Cape Peninsula University of Technology

FACULTY OF HEALTH AND WELLNESS SCIENCES
Department of Emergency Medical Science

ACCESS TO HEALTH CARE FOR HEALTH CARE CONSUMERS WITH MENTAL HEALTH NEEDS: AN EMERGENCY MEDICAL SERVICE PERSPECTIVE.

By

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DECLARATION

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DEDICATION

FOR

UNCLE WAYNE

"... DO OR DO NOT, THERE IS NO TRY ..."

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ABSTRACT

Background: Neuropsychiatric disorders (mental illness/mental disorders) rank third in their contribution to burden of disease in South Africa. The historical socio-political climate has created multiple socio-economic burdens such as mental illness, crime, poverty, trauma and inequality: all likely social determinants of mental illness. Mental health reforms were established with the Mental Health Care Act 17 of 2002 and included deinstitutionalisation and human rights awareness. However, insufficient compensatory community mental health care services prevail. This increase in mental illness and exacerbated poor mental health provides challenges for prehospital Emergency Medical Service (EMS) care and transportation of health care consumers with mental health emergencies or needs. The South African prehospital mental illness milieu provides for a theoretical lacuna. The EMS, as a component of the health sector, should be considered in championing the human rights prerogative in mental health care. This study sought to appraise and strengthen access to health care for health care consumers who presented to a public EMS with mental health needs and to promote interventions for ameliorating human rights.

Methods: The methodology followed a quantitative retrospective descriptive study design, through the paradigmatic lens of critical theory. A census of three years of Emergency Medical Service Incident Management Records from an EMS district was undertaken using an original data collection instrument. Data analysis was done with R Statistical Software, using Logistic regression models, Pearson's Chi-squared tests of association, Fisher's Exact test, ANOVA and Tukey's *post hoc* method to find associations.

Findings: Among the 2976 (N) Incident Management Records that met the inclusion criteria, 39.6% (N=1178) were regarded as having a mental illness and 59.7% (N=1776) were regarded as having a mental health emergency. Deliberate self-harm and overdose or deliberate self-poisoning presented in the majority of the health care consumers, with overdose accounting for 52%. Attempted Suicide and Suicide accounted a combined 5.8% of the health care consumers. Suicide averaged 2.8 suicides per month in the

Garden Route District over the 3-year period. Furthermore, age was not a valid predictor of attempted suicide, but a significant predictor for suicide, deliberate self-harm and overdose. The expected odds of a male attempting or committing suicide are more than two and five times respectively as high as odds of a female attempting suicide. Males are more likely than females to attempt or commit suicide. The expected odds of a female overdose or of deliberate self-harm are more than 2.8 and 2.4 times respectively as high as odds of a male overdose or deliberate self-harm. Females are more likely than males to deliberately self-harm and overdose. Males are more likely to use strangulation while females are more likely to use poisoning or overdose to commit suicide in the Garden Route District.

Conclusions and Recommendations: Mental Illness and mental health emergencies had a myriad of presentations in the Garden Route District over the 3-year period. The ambulance service does use the service of South African Police Services for combative health care consumers, while providing access to health care for mental health care users. It is recommended that further research is done, with consideration of change towards Section 40 of the Mental Health Care Act 17 of 2002. Recommendations toward a specific prehospital mental health care protocol are provided.

Keywords

Mental Illness; Poor Mental Health; Deliberate Self-Harm; Overdose; Suicide; Attempted Suicide; Retrospective Descriptive Study; Stigma; Human Rights; Critical Theory; Emergency Medical Services; Prehospital; Mental health promotion and protection

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ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
ANOVA	Analysis of Variance
BTech EMC	Bachelor of Technology: Emergency Medical Care
CPUT	Cape Peninsula University of Technology
DOH	Department of Health
DSH	Deliberate Self-Harm
DSP	Deliberate Self-Poison
EC	Emergency Care
ECP	Emergency Care Practitioner
ED	Emergency Department
EMC	Emergency Medical Care
EMS	Emergency Medical Services
GBD	Global Burden of Disease
GRD	Garden Route District
HIV	Human Immunodeficiency Virus
HPCSA	Health Professions Council of South Africa
IMR	Incident Management Record
NDip EMC	National Diploma: Emergency Medical Care
S.A	South Africa
WCEMS	Western Cape Emergency Medical Services
WHO	World Health Organisation

CHAPTER ONE: INTRODUCTION

Neuropsychiatric disorders (used interchangeably with the term 'Mental Disorders') rank 3rd in their contribution to burden of disease in South Africa (S.A) (Motsoaledi and Matsoso, 2013). Mental health reforms included deinstitutionalisation[1] but without establishing sufficient compensatory community mental health care services. Simultaneously, the historical socio-political climate has created a comorbid like relationship between mental illness, crime, poverty, trauma and inequality, likely factors for the festering of poor mental health. S.A endures a quadruple disease burden[2], providing sequela for mental illness. These exacerbated burdens and probable increase of mental illness provide challenges for prehospital Emergency Medical Service (EMS) transportation of voluntary and involuntary mental health care users. Research in South African prehospital mental illness management or transport suggests a theoretical lacuna. The EMS, as a component of the health sector, should be considered in championing the human rights prerogative in health care. This study sought to appraise and strengthen access to health care for health care consumers who present to a public EMS with mental health needs, to promote interventions for ameliorating human rights awareness for people with mental health needs.

1.1. Statement of Research Problem

The public EMS is responsible for the care and transport of public[3] mental health care users as well as being first-to-scene responders to mental illness emergencies[4] (Van Huyssteen, 2016). Deinstitutionalisation without compensatory community mental health care services, stigma and sequential growth in the burden of mental illness (World Health

[1] This is the downsizing of state mental hospitals with reduction on the number of chronic patients staying at a state hospital, with the development of community based mental health services, with mental health care at primary, secondary and tertiary levels of care (World Health Organization, 2003b).
[2] Quadruple disease burden is four colliding epidemics: maternal, newborn and child health; HIV/AIDS and tuberculosis; non-communicable diseases; violence and injury (Ataguba, Day and McIntyre, 2015)
[3] Referring to communities who can't afford private treatment
[4] Refers to suicide or attempted suicide usually also referred to involuntary mental health care users considered to be dangerous to the public and themselves. An emergency is a dangerous situation that needs to be dealt with immediately

Organization, 2003b) provides many challenges to access. Thus, the public EMS needs to appraise access[5] to health care for health care consumers with mental health needs, as a basis for interventions for ameliorating human rights transgressions.

1.2. Background of Research Problem

There is a growing burden of Mental Illness which impacts on health, social and human rights, with economic consequences for countries worldwide (Motsoaledi and Matsoso, 2013; Bitanihirwe, 2015). The World Health Organisation (WHO) elucidates the significance of mental health, advocating that all people with mental disorders should be protected from discrimination and inhumane treatment, having the right to acquire high quality treatment and care, delivered by responsive health care services (World Health Organization, 2003a). As a health care institution, and an assumption of this study, the EMS must diversify to uphold and withstand changing climates of mental illness, poor mental health and Deliberate Self-Harm (DSH).

1.2.1. Prevalence of Mental Illness

Mental Illness is a global crisis and is seen as a pandemic of the 21st century as it is a compelling cause of global morbidity and mortality. The World Health Organisation (WHO) states that at least 700 million people worldwide were affected with behavioural, mental or neurological problems in 2010 (Patel and Saxena, 2014; Shaban, 2004). Shaban (2004) ratifies that mental illness disorders constitute 12% of the global burden of disease while the WHO estimated a rise to 15% by 2020[6] with protracted mental health problems globally, becoming the leading cause of morbidity and mortality by 2030 (World Health Organization, 2003b; Mental Health Foundation, 2016). This burden exceeds diseases like heart disease, cancer, AIDS, tuberculosis and malaria; while suicide deaths approximate 873 000 people per year (Shaban, 2004). Depression is most prevalent of mental disorders, while major depression (associated with psychiatric diagnosis) is most commonly associated to suicide with 20% of people with untreated depressive disorder

[5] In terms of "rights of access", the socio-economic rights (27), the right of access to health care services (Hassim, Heywood and Berger, 2007)

[6] This estimation preceded the Covid-19 Pandemic and is likely to exacerbate the burden of associated mental illness.

attempting or committing suicide (American Association for Suicidology, 2009). DSH has been found to be the leading indicator towards suicide among adolescents and has been defined as one's ability to inflict bodily self-harm, notwithstanding any mortality intention, eventually culminating in attempted or suicide (Arkins *et al.*, 2013; Lauw, How and Loh, 2015). Keyes (2014) further explained poor mental health to also be an indicator towards mental illness, suggesting a person who doesn't have flourishing mental health is more likely to develop a mental illness (Keyes, 2014; Keyes, 2007).

The comorbidity risk associated with mental illness, communicable disease, non-communicable disease and poverty[7] includes diminished immune functioning, poor health behaviour and unfavourable disease outcomes (World Health Organization, 2003b; Motsoaledi and Matsoso, 2013). S.A is a middle-income country plagued by social, political and economic injustices. With a population of 59 million (Stats SA, 2019), S.A has numerous societal-level socioeconomic risk factors for mental illness (Burns, 2011). Neuropsychiatric disorders (Mental Disorders/illness) rank 3rd in their contribution to burden of disease in S.A, after HIV/AIDS and other infectious diseases (Motsoaledi and Matsoso, 2013). S.A has a quadruple disease burden[8], antagonising mental illness comorbidity and exacerbating mental illness through compounding variables[9] (Motsoaledi and Matsoso, 2013). S.A is the epicentre for the HIV/AIDS pandemic in Sub-Saharan Africa, being home to the largest number of people living with HIV/AIDS worldwide, whilst fifty percent of the population live in poverty (Burns, 2011). It is pertinent to understand the comorbidity between HIV/AIDS and mental illness in S.A, as both conditions coexist in a complex relationship with both phenomena having a high prevalence for comorbidity that impacts on and is exacerbated through either condition, both being mutually reinforcing risk factors (Motsoaledi and Matsoso, 2013). This impacts on poor mental health, which leads to mental illness (Iasiello *et al.*, 2019; Keyes, 2007).

[7] Poverty is a vicious cycle that aids in increase poor mental health, while poor mental health aids in poverty (Motsoaledi and Matsoso, 2013)

[8] Quadruple disease burden is four colliding epidemics: maternal, newborn and child health; HIV/AIDS and tuberculosis; non-communicable diseases; violence and injury (Ataguba, Day and McIntyre, 2015)

[9] These variables pertain to violence and crime, poverty, trauma and inequality (Burns, 2011).

1.2.2. Legislative imperatives

Legislation, when used as a framework for policy development can enforce rights that protect people with mental disorders from discrimination and human rights violations through improved access to health care (World Health Organization, 2005). The WHO elaborate that governments can negatively affect the mental health of populations at policy level; with poor policies and reforms likely to aid in mental status through socio-economic factors such as poverty, urbanization, homelessness, unemployment, lack of education and decentralisation-these socioeconomic factors are inextricably interlinked (World Health Organization, 2003b).

Health care responses to Mental Illness in S.A is governed by the Mental Health Care Act of 2002. This act focuses on eradicating stigma, disempowerment and alienation through championing human rights and deinstitutionalisation (Burns, 2008). The Mental Health Care Act of 2002 has not been as successful as planned, as no standardised Mental Health Care policy emerged, thus jeopardising the significance of the act (Lund *et al.*, 2011). In relation to the EMS, the Mental Health Care Act of 2002 (section 40)[10] specifies guidelines for combative involuntary mental health care users exclusively (Parliament of South Africa, 2002; Thom, 2003). The public EMS are responsible for the care and transport of public mental health care users as well as being first to scene responders to mental illness emergencies (Van Huyssteen, 2016). The role of the EMS is statute to the socio-economic[11] rights in the Bill of Rights in section 27 of the Constitution (Hassim, Heywood and Berger, 2007; RSA Constitution, 2005), when corroborated with section 40 of the Mental Health Care Act the postulation of access to mental health care should be assumed (Mental Health Care Act 17 of 2002, 2002) however stigma remains a barrier.

The state has a duty to fulfil the socio-economic rights. The “right to access” is synonymous with section 25-28 in the Bill of Rights and deals with the access people

[10] Where a mentally incapacitated person is seen to be of harm to themselves or their surroundings, the South African Police Service (SAPS) must be contacted for assistance in relation to restraint (mechanical or chemical). The SAPS and the Emergency Medical Provider will transport the person to the appropriate facility (Mental Health Care Act 17 of 2002, 2002) (Thom, 2003).

[11] Fundamental rights consisting of civil, political, social, economic rights. Social and economic rights function together and focus on “rights of access”, section 24 to 29 (Constitution of South Africa, 2005)

have to basic services and needs (Jansen van Rensburg, 2003; Moyo, 2013). One only needs to refer to the reputation of "right of access", through the *Soobramoney*[12] and *Grootboom*[13] cases, which, when amalgamated, defines access to socio-economic rights as an imperative (Hassim, Heywood and Berger, 2007). The Constitution of South Africa encompasses the validity of the *Soobramoney* and *Grootboom* cases, defining access to socio-economic rights as unqualified[14] and qualified[15], maintaining that through available resources[16] and progressive realisation[17], each right could be achieved (Moyo, 2013). In a case known as the *TAC*[18] case, the socio-economic rights were championed as the *TAC* case presented the state with a dilemma, allowing for the ideology of *Soobramoney* and *Grootboom* cases to be fully affected. It was initiated that prioritisation for major public health needs and emergency short, medium and long term plans are required by the state (Hassim, Heywood and Berger, 2007). Therefore, access to health care for health care consumers with mental health needs was imperative from an emergency medical service point of view, the proverbial gateway to access of health care for many marginalised groups.

1.2.3. Human rights vulnerability and protection

People with mental illness are considered a marginalised group, requiring human-rights-orientated mental health legislation, as this group experiences numerous human rights violations, stigma, discrimination and economic marginalisation. Often exposed to inhumane conditions, the WHO expresses the cruelty of treatment of involuntary mental health care users in psychiatric institutions, while the idea of being mentally ill manifests with sexual exploitation and physical abuse (World Health Organization, 2003b; World

[12] *Soobramoney v Minister of Health (KwaZulu-Natal) 1998 (1) SA 765 (CC)*-first constitutional court case on right of access to health care (Hassim, Heywood and Berger, 2007)
[13] *Government of the Republic of South Africa v Grootboom 2001 (1) SA 46 (CC)*-further helps define the rights of access to socio-economic rights (Hassim, Heywood and Berger, 2007)
[14] Rights the state must carry out (e.g. children's right to basic services) (SA Government, 2007)
[15] Delivery of these rights depends on factors like availability of money (e.g. the right of access to health care) (SA Government, 2007)
[16] Available resources include things like people, materials, technology and money (SA Government, 2007)
[17] Progressive realisation is the state's responsibility to make provision within its available resources to give people their qualified socio-economic rights over a period of time (SA Government, 2007)
[18] *Minister of Health v Treatment Action Campaign (No 2) 2002 (5) SA 721 (CC)*-the *TAC case* gives further explanation on improving rights of access (Jansen van Rensburg, 2003)

Health Organization, 2005). This perception nuances human rights and forecasts unfair employment opportunities, and limited access to services (healthcare, insurance and housing)(World Health Organization, 2005). It is evident that abstract semantic qualifiers aid in stigma and poor access to human rights and health care. Zartaloudi and Madianos (2010) suggest stigma of mental illness aids in discrimination against mental health care users, with poor development in mental health care policy and reform (Zartaloudi and Madianos, 2010). Notably, in a study done on *"Attitudes towards stigma"* it was concluded that stigma has resulted in less prioritization of public resources to mental health services and diminished access to quality of care delivered to mental health care users (Southgate, 1993).

Poverty intersects mental illness. Poverty is reciprocated through developed mental disorders from stress of poverty, while having a mental disorder enhances the likelihood of poverty through health care expenditure, reduced productivity and loss of employment (Motsoaledi and Matsoso, 2013). Deinstitutionalisation (which could help bear the brunt of poverty for institutionalised mentally ill patients) is a complex process of de-hospitalisation that creates an alternative network outside mental hospitals to serve mental health care users, however many concepts of deinstitutionalisation was not accompanied by the development of appropriate policy and compensatory community mental health care services (World Health Organization, 2003b). A pertinent example of human rights violations towards mentally ill people is the Life Esidimeni[19] tragedy where deinstitutionalisation, a core principle of the Mental Health Care Act (Makgoba, 2017) failed to attenuate stigma while violating human rights conditions through poor access to proper health care (Makgoba, 2017). Thus, governments must acknowledge that mental health is a fundamental human value, with protection of the rights of people with mental disorders, as a state obligation (World Health Organization, 2005). The deinstitutionalisation of mentally ill people has added to the significance of the EMS, as the EMS is the 'vehicle' that enables the movement of health care consumers from institutions to other places of care or residence. It was prudent then, for access to health

[19] The tragic death of 143 people at psychiatric facilities mainly from starvation and neglect, named Life Esidimeni tragedy (L. Naidoo, 2017).

care for mentally ill people and health care consumers with mental health needs to be better understood and for the EMS role to be better defined.

1.2.4. Motivation for the study

In an interview with Dr Schaffer from the psychiatric component at George Provincial Hospital, a gradual increase in psychiatric treatment for voluntary and involuntary mental health care users had been noted over time (Schaffer, 2018). Dr Schaffer refers to the social determinates of health as an underlying cause for increase in mental health care users and ratifies stigma and poor access to health care as a challenge, creating confounding effects for the all-round functioning of mental illness treatment. There was further elucidation that poor mental health, along with DSH adds to the maleficence of mental illness protagonist, while putting a burden on the already burdened government system. This phenomenon of mental illness in the prehospital setting may mimic abstract semantic qualifiers such[20] as drug induced psychosis or genuine mental illness. This refers to the mimic of abstracting semantics whereby the concept of being intoxicated can be assumed, whereas the presentation of a mental condition can mimic the nuance of alcohol or drug abuse and where by drug and alcohol abuse mimic mental illness signs and symptoms, thus throwing in constructs that can obfuscate one's ability to judge the case. One relies on their intuition and experience rather than their ability to fully diagnose the health care consumer with diagnostic reasoning (Bowen, Cox and Irby, 2006). The plausible lacuna that needed to be prioritised, was how this significant increase in mental illness, poor mental health and DSH health care consumers is responded to by the public EMS.

The public EMS is responsible for the prehospital care and transport of and access to health care for the majority of poverty-stricken people. The role of the EMS as a service provider to all types of health care consumers with prevailing illness is to provide access to health care through treatment and transport to medical facilities. The EMS deals with

[20] Abstract semantic qualifiers are critical reasoning whereby representations can trigger patterns creating a predictable structure as an analytic or non-analytic anchor point. These descriptors can be used to compare and contrast (Bowen, Cox and Irby, 2006).

mental health care users daily, often treating many with comorbidities, transporting restless, calm mental illness health care consumers as well as having to deal with self-harm (overdoses and bodily harm) attempted suicides, combative fighting mentally ill people and health care consumers with mental illness who refuse to be medically helped but need medical help urgently (involuntary). The EMS also attends to DSH[21], the collective description for suicides, attempted suicides, overdoses and bodily self-harm which effectively aids in mental illness from poor mental health (Keyes, 2014). Section 40 of the Mental Health Care Act provides a nuance for human rights, allowing police to manage involuntary mental health care users (Naidoo, 2017; Lund *et al.*, 2011; Van Huyssteen, 2016), however there has been no reprieve, as the concept of increase in mental illness, crime, poverty and public service sector staff shortage[22] presents a larger challenge when dual service of police and EMS needs to attend the same involuntary mental health care user complaint (Van Huyssteen, 2016).

It is not in dispute that mental illness contributes to the burden of disease in the Western Cape (Jacob and Coetzee, 2018) while it was acknowledged by Dr Schaffer (2018) that cases of mental illness is on the rise in the Garden Route district (GRD). The concept that was investigated is if this increase of mental illness has been deliberated by the EMS to provide access to health care for this increase in mental health care users. The significance of this rise in mental illness needed to be investigated through a poor mental health[23] lens whereby poor mental health can lead to mental illness. Mental illness carries proliferated stigma and human rights violations, coupled by the concept of police transport being used, the risk to access to health care is substantiated.

There was a need to quantify the burden of mental illness and poor mental health from the perspective of the EMS in the GRD to appraise the EMS exposure to mental health care users, and investigate how the EMS may be predisposed to ameliorate human rights and attenuate stigma. The concept of mental illness and the EMS is uncharted territory

[21] DSH usually implies to self-harm without the intent to die, but is the leading indicator towards suicide. For this research DSH will include attempted suicides, suicides, bodily self-harm and overdoses as the collective broader category name. Suicide and attempted suicide will be referred to separately, when a point is prudent.
[22] Public service sector staff shortage is described as skills shortages to do certain jobs, affecting the greater scheme of staff shortages in the public service (Daniels, 2007)
[23] Poor mental health is a consequence of the social determinants of mental health (Compton and Shim, 2017)

as no official protocol exists in S.A that provides direction for the handling of mentally ill health care consumers, notwithstanding that protocols are set up for dealing with other medical conditions. The need to appraise access to health care for health care consumers who presented to a public EMS with mental health needs was a significant start to understanding the phenomenon of mental illness and poor mental health in the EMS setting. This significance was detailed as deinstitutionalisation was instituted with no compensatory community mental health care services being created.

1.3. Significance of the Study

The significance of this research is expressed through the World Health Organisations stance on the significance of mental health, whereby it is elucidated that all people with mental disorders should be protected from discrimination and inhumane treatment, having the right to acquire high quality treatment and care, delivered by responsive health care services (World Health Organization, 2003a). The burden of mental illness has proliferated, with neuropsychiatric disorders ranking 3rd in their contribution to burden of disease in S.A, after HIV/AIDS and other infectious diseases (Motsoaledi and Matsoso, 2013). Festering in a quadruple disease burden country, S.A expresses many variables[24] to exacerbate comorbidity for mental illness (Motsoaledi and Matsoso, 2013) while harvesting societal-level socioeconomic risk factors for mental illness (Burns, 2011), like the social determinants of mental health (Compton and Shim, 2017). It is proven that poor mental health and DSH exacerbate mental illness sequela (Keyes, 2014; Arkins *et al.*, 2013).

Research and evidence-based care for mental health care users pertains to hospital evidence and research, and completely bypasses the reforms in the EMS. Upon commencement of this research topic, it was established that mental health care users have increased substantially in the last 2 years in the GRD while very little evidence-based research in mental illness is available in the South African EMS or prehospital setting. The challenge faced by the author is that before any significant changes can be implemented the author needs to prove if the increase in mental health care users is

[24] These variables pertain to violence and crime, poverty, trauma and inequality (Burns, 2011).

significant enough to derail the provision of access to health care from an EMS perspective. The concept of quantising an increase will be the roots to an improved concept of scrutinising access to health care for a marginalised group. By appraising access to health care for health care consumers who present to a public EMS with mental health needs, the author can open up the path to promote change and enhance forensic-accountability[25] (Waldron, 2014).

1.4. Researchers Positionality

In authenticity the author is a novice researcher with a NDip and BTech in Emergency Medical Care (EMC) qualifications. Having been in the employ of the Western Cape Emergency Medical Services (WCEMS) as an operational Emergency Care Practitioner for eight years one has become exposed to the vulnerable, the marginalised and the socieo-inequalities in life. People with mental illness and mental health needs are always vulnerable, a marginalised group bound to stigma. Vulnerability and the lack of taking accountability for the vulnerable has become a tainted perception in the medical milieu. One needs only to take into context the Life Esidimeni[26] tragedy to expose the flaws of vulnerability amongst the mentally ill, amongst care workers and amongst role-players.

From professional experiences, the author has been exposed to the vulnerability experienced by people with mental illness and as an Emergency Care Practitioner felt the accountability to champion this marginalised group. Mental illness is not considered as serious as other medical conditions. The law governing involuntary mental health care users allows the S.A police to handle mentally ill health care users, supplying more stigma to an already stigmatised group. Justice occurs when you prioritise the vulnerable and accountability occurs when one accepts consequences of their actions for the responsibilities they assume. Embedded in treating a rising phenomenon, the author is not an agent of the WCEMS Communications Centre and could not influence the data.

[25] "…forensic accountability applies to any situation where a person's actions are assessed impartially on the basis of a pre-established standard…" (Waldron, 2014, pp. 1-2; N. Naidoo, 2017). Accountability is a person's liability to have a person's actions assessed by a tribunal based on an established norm (N. Naidoo, 2017; Waldron, 2014). Forensic denotes to the judicial paradigm that is involved (N. Naidoo, 2017; Waldron, 2014).

[26] The tragic death of 143 people at psychiatric facilities mainly from starvation and neglect, named Life Esidimeni tragedy (L. Naidoo, 2017).

The researcher endeavours to be an actor for the EMS prerogative and not an agent for the employer.

1.5. Aim

To appraise access to health care for health care consumers who present to a public EMS with mental health needs.

> *'Appraise' means assessing the value or quality of…a formal assessment of performance. Appraise in this proposal will be the formal assessment of assessing access to health care for health care consumers with mental health needs*
>
> *'Access to health care' means the right or opportunity to use or benefit from something implies access to health care or (in terms of rights of access) the socio-economic rights (27) and the right of access to health care services (Hassim, Heywood and Berger, 2007). Access to health care is an important component promoting the right of access to health care for a marginalised group such as those with mental illness.*

1.6. Research Question

How can the Emergency Medical Services increase its value proposition[27] for access to health care for health care consumers suffering from mental illness, poor mental health and deliberate self-harm?

1.7. Objectives

I. Quantify the burden of mental illness cases for the EMS.
II. Describe the problem space[28] that emergency medical services are located in with regards to care and transportation of health care consumers with mental illness.

[27] Value proposition is the premise of value to be delivered and acknowledged, whereby the belief of how value will be acquired, delivered and experienced by a customer. For this thesis, this would be the health care consumers.
[28] Problem Space is the arena of a range of components that are found when searching for a solution to a problem. Here problem space would be the components to the problems being questioned.

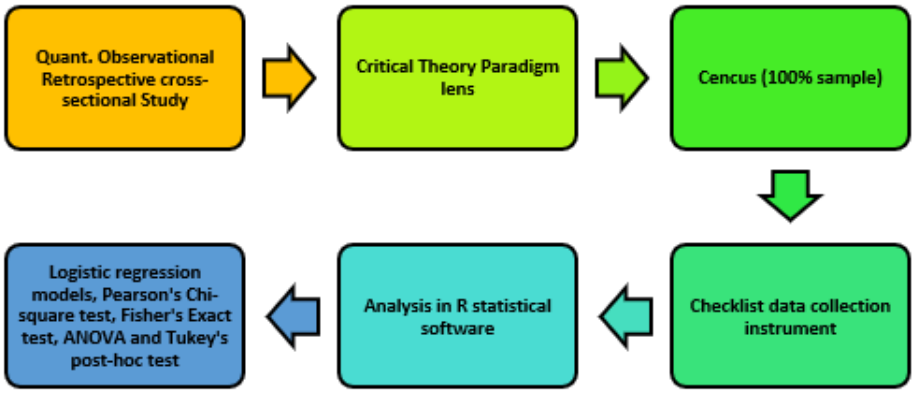
III. Describe the problem space that emergency medical services are located in, with regards to deliberate self-harm and poor mental health.

IV. Investigate the association between EMS practice and health care consumer poor mental health, deliberate self-harm and mental illness burden.

1.8. Research Design and Paradigm

The research design chosen for this study was a quantitative observational Retrospective Cross-Sectional Study viewed through the Critical Theory paradigm. The data for the study was obtained by undertaking a census (100% sample) of EMS cases in the GRD from the years 2017 to 2019 that met the inclusion criteria. Sampling—drawing a subset of units from the population of cases—was deemed unnecessary since, although labour-intensive, it was feasible to obtain and capture data on the whole target population of cases over this three-year period. Data was collected with a checklist-styled data collection instrument. This data was then captured manually into an Excel® spreadsheet, which was cleaned and analysed in R statistical software (R Core Team, 2020). The research was conducted in the district of the GRD in the Western Cape Province through the WCEMS.

Figure 1: Process of research design



1.9. Assumptions and Structure of Study

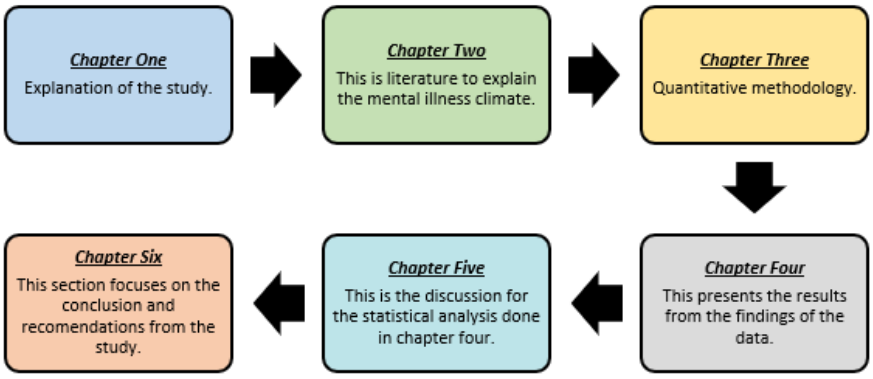
1.9.1. Assumptions

It is assumed that mental illness is a growing burden to society, and will become the leading cause of morbidity and mortality by 2030 (Keyes, 2014). It is also assumed that poor mental health results in negative mental illness sequela, while DSH is the earliest indicator for suicide (Keyes, 2014; Arkins *et al.*, 2013). Mental illness carries devastating impact to families and societies and it was assumed that health care consumers who presented to the public EMS with overdose, bodily self-harm and attempted suicide suffered from poor mental health, cascading into DSH. More impetus is needed in mental health reforms to improve access to mental health care as a marginalised group. Positive mental health is assumed to be the area of emerging opportunity. Positive mental health provides the ability for a flourishing life, while poor mental health has proven to display development of mental illness sequela (Keyes, 2007). It is assumed that health care consumers with DSH, mental illness and poor mental health are attended to by the public EMS, while it is assumed that the public EMS functions within the social determinants of health milieu and is subjected to interaction with individuals enduring the social determinants of mental health.

1.9.2. Structure of the Study

Chapter One is the explanation of the study, derived from the proposal. Explaining the concept and motivation for the study. Chapter Two is a literature review to explain the mental illness climate, as close to an EMS perspective as possible. Chapter Three provides perspective of the methodology, a quantitative descriptive retrospective design with the paradigmatic lens of critical theory. A census (100% sample) was used as a sample method. A data collection tool was designed to extract evaluands. Chapter Four presents the results from the findings of the statistical analysis, providing evaluands and inferences. Chapter Five is the discussion on the statistical analysis done in Chapter Four, with views and discussion about inferences and evaluands put into perspective. Chapter Six focuses on the conclusion and recommendations from the study.

Figure 2: Structure of the Study



1.10. Definition of Terms

This section provides definition to certain terms and concepts used throughout the study, and is important when providing context to the study. The terms are: Mental Illness; Emergency Care; Prehospital/out-of-hospital; Emergency Medical Services; Emergency Care provider; Suicide; Deliberate Self-Harm; Stigma; Mental Health Care Act.

1.10.1. Mental Illness

Mental illness or mental disorders are terms used interchangeably in the literature. The need to grasp the most appropriate phenomenon is important in attenuating the stigma reputable to mental illness and mental disorder. For this research the author chooses to use the term Mental Illness. Mental illness refers collectively to all diagnosable mental disorders within the mental illness spectrum (Goldman and Grob, 2006). The feeling of stigma surrounds the concept of disorder and by categorising a health care consumer with a mental disorder under the term mental illness, could remove the perversity associated with mental disorder. The concept needs to be considered in a holistic perspective. Mental illness defines the collective problem while disorder aids in pretence to a specific problem of mental illness. Mental illness is a complexed term to define. The concept of mental illness, mental disorder and mental health all refer to each other in one or another way (Leighton and Dogra, 2009), which aids in the complication of such a diverse subject. The prehospital milieu consists of many surroundings, dimensions and paradigms different to the hospital environment. The EMS has to operate through these

variables, being exposed to poor mental health, social determinants of mental health, deliberate self-harm and mental illness. Mental Illness knowns no race, gender or age, however dimensional perspective and traits of mental illness are seen as normal behavior, depending the culture (Leighton and Dogra, 2009). Thus, based on South African culture, history and diversity the EMS needs a more robust, diverse definition of mental illness. Notably mental health defines mental well-being and mental illness defines having a diagnosed mental disorder, as per DSM. Therefore, mental illness for this research (made up from many ideologies on mental illness) will be defined as (this is not a direct quote):

> …Mental illness is the broad range term of mental disorders which is characterized by disturbances in an individual's cognition, emotion regulation or behavior which reflects a psychological, biological or developmental dysfunction (Telles-Correia, 2018). Poor mental health can exacerbate mental illness and decreased cognitive, behavioral and emotional well-being changing the dynamic state of internal equilibrium (Galderisi *et al.*, 2015). Deliberate Self-Harm (DSH), considered holistically in the prehospital environment as suicides, attempted suicides, overdoses and bodily self-harm, can be an indication towards underlying mental illness (Arkins *et al.*, 2013), while common examples of mental illnesses are schizophrenia, depression, Bipolar disorder, Autism, Substance abuse, anxiety, PTSD, Delirium, Dementia and Alzheimer's. Social determinants of health[29] benefits poor mental health which benefits mental illness... (Telles-Correia, 2018; Galderisi et al., 2015).

1.10.2. Emergency Care (EC)

Emergency Care (EC) in the prehospital or out-of-hospital milieu, is acute care usually practiced by health care professionals, registered with the Health Professions Council of

[29] It is understood that one's health is not solely affected by healthcare or lack of access to healthcare services but could be a result of multidimensional complex factors namely the "social determinants of health" (Ataguba, Day and McIntyre, 2015)**.** These determinants include a range of social, economic, environmental, political and cultural factors.

South Africa (HPCSA), as per the Health Professions Act 56 of 1974 (Health Professions Act 56 of 1974, 2009). There are a range of emergency care registration categories from basic to advanced life support registered with the HPCSA. For this thesis all qualification levels are referred to as Emergency Care (EC) providers. The Health Professions Act 56 of 1974 provides the legal framework for practicing EC, and requires any person who practices EC to have professional registration with the Professional Board of Emergency Care (PBEC). The prehospital EC arena has different scopes of practice for registered qualifications, that individuals may not exceed (Health Professions Act 56 of 1974, 2009).

EC is defined by the *African Federation of Emergency Medicine (AFEM)* as a medical specialty that delivers time sensitive care to people with an acute illness or injury (Mould-Millman *et al.*, 2019; Naidoo, 2017). The Health Professions Act 56 of 1974 stipulates EC to be the evaluation, rescue, treatment and care of acutely sick or injured patients within an emergency situation, with continuity of care and treatment while transporting the patient to or between health care facilities (Health Professions Act, 2009; Naidoo, 2017). 'Acute' usually refers to emergency, encompassing a comprehensive system-based approach to time-sensitive disease. This EC (acute) approach uses all health system components to diagnose, treat and manage illness or injury. This effective (but not necessarily efficient) approach to health care provides a response to extreme risk under intense time pressure (Naidoo, 2017; Reynolds *et al.*, 2014).

Notably, the EMS practices emergency medicine (Naidoo, 2017; Christopher *et al.*, 2014). EC in the prehospital setting has helped to manage, diagnose and treat injury and illness while providing health action to address emergent health conditions (N. Naidoo, 2017). It needs to be considered that "Emergency medicine is the only discipline with 'universality' and 'responsivity' at the point of need. This implies the widespread potential for facilitation of access to health care" (Christopher *et al.*, 2014, pp. 156; N. Naidoo, 2017). EC was defined for this thesis as it is the discipline provided in part by the EMS, the milieu for the scope of the thesis and the acute care needed for many of the health care consumers presenting to the public EMS with mental health needs.

1.10.3. Prehospital / Out-of-hospital care

Prehospital or Out-of-hospital are concepts synonymous with the EMS prerogative, and is referred to the milieu serviced by the EMS prior to hospital transportation usually providing prehospital or out of hospital care, whereby emergency services are render to health care consumers for stabilizing, analytic, resuscitative or preventative purposes. This service is usually referred to as a paramedic service. This service is provided before and during the emergency medical service transportation of the health care consumer to a health care facility. The priority is to provide early medical interventions in the community to increase the chance of life (Sasser *et al.*, 2005; Thomas *et al.*, 2012).

1.10.4. Emergency Medical Services (EMS)

EMS pertains to prehospital or out-of-hospital services whereby time sensitive Emergency Care is practiced. The EMS provides early activation for early medical interventions for the prehospital milieu, offering Basic, Intermediate and Advanced Life Support for the stabilizing, resuscitative, preventative purpose and transportation of health care consumers to health care facilities and between health care facilities (Kobusingye *et al.*, 2006). The EMS is first to scene responders to many emergencies. The EMS usually functions with ambulances, medical response vehicles and medical rescue vehicles (mainly for accidents). The EMS within the South African context is comprised of the public EMS which is run by the Department of Health within each province and private EMS companies, functioning mainly within the private health sector. The public EMS provides a service to those who generally cannot afford a medical aid. The private EMS usually provides a service to medical aid or paying health care consumers.

1.10.5. Emergency Care provider (EC provider)

Emergency Care provider or EC provider is the collective term used for people working in the EMS. Collectively EC provider will consist of the makeup of Basic, Intermediate and Advanced Life Support. Collectively all disciplines provide some sort of level of emergency care, depending the qualification (Health Professions Act 56 of 1974, 2009).

Basic (BAA), Intermediate (AEA) and Advanced Life Support (CCA/ECT/NDip/Btech) are older qualifications within prehospital Emergency Care, still registered today in accordance with the Health Professions Council of South Africa (HPCSA) and Health Professions Act 56 of 1974 (Health Professions Act 56 of 1974, 2009; HPCSA, 2017). In advancing the profession of prehospital Emergency Care, the profession of Emergency Medical Care has been aligned to the National Qualifications Framework (NQF). These qualifications are Emergency Care Assistant (ECA) at NQF5, National diploma in Emergency Medical Care (NDip EMC) at NQF 6 and a Bachelor's degree in Emergency Medical Care (BEMC) at NQF 8. The BEMC carries the highest qualification as an Emergency Care Practitioner and still considered Advanced Life Support. These new qualifications filter into the old qualifications creating the EMS. For this thesis EC provider will stand for the collective of all these disciplines of emergency care within the EMS, namely Emergency Care providers. These qualifications require registration with the HPCSA as per the Health Professions Act 56 of 1974 and provide different scope of practice that individuals may not exceed (Health Professions Act 56 of 1974, 2009). The Health Professions Act 56 of 1974 provides the legal framework for practicing Emergency Care, and requires any person who practices Emergency Care to have professional registration with the Professional Board of Emergency Care (PBEC). (Health Professions Act 56 of 1974, 2009)

1.10.6. Suicide

The word suicide authenticated in the 17th century from the Latin words *sui* (of oneself) and *caedere* (to kill). Suicide was used to distinguish between homicide of oneself and murder of another (De Leo *et al.*, 2006). Suicide is defined as:

> "…Suicide is an act with fatal outcome, which the deceased, knowing or expecting a potentially fatal outcome, has initiated and carried out with the purpose of bringing about wanted change…*"* (De Leo *et al.*, 2006, pp. 12).

Globally, about 800 thousand people commit suicide yearly, averaging one person every 40 seconds (Klonsky, May and Saffer, 2016). Suicidal ideation[30] and progression from

[30] Suicidal ideation is suicidal thoughts, suicidal thoughts towards death

ideation to suicide attempts are two distinct phenomena that produce explanations and predictors towards eventual suicide. An ideation-to-action framework provides literature behind dealing with suicide ideation and has proven DSH and depression to be an accurate indication for early suicide and suicidal ideation (Klonsky, May and Saffer, 2016).

1.10.7. Deliberate Self-Harm (DSH)

Deliberate self-Harm (DSH) is the concept whereby a person will inflict bodily harm to themselves, usually without the intention to die. Much research proves that DSH is one of the leading causes and indicators to suicide and has found to be present in many attempted suicides and suicide history (Arkins *et al.*, 2013; Lauw, How and Loh, 2015). For this research DSH will refer to any deliberate bodily harm (self-harm), as well as suicide, attempted suicide and overdose. The intention is not to down play attempted and suicide ideation and thus will refer individually to attempted and suicide ideation where the relevance is important. DSH provides a broader category name to group these deliberate acts of self-harm. In the end, suicide is the most fatal form and conclusion to DSH.

1.10.8. Stigma

'Stigma' is from 'stigmata', Greek for 'mark of shame', in reference to mental illness is a multifaceted construct involving feelings, attitudes and behaviours (Zartaloudi and Madianos, 2010).

1.10.9. Health Care Consumer

Health Care Consumer is the universal name given to people who use health services. In this research a health care consumer is the name given to those who require the WCEMS. Health care consumer recognises that those with mental illness or emergencies retain their autonomy and are not objects of medical care.

1.10.10. Mental Health Care Act 17 of 2002

> "…To provide for the care, treatment and rehabilitation of persons who are mentally ill; to set out different procedures to be followed in the admission of such

persons; to establish Review Boards in respect of every health establishment; to determine their powers and functions; to provide for the care and administration of the property of mentally ill persons; to repeal certain laws; and to provide for matters connected therewith…" (Parliament of South Africa, 2002, pp.1).

The following terms are found within the Mental Health care act:

Mental health care practitioner

→ *A psychiatrist or registered medical practitioner or a nurse, occupational therapist, psychologist or social worker who has been trained to provide prescribed mental health care, treatment and rehabilitation services.* (Mental Health Care Act 17 of 2002, 2002, pp. 6)

Mental health care user

→ *A person receiving care, treatment and rehabilitation services or using a health service at a health establishment aimed at enhancing the mental health status of a user, state patient and mentally ill prisoner. Usually voluntary.* (Mental Health Care Act 17 of 2002, 2002, pp. 6)

Involuntary mental health care user

→ *A person receiving involuntary care, treatment and rehabilitation.* (Mental Health Care Act 17 of 2002, 2002, pp.6)

CONCLUSION

In concluding Chapter One, a synopsis of the study was drawn. Mental illness carries stigma and possess many challenges in the Western Cape (Corrigall *et al.*, 2007) contributing significantly to the burden of disease in the Western Cape (Jacob and Coetzee, 2018). There exists a rise in public mental health care users within the Garden Route District of the Western Cape (Schaffer, 2018). The question this study sought to address was how this increase manifested in the EMS. This study sought to appraise and strengthen access to health care for health care consumers who present to a public EMS with mental health needs, to promote interventions for ameliorating human rights. The design of the study looked to quantify the mental illness phenomenon through a descriptive analysis whereby census sampling was used to look through retrospective

archive data in the Garden Route District WCEMS Communications Centre. Keyes (2014) explains positive mental health to provide a person as flourishing, while poor mental health causes a person to be languishing, leading to mental illness over time (Keyes, 2014). The study targeted DSH emergencies that provide an expression of the EMS burden (as a proxy measure) and the diagnosed mental illness health care consumer, who needed the public EMS. DSH is considered a good indicator of poor mental health (Arkins *et al.*, 2013).

Therefore, Chapter One explains the gap in the knowledge and the layout of the study. Chapter Two is the Literature Review and provides the literature around the mental illness phenomenon. A theoretical lacuna present in prehospital EMS mental illness or mental health care milieu provided a challenge and thus is what the researcher envisages as paramount to where the prehospital EMS and Emergency Care providers would locate. Chapter Three focuses on the methodology of the research. The methodology has a quantitative descriptive design, using retrospective data that has been census sampled. Chapter Four is the statistical analysis of the results from the data collection. Chapter Five focuses on the discussion of the results from the data collection. Chapter Six provides recommendations and conclusions from the study, enhancing new perspectives.

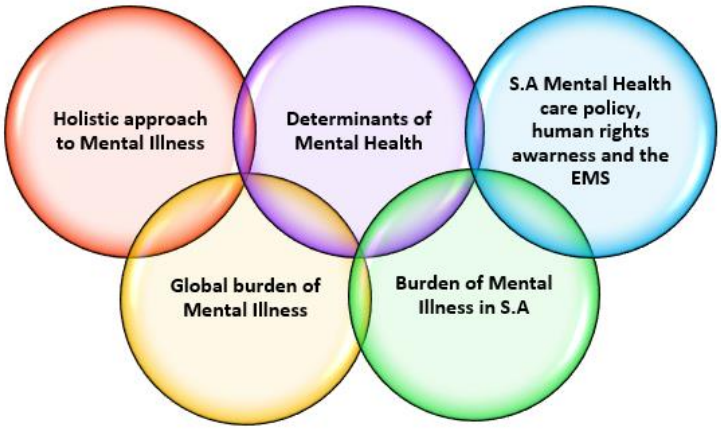
CHAPTER TWO: LITERATURE REVIEW

INTRODUCTION

This literature review will focus on topics related to the field of mental illness within the South African prehospital milieu. The EMS attend to health care consumers with mental illness emergencies and poor mental health. The fields of mental illness and mental health are both broad, empirically embedded in psychology, psychiatry and more importantly robustly studied in high-income countries. The robustness of systematic reviews on qualitative and quantitative research within the mental illness milieu is not as vast in low- to middle-income countries. High-income countries have also produced empirical knowledge and data around mental illness in the prehospital Emergency Medical Care setting. Mental illness, Emergency Medical Care and South Africa was a search string that didn't produce enough evidence, suggestive of a theoretical lacuna within the prehospital mental illness Emergency Medical Care environment.

A narrative review suggested that the secondary literature that best elucidated and intersected the research was grouped as Holistic approach to Mental Illness, Global burden of Mental Illness, Determinants of Mental Health, Burden of Mental Illness in South Africa and South Africa Mental Health care policy, human rights awareness and the EMS. Being a narrative review, the secondary evidence used was selective without being explicit (Paré *et al.*, 2015). These groups are further unpacked in sub sections under each section.

Figure 3: Relationship between areas of literature



2.1. Holistic approach to Mental Illness

The holistic approach to mental illness is where the author envisaged mental illness and mental health should be combined to be looked at in a symbiotic relationship. Poor mental health leads to mental illness and such the authors explores the avenue of combining the idea of promoting and protecting mental health and mental illness. A person with mental illness can still have positive mental health. Capacity could also be cited to help promote positive mental health.

Mental illness or mental disorder are terms used interchangeably, subjecting confusion in the right classification of term. The need to grasp the right definition of this concept is important in attenuating the stigma reputable to mental illness and mental disorder. For this research the rapport of Mental Illness will be used. Mental illness focuses and refers collectively to all diagnosable mental disorders within the mental illness spectrum (Goldman and Grob, 2006). The feeling of stigma surrounds the concept of disorder and by categorising a person with a mental disorder under the term mental illness, could remove the perverseness associated with mental disorder. The concept needs to be considered in a holistic perspective. Mental illness defines the collective problem while disorder aids in pretence to a specific problem of mental illness. Using mental illness instead of mental disorder removes ambiguity as only an experienced mental health care practitioner with the aids of DSM records and diagnostic tools is capable of making an actual diagnosis of disorder (Grohol, 2020). Emergency care providers working in the prehospital environment are not trained to make such diagnosis, therefore providing a general diagnosis of mental illness instead of an exact diagnosis of disorder.

Mental illness is a complexed term to define. The concept of mental illness, mental disorder and mental health all refer to each other in one or another way (Leighton and Dogra, 2009), which aids in the complication of such a diverse subject. The ideology of mental illness from a prehospital EMS perspective in the South African setting provides a theoretical lacuna. Notably, the EMS practices emergency medicine, a time sensitive care for health care consumers with any illness, injury or emergency through a systems based approach encompassing all health system components (Naidoo, 2017;

Christopher *et al.*, 2014). Emergency care in the prehospital setting has helped to manage, diagnose and treat injury and illness while providing health action to address emergent health conditions (N. Naidoo, 2017). It needs to be considered that emergency medicine is the only discipline with 'universality' and 'responsivity' at the point of need (Christopher *et al.*, 2014, pp. 156; N. Naidoo, 2017), thus directing a need for a holistic mental illness definition from a prehospital emergency care perspective. A definition inclusive of the perceived cultural factors (Vaillant, 2012), mental illness and the social determinants of mental health-domains prehospital emergency care providers usually have to navigate.

2.1.1. Constructs defining Mental Health

Defining mental illness requires the understanding of mental health. Both concepts often considered the same, carry two different meanings. The simplicity suggests poor mental health could lead to mental illness if not maintained, but is less severe and experienced temporally to stresses of life (Australian Government Department of Health, 2011). The WHO define mental health as:

> "…A state of well-being in which the individual realises his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully and is able to make a contribution to his or her community…" (WHO, 2003, pp. 7)

This conception by the WHO at looking at positive function and positive feeling as a state of mental health, with well-being considered a normal state of equilibrium provides a nuance (Galderisi *et al.*, 2015). The idea of an individual having a chronic disease but is considered to have good mental health (as per the WHO definition) suggests that health reforms haven't indulged thoroughly through all sequela, providing the possibility that mental illness is being treated but not prevented, through optimization of mental health promotion and prevention (Keyes, 2014; Galderisi *et al.*, 2015; Westerhof and Keyes, 2010). The concept of poor mental health leading to mental illness is synonymous with many articles regarding mental illness and mental health. This provides a unique background to identify with a prehospital setting, where emergency care practitioners are confronted with the social determinates of mental health-being first to scene responders.

Three components of mental health are postulated when considering positive mental health: Social well-being, Psychological well-being and Emotional well-being. Keyes (2014) suggests social well-being to be positive functioning and includes:

→ Social contribution: being able to contribute to society, feeling valued.
→ Social integration: feeling part of a community.
→ Social acceptance: positivity while acknowledging one's difficulties.
→ Social coherence: making sense of society.
→ Social actualisation: belief that society will evolve positively for all people (Galderisi *et al.*, 2015; Westerhof and Keyes, 2010)

Emotional well-being was further explained as one's ability to have interest in life with happiness and satisfaction (Galderisi *et al.*, 2015), while concepts of positive mental health referred the notion of psychological well-being and inferred to striving to one's full potential (Westerhof and Keyes, 2010), which included:

→ Purpose in life: goals, beliefs and direction in life.
→ Autonomy: self-direction by internal standards.
→ Self-acceptance: acceptance of one's self positively.
→ Environmental mastery: managing the complex environment.
→ Personal growth: insight into potential for self-development.
→ Positive relations with others: where intimacy and empathy are disclosed. (Westerhof and Keyes, 2010; Keyes, 2014)

Keyes (2014) suggested that two distinct philosophical viewpoints on happiness were the origin of this subjective well-being research, resonating from the Eudaimonic and Hedonic traditions. The Hedonic tradition focused on positive emotions, with the Eudaimonic tradition focused on striving toward excellence in functioning as an individual and a citizen (Keyes, 2014, pp. 181). Thus Keyes (2014) states "mental health can be measured in terms of presence and absence of positive feelings towards one's life, and the presence and absence of positive functioning in various facets of functioning in life" (Keyes, 2014, pp. 181). Vaillant (2012) relates his conceptions to Keyes and further hypothesises seven models for conceptualizing positive mental health, considering mental health in a holistic

and cultural perspective (Vaillant, 2012). Vaillant (2012) stated the seven empirical models of metal health are:

- → Mental health is above normal, illustrated by DSM-5's Assessment of Functioning (GAF) score of over 80 (IQ test).
- → Presence of multiple human strengths, rather than absence of weakness.
- → Mental health conceptualized as maturity.
- → Mental health as dominance of positive emotions.
- → Mental health as high socio-emotional intelligence.
- → Mental health as subjective well-being.
- → Mental health conceptualized as resilience.

  (Vaillant, 2012, pp. 93)

Mental health importance in the scale of mental illness has significance. The absence of mental illness does not suggest good mental health, while good mental health does not suggest well-being or functioning (Keyes, 2014; Keyes, 2007; Galderisi *et al.*, 2015), elucidating that mental health and mental illness need to be considered in a holistic and complete state and not separate entities (Keyes, 2014; Westerhof and Keyes, 2010). Galderisi *et al* (2015) describe a new definition for mental health as a holistic view denoting the concepts of social well-being, psychological well-being and emotional well-being, safeguarding mental health paradigm through a cultural, sensitive and inclusive perspective (Vaillant, 2012; Galderisi *et al.*, 2015). This definition states:

> "…Mental health is a dynamic state of internal equilibrium which enables individuals to use their abilities in harmony with universal values of society. Basic cognitive and social skills; ability to recognize, express and modulate one's own emotions, as well as empathize with others; flexibility and ability to cope with adverse life events and function in social roles; and harmonious relationship between body and mind represent important components of mental health which contribute to varying degrees, to the state of equilibrium…" (Galderisi *et al.*, 2015, pp. 231).

Galderisi *et al* (2015) unpacks this definition, describing dynamic state of internal equilibrium as a reflection on people's life epochs. These life epochs require different equilibrium based on certain changes in one's life, where one could return to a dynamic state of equilibrium adapting to these changes. Therefore, acknowledging that mentally

healthy people can experience human emotions such as anger or grief while having the ability to return back to a dynamic state of equilibrium is important for mental health (Galderisi *et al.*, 2015). Basic cognitive and social skills are an aspect of daily life and facilitate a large component of mental health. These cognitive skills are making decisions, paying attention, remembering, organising and problem solving. The social skills lay foundations of one's ability to interact and communicate with other people of society. This cognition allows for emotional regulation where controlling emotions and having empathy (understanding what others feel without confusion for oneself) enables better communication and effective interactions between individuals (Galderisi *et al.*, 2015).

This ability to function in social roles and have social interactions is considered an important variant of mental health, contributing to a meaningful life without social exclusion or stigmatization (Galderisi *et al.*, 2015). Galderisi *et al* (2015) completes the definition suggesting a harmonious relationship with body and mind could define a complete mental health outlook. The concept advocates that mind, brain, organism and environment are interconnected and can't be separated from how one feels in their environment, with disturbances to this concept of body, mind and state of dynamic equilibrium conclusive of developing mental illness (Galderisi *et al.*, 2015).

The notion of describing mental health is important for defining mental illness. As stated above mental health and mental illness need to be considered together when tackling the broad spectrum of mental illness (Vaillant, 2012; Keyes, 2014; Keyes, 2007), and has been seen through the concept of promoting positive mental health to help alleviate sequela of mental illness. (Keyes, 2007)

2.1.2. Constructs defining Mental Illness

Mental illness, the term chosen for this research represents the broader spectrum of mental disorders, as specified by the DSM-5 (Australian Government Department of Health, 2011). Mental illness is considered a health problem where impairment of personal functioning nuances one's ability to feel, think, behave or interact with society. This impairment is usually seen through distress with these features usually occurring in a single episode, persistent or relapsing and remitting (Australian Government

Department of Health, 2011). The American Psychiatric Association (2015) further stipulate mental illness as conditions involving changes in thinking, emotion or behaviour. Mental illness causes distress or problems functioning in social, work or family activities. Major depression, schizophrenia, obsessive compulsive disorder or panic disorder are considered the broad range of mental illness which is marked by sufficient disorganisation of personality, emotions or mind. Mental illness is usually associated with disruption in normal psychological functioning (American Psychiatric Association, 2015). The severity, pervasiveness and impact on daily functioning weighs heavily on the impact mental illness creates, while the bare minimum of symptoms does not define a mental disorder (Leighton and Dogra, 2009).

The World Health Organisation prioritises the concept of mental health, however stipulates that mental illness has many symptoms with a range of problems usually synonymous with aberrant emotions, behaviour and thoughts. Usually in combination, affecting relationship with society (World Health Organization, 2011; World Health Organization, 2004). The need to conserve the ideology of a definition is essential for a few reasons:

- → To know which diagnosis should or should not be included in the classification.
- → To separate areas of responsibility of the medical system from other societal systems.
- → To avoid dangerous medicalisation of social problems.
- → To distinguish between pathological and normal.
- → To identify the conditions that, as a result of their negative consequences, implicitly have a call to action to the psychiatrists.
- → To identify the cases that justify societal recognition of the appropriateness of the sick role.
- → To understand which situations may prevent legal inputability.
- → To avoid false positives and other related problems such as overmedicalisation, unnecessary labelling and wasted resources.
- → To define psychiatry's position as a special medical discipline.

  (Telles-Correia, 2018, pp. 1; Telles-Correia, Saraiva and Gonçalves, 2018, pp. 1)

These validations prescribe a need to define mental illness however nuance the fields outside psychiatry. The elevation of psychiatry as a requisite to define mental illness is justified as the field of study, however suggests very little impetus was considered for mental illness through a mental health promotion and social determinates of mental health perspective-a concept prehospital EMS practitioners need to deal with daily. The first definition for mental illness came from DSM-3 where Spritzer has based the main criteria of mental illness on harm (distress and disability) and dysfunction (Telles-Correia, Saraiva and Gonçalves, 2018). The DSM-3 definition stated:

> "…Each of the mental disorders is conceptualized as a clinically significant behavioral or psychological syndrome or pattern that occurs in an individual and that is typically associated with either a painful symptom (distress) or impairment in one or more important areas of functioning (disability). In addition, there is an inference that there is a behavioral, psychological, or biological dysfunction…" (Telles-Correia, 2018, pp. 2)

Consequences of a condition and not etiology were alluded to when considering a disorder, where Spritzer followed Boorse (Boorse, 2014; Boorse, 1975) model of disease using dysfunction as criteria for the definition, not fully regarding harm (distress and disability) (Telles-Correia, Saraiva and Gonçalves, 2018). Boorse's biostatistical model of health is reputable for correlating disease with dysfunction. Once life functions (reducing reproduction output and life expectancy) were altered a biological or psychological dysfunction suggested existence of a disease (Telles-Correia, Saraiva and Gonçalves, 2018; Boorse, 2014; Boorse, 1975). Wakefield (2014) who developed the distress-disability model agrees with Boorse (2014; 1975) concept of dysfunction with the revelation that dysfunction is independent of values and is fundamental when defining a psychiatric or medical illness. However, Wakefield (2014) demanded it insufficient to establish medical disturbance and elucidated the need for criteria of harm (distress and disability). Spitzer combined models with Wakefield to include dysfunction and harm (distress and disability), significantly labeling the concept as harm dysfunction-requiring a medical or psychiatric disorder to have a dysfunctional component (non-value laden) and a harm component (value laden), (Telles-Correia, 2018; Wakefield, 2014; Boorse, 2014). With this in consideration, the DSM-5 definition of mental illness states:

> "…A mental disorder is a syndrome characterized by clinically significant disturbance in an individual's cognition, emotion regulation or behavior that reflects a dysfunction in psychological, biological or developmental processes underlying mental functioning. Mental disorders are usually associated with significant distress or disability in social, occupational or other important activities…" (Telles-Correia, 2018, pp. 2)

The criteria of dysfunction remains, with the harm criteria being more frequent, subsequently eluding to the premise that mental disorders normally identify with distress and disability (Telles-Correia, 2018). Mental disorders have said to be social constructs, co-dependent on human effort and should be considered in social, moral and cultural aspect, only being considered a mental illness if the disorder is regarded as non-adaptive, inadequate or causing harm. Mental functions are linked to social and cultural values, bound to a social role physical functions are not (Telles-Correia, Saraiva and Gonçalves, 2018).

2.1.3. Positive mental health promotion and protection

Mental health and mental illness are usually considered as two separated features at opposite ends of the same continuum, whereby modern mental health systems prioritize reduced metal illness to improve mental health. These systems risk providing reactive health care, resonating prejudice, fear, avoidance and stigma (Iasiello *et al.*, 2019). Recently evidence substantiates mental illness and positive mental health as interrelated distinct constructs reflecting separate continua (Keyes, 2014). Iasiello *et al* (2019) advocates that evidence predicts low levels of positive mental health being a risk factor for mental illness, while positive mental health seems to protect people from mental illness (Iasiello *et al.*, 2019; Keyes, Dhingra and Simoes, 2010).

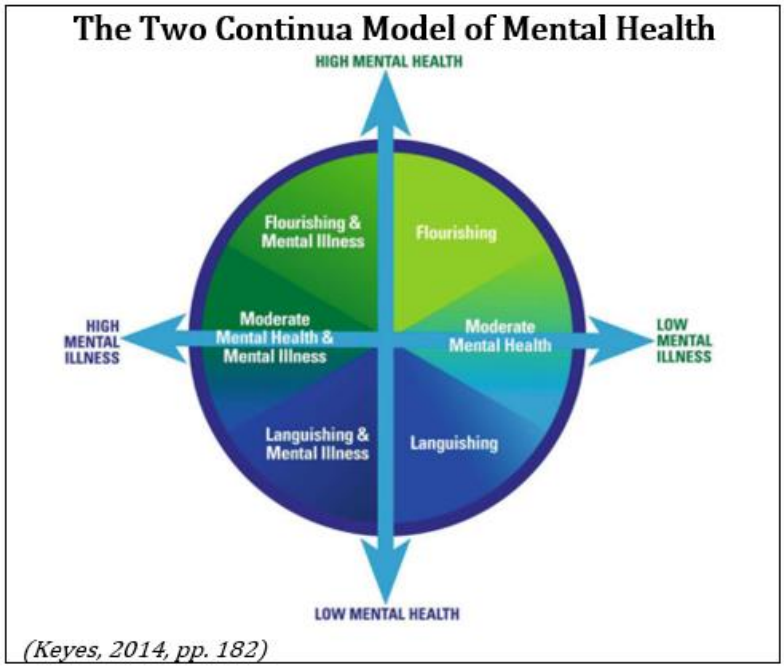
Keyes (2014) makes empirical claim that the *de facto*[31] approach to mental illness hasn't reduced the burden or prevalence of mental illness, with mood, substance abuse disorders and anxiety all preventable problems, unprevented from early age onsets. This projects unipolar depression to be a leading cause of burden to the world by 2030 (Keyes, 2014). Mental health promotion is aimed at increasing positive mental health to help

[31] In reality*, de facto* will allude to the reality of what has been the present or norm

protect against mental illness for the future. The medical concept statutes that treatment targets mental illness risk reduction and prevention targets vulnerable people to mental illness. Mental health promotion targets people with good and poor mental health (all members of society). This promotion of mental health should be seen as complimentary to treatment. (Iasiello *et al.*, 2019; Keyes, 2014)

Subjective well-being operationalizes mental health and has been divided into two salutogenic streams of research, the Hedonic tradition relating well-being to positive feelings and emotions and the Eudaimonic tradition relating well-being to positive functioning, striving to excellence (Keyes, 2014). Salutogenesis, advocated by Keyes (2014) as a holistic construct for mental health promotion, "views health as the presence of positive states of human capacities and functioning in cognition, affect and behavior" (Keyes, 2014, pp. 1). However, Keyes (2014) premised the concept of a dual continuum model, a construct were mental illness and mental health, individual but correlated paradigms in society health, aids in scientific inquiry to the hypothesis of mental health as a complete state, being more than the absence of mental illness. This authenticated mental health promotion and protection (Iasiello *et al.*, 2019; Westerhof and Keyes, 2010; Keyes, 2014).

Figure 4: The dual continua model of mental health and mental illness (Keyes, 2014, pp. 182)



The dual continua model of mental health and mental illness supplements categorization of people according to recent mental illness status and level of mental health as either languishing, flourishing or moderate. The scale of well-being (emotional, social and psychological well-being) could be used to measure positive mental health. One ramification however suggests that the absence of mental illness doesn't prescribe presence of mental health. (Keyes, 2014; Westerhof and Keyes, 2010)

A study of mentally healthy participants (with no diagnosis of mental illness) was organized through the 1995 and 2005 waves of the Midlife in the United States (MIDUS)[32] National Study of Health and well-being, where participants were divided into six groups based on their level of positive mental health and mental illness status in 1995. It was concluded over the ten-year duration, that the chance of developing mental illness was decreased in participants who preserved or harvested high levels of positive mental health, while participants who had decline in positive mental health had increased chances of developing a mental illness (Iasiello *et al.*, 2019; Keyes, 2005). Keyes (2014) suggest second ramification that needed to be noted that the presence of mental illness doesn't mean absence of mental health, with 70% of adults with mental illness had moderate mental health (Keyes, 2014; Keyes, Dhingra and Simoes, 2010; Westerhof and Keyes, 2010). Therefore, Keyes stated:

> "…The absence of mental illness does not mean the presence of mental health, but the presence of mental illness does not imply the absence of some level of good mental health…" (Keyes, 2014, pp. 183).

Wood and Joseph (2010) reiterated Keyes findings suggesting people with decreased positive mental health were likely to have depression ten years later, while Grant *et al* (2013) suggested that depressive symptoms appeared after one year with poor positive mental health (Wood and Joseph, 2010; Grant, Guille and Sen, 2013).

Thus it has been hypothesized and supported by research, that the two fundamental axioms of mental health promotion and protection for addressing mental illness and mental health needs of society (Keyes, 2005) simply state that gains in mental health

[32] The Midlife in the United States (MIDUS) is a collaborative and interdisciplinary investigation of patterns, predictors and consequences of midlife development in the areas of physical health, psychological well-being and social responsibility. (Radler, 2014)

decreased risk of mental illness over time-promoting mental health can reduce prevalence and incidence of mental illness. Loss of mental health increased risk of mental illness over time-protecting against loss of mental health can decrease prevalence and incidence of mental illness. This made mental health dynamic over time (Keyes, 2014; Keyes, 2005; Keyes, 2007). This protection and promotion hypothesis has been strongly supported by recent publications by Keyes, Dhingra and Simoes (2010) and Iasiello *et al* (2019) suggesting that positive mental health is an important resource for recovery of mental illness (Keyes, Dhingra and Simoes, 2010; Iasiello *et al.*, 2019). This provides evidence that positive mental health promotion should be considered in mental illness reduction. In an article by Slade (2010) *Mental illness and well-being: the central importance of positive psychology and recovery approaches*, he champions the prospective of positive mental health through positive psychology, suggesting the importance of knowledge and training mental health professionals to push reduction of mental illness through improvement of mental health (Slade, 2010). Slade (2010) expresses the distinction between mental health and mental illness is empirically validated with a correlation between measures of depression and measures of psychological well-being range from -0.40 to -0.55, suggestive of the close correlation between mental illness and mental health. (Slade, 2010)

2.1.4. Towards a prehospital definition of Mental Illness

Idiosyncratic factors and experiences, social interaction and family circumstances are all said to be involved in maintaining a quality of mental health, with mental illness having contrasting perceptions in many different cultures. Often dimensional perspective and traits of mental illness are seen as normal behavior, depending the culture (Leighton and Dogra, 2009). This is significant when dealing with mental illness from a South African perspective, with diversity on a cultural level very expressive in a land with eleven official languages.

The need to contextualize a prehospital definition for mental illness is prudent for mental health and mental illness promotion and protection, while providing a framework to create research to void the theoretical lacuna within the South African prehospital arena. Van

Huyssteen (2016) provides a nuance for the South African prehospital perspective in a thesis titled *"A Legal Analysis of the Emergency Medical Services in South Africa".* This thesis highlights the need for the EMS to improve within the field of mental illness, suggesting a protocol or paradigm shift to manage mental illness and poor mental health consumers, similar to the USA and Australia (Van Huyssteen, 2016). The conscription of this notion provides sensibility for the climate of mental illness, considered to be the leading cause of burden of disease by 2030 (Vigo, Thornicroft and Atun, 2016). With the socio-economic risk factors in S.A, toppled with social determinants of health and mental health factors, S.A needs to prepare frontline workers to start dealing with an increase in mental illness. S.A has risk factors for poor mental health. Inequality, the political climate, a quadruple disease burden and poverty make the average South African prone to mental illness or poor mental health.

Therefore, for the prospectus of this thesis and to start championing the human rights of mental stability, mental health and mental illness a new definition for prehospital prerogative mental illness should be established. The nuance of being first to the scene responders and not being qualified to diagnose a mental disorder (Grohol, 2020; Goldman and Grob, 2006) puts EMS practitioners on the spot. The EMS in S.A is traditionally made up of a tripartite qualifications of Basic Life Support, Intermediate Life Support and Advanced Life Support (Van Huyssteen, 2016) with the different levels carrying more knowledge and expertise. This provides a need for a universal mental illness definition for all levels of life support to be able to make a semi accurate diagnosis of someone experiencing poor mental health and mental illness. On the contrary, medical professionals should be more trained to diagnose metal illness than police[33] (Bradley, Townsend and Eburn, 2018).

For this research, a prehospital definition for mental illness based on a South African context and climate needs to consider poor mental health, social determinants of mental health, deliberate self-harm and mental illness (DSM-5 diagnosis) as a holistic view of a broader picture. Thus, mental illness for this research will be defined as a combination of

[33] Police are required to assist with involuntary mental health care users as per section 40 of the Mental Health Care Act of 2002.

varieties and ideologies posed by various authors and the author of this research that best suits the prehospital and EMS milieu (this is not a direct quote):

> … Mental illness is the broad range term of mental disorders which is characterized by disturbances in an individual's cognition, emotion regulation or behavior which reflects a psychological, biological or developmental dysfunction (Telles-Correia, 2018). Poor mental health can exacerbate mental illness and decreased cognitive, behavioral and emotional well-being changing the dynamic state of internal equilibrium (Galderisi *et al.*, 2015). Deliberate Self-Harm (DSH)-considered as suicides, attempted suicides, overdoses and bodily self-harm-can be an indication towards underlying mental illness (Arkins *et al.*, 2013), while common examples of mental illnesses are schizophrenia, depression, Bipolar disorder, Autism, Substance abuse, anxiety, PTSD, Delirium, Dementia and Alzheimer's. Social determinants of mental health benefits poor mental health which benefits mental illness... (Telles-Correia, 2018; Galderisi *et al.*, 2015)

2.1.5. Considering Capacity with Mental Illness

Capacity is termed as a legal word, aiding in decision-making. Capacity is the decisions an adult needs to make in daily life (NSW Government Attorney General's Department, 2009). Scott (2008) defines capacity as:

> "…the ability to both understand information relevant to a decision and to appreciate the consequences of a decision…"(Scott, 2008, pp.4).

'Understand' in this definition considers the person's ability on factual understanding, cognitive function of grasp and retain and managing information based on available options and risks (Scott, 2008; NSW Government Attorney General's Department, 2009). 'Appreciate' considers the person's ability to have emotion towards decisions, while appraising outcomes with justifiability (Scott, 2008). Capacity can be assessed to determine the cognitive ability to make a decision based on the best interest of all the concerned parties. This assessment of capacity could help provide a bridge needed to treat, care and transport involuntary mental health care users. Capacity is used legally and has many different connotations on how it is used and perceived. For this thesis, a

medical outlook at capacity is portrayed and how it could be used for EMS management, care and transport to hospital for health care consumers with mental health needs (more specifically for involuntary mental health care users). “Capacity is an essential component of valid consent” (Scott, 2008, pp. 8).

The following sections can serve as a capacity assessment toolbox. Assessing capacity has many different techniques and varies as per situation (Scott, 2008). For this thesis and mental health, the author has incorporated guidelines and principles from Australia and England. Australia, more specifically New South Wales looks at capacity in a broad spectrum, as to not deny a person their civil right to making a decision (NSW Government Attorney General’s Department, 2009). The guidelines from England are from the Regional Geriatric Program of SW Ontario program at Parkwood Hospital (London), where capacity is assessed regularly with people with dementia and other geriatric ailments (Scott, 2008). These guidelines and principles of a capacity assessment could help alleviate some of the burden of dual service (police/EMS) for involuntary mental health care users (Mental Health Care Act 17 of 2002, 2002).

2.1.5.1. Capacity pre-assessment guidelines

Assessing capacity as a decision-making capability will need to follow a few guidelines. A person’s capacity should never be questioned unless the person displays ‘Triggers’. ‘Triggers’ are subsets of characteristics that a person will display that may be questionable, leading to question capacity (NSW Government Attorney General’s Department, 2009). Types of ‘Triggers’ would be decisions that are irrational, putting themselves or other people at harm, confusion, sudden loss of speech, sudden memory loss, inappropriate expression of emotion, personality changes, over spending or eating and loss of self-agency[34] (NSW Government Attorney General’s Department, 2009). Assessing capacity means all attempts to solve a problem have failed and the person

[34] Self-agency is described as how individuals maintain homeostasis through good physical and mental health, prevention of illness and accidents and managing acute care and chronic care, all while maintaining social and psychological goals (NSW Mental Health Commission, 2014).

could be causing self-harm or to others. Importantly an assessment must be applied accurately to prevent denying a person the right to make a decision, or forcing them in to making a decision that could cause a person harm (Scott, 2008; NSW Government Attorney General's Department, 2009).

Before an assessment can be done, tell the person about the process. This is important as the aim would be to aid in participation from the person. Explain to them there is a concern for their capacity, to prevent any possibility of self-harm and that the result will determine capacity (NSW Government Attorney General's Department, 2009). Knowingly that people who experience mental illness, still have capacity to influence their health outcomes (NSW Mental Health Commission, 2014). The assessments should be flexible and consider cultural and linguistic diversity. Ethnicity, religion, culture and language influence decision making, shaping how people behave (NSW Government Attorney General's Department, 2009). The right questions must be asked to determine what you are looking for, thus being precise with open end questions is preferred. Asking questions carefully without leading, that require sentences instead of a yes or a no, should be the aim (NSW Government Attorney General's Department, 2009).

2.1.5.2. Capacity assessment principles

There are six main principles that should be focused on to ensure and protect people of their decision-making abilities: *Always presume a person has capacity; Capacity is decision specific; Don't assume a person lacks capacity based on appearances; Assess the person's decision-making ability – not the decision they make; Respect a person's privacy; Substitute decision-making is a last resort* (NSW Government Attorney General's Department, 2009, pp. 27).

1. *Always presume a person has capacity.*

Simply all adults should be presumed to have capacity, unless 'triggers' have been made. Culture, religion, language and ethnicity should be considered when making presumption on capacity, remembering that the head of the family or community could speak for certain members (NSW Government Attorney General's Department, 2009). Presumption needs to be balanced with protection. Often a person's decision may seem unwise and

protecting them from the decision may seem helpful, but intervening is not recommended. Thus balancing between a right to make a decision and intervening because it's an unwise decision that could affect ones health is a complicated exercise (NSW Government Attorney General's Department, 2009).

2. *Capacity is decision specific.*

A person's capacity needs to be assessed for each decision. It must be understood a person can make some but not all decisions. Delaying a decision to be made will give a person ultra-control over their life (NSW Government Attorney General's Department, 2009). A person has the right to make as many decisions as they can as a person's capacity can change depending on the situation being experienced. A person could make a decision today that couldn't be made in the past and *visa-versa.* Capacity should always be based on the decision that needs to be made now (NSW Government Attorney General's Department, 2009).

3. *Don't assume a person lacks capacity based on appearances.*

Assuming capacity based on a person's age, disability, behaviour, appearance, language or ethnicity is erroneous (NSW Government Attorney General's Department, 2009). Remember under law, these acts could be seen as discrimination. Reportedly, incorrect assumptions on capacity have been made based on: the way a person looks, communication skills, a person's impairment (mental illness), presentation (piercings) and their behaviour (NSW Government Attorney General's Department, 2009).

4. *Assess the person's decision-making ability – not the decision they make.*

Simply, one can't base a capacity assessment on their own opinion of a person's decision. People have their own beliefs, values and morals and a decision that you may think is unwise, could be wise to another. Thus capacity should be based on the person's ability of decision-making rather than on the decision that is made (NSW Government Attorney General's Department, 2009). Capacity can be questioned if the decision puts themselves and others at risk and if the decision made is very unusual to the way the person usually acts; 'TRIGGERS' (NSW Government Attorney General's Department, 2009).

5. *Respect a person's privacy.*

Privacy laws are incorporated into everyday life and needs to be considered when assessing a person for capacity. The more common privacy principles would be collecting information, using the information and disclosing the information (NSW Government Attorney General's Department, 2009). Collecting information is about being transparent with the person so they are aware of what is being done. Using the information is only for capacity assessment and reusage would need consent. Disclosing the information would be on a need vs health and safety basis, usually for safety of the person (NSW Government Attorney General's Department, 2009).

6. *Substitute decision-making is a last resort.*

A person who lacks the ability to make a decision, lacks capacity. A person may be able to make decisions at other times but may lack capacity at this time (NSW Government Attorney General's Department, 2009). Before deciding on incapacity and substitution of decision making, all must be done to support the person into making their own decision. The trick is not to roll off your own opinion and decisions but to assist the person as far as possible to make their own decision (NSW Government Attorney General's Department, 2009). If all efforts of support fail in the decision-making process then a lack of capacity is assumed, a substitute decision maker will need to make the decisions (NSW Government Attorney General's Department, 2009).

2.1.5.3. Decision-Making abilities

There are four main decision-making abilities a person needs to demonstrate capacity; *Ability to understand, ability to appreciate the situation and its consequences, ability to reason, ability to communicate and express a choice* (Scott, 2008, pp. 5):

1. *Ability to understand relevant information.*

This is the comprehension of understanding information with potential benefits and risks, while associating each decision to these risks and benefits with solutions (Scott, 2008). A person's level of education and intelligence could influence understanding of this information (Scott, 2008). Questions that could be probed are: What do you understand;

what do you understand about benefits of the situation; Do you understand what options are available (Scott, 2008)

2. *Ability to appreciate the situation and its consequences.*

This is the ability to comprehend how a problem or solution would pertain to a person's situation, making a decision through complexity of a situation (Scott, 2008). Questions that can be probed here are: What do you believe is wrong now; Do you believe this help will benefit or harm you; Do you know what other options there are (Scott, 2008).

3. *Ability to reason*

This is acknowledging solutions to problems by understanding how a solution could affect daily life, comparing solutions and using logical thought processes in making a choice (Scott, 2008). Questions that can be probed here are: How did you reach your decision; what did you consider in making this decision (Scott, 2008).

4. *Ability to communicate and express a choice.*

This is making a clear decision from the choices of decisions available. This should be consistent with morals, culture, religious beliefs and previous decisions and actions (Scott, 2008). Questions that can be probed here are: With all this information to make a decision have you decided on an option best suited for you (Scott, 2008).

Alternatively to simplify the task of a capacity assessment for the EMS, would be the Four C's of capacity: *Context, Choices, Consequences* and *Consistency* (Scott, 2008, pp. 9).

Context – Does the person understand the situation they in?
Choices – Does the person understand their options?
Consequences – Does the person understand the ramifications of such options?
Consistency – Do they Fluctuate in understanding of their choices?
(Scott, 2008, pp. 9)

2.1.6. Brief History of Mental Illness

A brief history of mental illness is to give guidance into the understanding of why reforms in developing and developed countries have taken place. Adopting a historical perspective, the naivety behind the poor understanding of mental illness can be

understood by paving an illumination on how past and present reforms have navigated the centuries from proposed religious or spiritual aetiologies to actual 21st century diagnosis.

Mental illness is a subject that has raised many concerns for many centuries, just with different interpretations and different ideas on how to resolve it. The stigma of mental illness has nuanced the subject entirely. The aetiology of mental illness comes from three general theories; supernatural, somatogenic and psychogenic theory (Farreras, 2013). The supernatural theory expresses the idea of mental illness as a cause from possession of evil or demonic spirits, displeasure of the gods, curses and sin. The somatogenic theory identifies with different disturbances in physical functioning, resultant from genetic inheritance, illness or brain damage. The psychogenic theory focuses on learned cognitions and associations like that of trauma, stress or distorted perceptions (Gosselin, 2017; Farreras, 2010). The different theory surrounding the person with mental illness would determine how that patient was treated.

Treatment for mental illness is registered as far back as 6500 BC where the use of Trephination[35] was found used on skulls and in cave art, subjecting the idea of early supernatural type explanation for mental illness. The surgical drilling would be used to relieve evil spirits, epilepsy and release pressure from brain injuries (Farreras, 2013). The Greeks physicians ostracised the idea of mental illness being supernatural, with Hippocrates around 400 BC attempting to separate superstition and religion from medicine, classifying mental illness into epilepsy, mania, melancholia and brain fever. During the Middle Ages the Roman Catholic church was threatened by political and economic turmoil giving rise to mental illness supernatural theories that dominated Europe between the 11th to the 15th century. Stories of famine and plague were used and interpreted as the devil-mental illness was used as a source for brainwash and manipulative control over the masses (Heinz and Kluge, 2010; Gosselin, 2017). At the turn of the 13th century, mentally ill especially woman were persecuted as witches, possessed by the devil (Heinz and Kluge, 2010).

[35] Drilling of burr hole in the skull to expose dura mater to treat health problems or release pressure (Farreras, 2013)

The more modern type of treatment associated with mental illness was the establishment of hospitals and asylums. Into the 16th century institutions to house mentally ill, poor, homeless and unemployed were erected. Economic depression and war produced large numbers of people suffering from mental health problems. The early 17th century gave rise to secular explanations of madness as a physical state, organising poor people with mental disorders into public jails, workhouses, poorhouses and asylums across Europe and North America (World Health Organization, 2003; Farreras, 2010). Farreras (2010) suggests Mental illness was viewed somatogenically with treatment similar to that of physical illness: purges, bleedings and emetics. Although considered inhumane, the view of insanity and the mentally ill was likened to animals with no capacity to control or reason with oneself and highly capable of inflicting violence without provocation. The mentally ill were considered to not feel the same pain or physical sensitivity and thus were subjected to miserable conditions without complaint. Instilling fear was believed to be the cure to fix a disordered mind to reason (Heinz and Kluge, 2010). This inhumane treatment of mentally ill people was alleviated in the 18th century with protests pushing the growth of a more humanitarian view of mental illness. Europe practiced the idea of moral treatment, physicians Vincenzo Chiarughi and Philippe Pinel would remove shackles off their patients-promoting freedom and hygiene using an occupational outlook towards treatment (Munsche and Whitaker, 2012). In America, asylums for the mentally ill practised somatogenic theory treatment of mental illness, considered moral treatment, patients experienced bloodletting, gyrators and tranquilizers (Farreras, 2013). Although mental illness had moved from the unknown to the known, during the 18th to 19th century European psychiatry struggled between somatogenic and psychogenic explanations of mental illness (Munsche and Whitaker, 2012; Gosselin, 2017).

Introduction of moral treatment instituted the need to build many mental asylums in Europe and USA, however with the turn of the 1950s mental asylums were discredited on the bases of humanitarian grounds, with governments opting to move to community care programs (World Health Organization, 2003b). Thus, downsizing and closing of mental hospitals and reducing the number of chronic patients in state hospitals was the objective. This process has become a common practice in developing and developed countries and is known as deinstitutionalisation (Schomerus *et al.*, 2012; World Health

Organization, 2003). Deinstitutionalisation is not just discharging of patients but dehospitalisation that should negate alternatives to care outside psychiatric institutions with community care and primary health care as the viable options. A constant challenge faced in developing countries is the significance of colonial powers westernisation which left intolerable inequality between communities, often building less infrastructure for comprehensive coverage of entire populations. Developing countries are often lacking in mental health resources compared to developed countries (World Health Organization, 2003b).

Aetiology theories coexist today if we consider the biopsychosocial model of explaining human behaviour. Individuals can be born with a genetic predisposition for a psychological disorder or certain stressors need to be present for them to develop a disorder. Sociocultural factors like socio-political or economic unrest, poor living conditions or poor relationships with people can all cause contributing factors for the predisposition for mental illness. This elucidates the idea of underlying somatogenic and psychogenic theories still used in modern day; however progress in the treatment of mental illness usually implies improvements in mental illness diagnosis (Farreras, 2010; Gosselin, 2017).

2.2. The Global Burden of Mental Illness

Mental Illness is a global crisis; seen as a pandemic of the 21st century-advocating a compelling cause for global morbidity and mortality. The World Health Organisation (WHO) state that at least 700million people worldwide were affected with behavioural, mental or neurological problems in 2010 (Patel and Saxena, 2014; Shaban, 2004). Shaban (2004) ratifies that mental illness disorders constitute 12% to the global burden of disease (GBD)[36] in disability-adjusted life years (DALYs)[37], exceeding diseases like heart disease, cancer, AIDS, tuberculosis and malaria. Suicide deaths approximate 873 000 people per year which is frequently caused by mental disorders like major depression

[36] Burden of disease is a concept developed to describe death and loss of health due to diseases, injuries and risk factors all over the world (World Health Organization, 2004a).

[37] Disability-adjusted life years (DALYs) is the sum of years of potential life lost due to premature mortality and the years of productive life lost due to disability (Chen *et al.*, 2015) (World Health Organization, 2006b)

(Shaban, 2004). According to the World Health Organisation untreated mental health problems will amount to 15% of total global burden of disease by 2020, projecting mental health problems to be the leading cause of global morbidity and mortality by 2030- suggesting depression to be greatest cause of disease burden globally (Mental Health Foundation, 2016; World Health Organization, 2011).

Mental health has multiple biological, psychological and social determinants occurring across all ethnic, economic, social and age boundaries (Motsoaledi and Matsoso, 2013). Global studies conducted estimate at least 10% of the world's population is affected with mental illness while 20% of children and adolescents suffer from a mental disorder, elucidating neuropsychiatric disorders to account for 28%-30% of non-fatal disease burden worldwide (Mnookin, 2016). Neuropsychiatric disorders are responsible for 1.2million deaths each year aiding in 1.4% of years-of-life lost. Dementia, Parkinson's disease and Epilepsy are significant causes for these deaths. Mental disorders like unipolar and bipolar depression, schizophrenia and post-traumatic stress disorder were accountable for 40 000 deaths per year, while substance abuse disorders were related to 182 000 deaths per year (Prince *et al.*, 2007). Mental disorders are considered to begin from childhood and adolescence with 50% of mental disorders beginning before the age of 14. Subsequently enduring episodes of mental ill-health can interrupt a person's capacity to effectuate family, social, work, community and academic roles (Motsoaledi and Matsoso, 2013). It is established that mental disorders can follow a chronic episodic course or could resolve after an episode; however worldwide 70 million people suffer with alcohol-related problems, 24 million people have schizophrenia, 37 million people have dementia and 121 million people suffer from depression (World Health Organization, 2003b). The significance of these numbers exposes the consequences of comorbidity[38] associated with mental illness, communicable disease[39] , non-communicable disease[40]

[38] In medicine, the presence of one or more additional conditions co-occurring with a primary condition is comorbidity. Each additional condition (Mnookin, 2016) (Prince *et al.,* 2007)

[39] An infectious disease transmissible by direct contact with an affected individual or the individuals discharges or by indirect means for e.g. HIV/AIDS, Tuberculosis (Prince *et al.,* 2007)

[40] A disease that is not transmissible directly from one person to another for e.g. Cardiovascular disease, stroke, diabetes (Prince *et al.,* 2007)

and poverty[41]. This has a prolific risk of diminished immune functioning, poor health behaviour and unfavourable disease outcome (World Health Organization, 2003b; Motsoaledi and Matsoso, 2013).

It is stated that low-and middle-income countries continue to see a rise in global burden of disease due to mental disorders, causing morbidity, while severe mental disorders show results of increased mortality and destitute health outcomes (World Health Organization, 2018). Low-and middle-income countries show a prevalence of 80% of the population to experience an episode of a mental disorder in their life time (Mnookin, 2016), and contribute 86% to suicidal global deaths aged between 15 and 44 years (Prince *et al.*, 2007). The burden of mental disorders is prominent in young adults-the most productive section of the population (Department of Health: RSA, 2012). Mental health problems in children and adolescents has a high prevalence bringing about concern due to the accompanying disabilities (World Health Organization, 2011). The World Health Organisation pays precise attention to the colossal effect of depression as a burden of disease, noting epilepsy and dementia as a priority, as these neurological conditions share common aspects in terms of treatment (World Health Organization, 2011).

Depression is the most prevalent of mental disorders, while major depression (psychiatric diagnosis) is most commonly associated to suicide with 20% of people with untreated depressive disorder attempting or committing suicide (American Association for Suicidology, 2009). It is estimated that suicide among youth (15-24) has increased by 200% in the last 50 years with rates in the elderly (85+) also increasing, suggestive that four times more men than woman commit suicide, while more woman attempt suicide and have higher plausibility for depression and major depressive disorders. If left untreated, comorbidity can occur with other mental disorders such as substance abuse aiding in episodes of recurring attempts of suicide (American Association for Suicidology, 2009).

The association of mental disorders and physical health problems go hand in hand with frequent need for primary healthcare (World Health Organization, 2003b). The response from health systems have been insufficient towards the burden of mental disorders

[41] Poverty is a vicious circle that aids in increase poor mental health, while poor mental health aids in poverty (Motsoaledi and Matsoso, 2013)

exaggerating the gap between need for treatment and its provision (World Health Organization, 2003b). This statement is validated as an estimated 76% - 85% of people from low-and middle-income countries with severe mental disorders receive no treatment, while 35% - 50% of people from high income countries receive no treatment for severe mental disorders (World Health Organization, 2011). The correlation between mental disorders, poverty and poor physical health suggests the need for urgent reforms that integrate mental health within health policies (Mnookin, 2016). Mental illness influences family, friends and community directly and indirectly occurring more frequently in vulnerable groups like poverty-stricken populations, elderly, children and disempowered groups (Bitanihirwe, 2015). However although a World Health Organisation report on the global burden of disease subscribing the vigour of mental illness consequence, the priority of mental illness remains poor in low-income and middle-income countries (Prince *et al.*, 2007). Prince et al (2007) suggests developing[42] countries prioritise reproductive, maternal and child health, trying to govern and eradicate infectious diseases compared to developed[43] countries who prioritise non-communicable diseases to prevent years lived-with-disability or YLD[44] (Prince *et al.*, 2007).

Mental disorders interact with other health conditions (comorbidity), being a risk factor for evolution of communicable and non-communicable diseases, also contributing significantly to accidental and non-accidental injuries. Infectious diseases can trigger a mental disorder as can the likelihood of increased risk of transmission of infectious disease among people with mental disorders. Poor health conditions can increase the chance of developing a mental disorder (depression)(Prince *et al.*, 2007). This comorbidity results in disease related mortality as help-seeking, diagnosis, treatment and quality of care is nuanced (Prince *et al.*, 2007). Aiding the nuance of mental disorder diagnosis is medically unexplained somatic symptoms and syndromes which cognate with mental disorders. This idea of somatisation[45] is suggestive of abstract semantic

[42] Classified as low-income to middle-income countries (Prospects, 2014).
[43] Classified as high-income countries (Prospects, 2014).
[44] Years lost due to Disability or YLD are years of healthy life lost due to time spent in a less than optimal functional health status because of a specific health condition (Martel and Steensma, 2012).
[45] Somatisation is medically unexplained somatic symptoms coupled with psychological distress and help-seeking behaviour-associated with poor health-related quality of life (Prince *et al.*, 2007)

qualifiers[46], as a third of those with somatisation have no comorbid mental disorder (Prince *et al.*, 2007).

It is understood that developing countries have introduced decentralisation to the healthcare sector which will lead to reforms. Although seen to improve healthcare systems, the associated risks with healthcare sector reform are demonstrated when decentralisation can be fragmented, or duplication of services takes place creating inefficient use of resources; while mental healthcare services could become marginalised as reforms prevent provision of these services (World Health Organization, 2003b). This will be most apparent in the transfer of responsibility-devolution-creating a significant difference in provision of mental healthcare services between decentralized regions. Therefore, governments can negatively affect the mental health of populations at policy level; with poor policies and reforms likely to aid in mental status through socioeconomic factors (World Health Organization, 2003b).

Human rights violations may occur with mental health conditions, as many people with mental illness may lack educational and income generating opportunities. This causes poor economic development, depriving a marginalised group from social networks and status within a community. Severer mental illness is associated with up to 90% of unemployment (World Health Organization, 2011). People with mental disorders are often subject to unhygienic and inhuman living conditions, attracting neglect, physical and sexual abuse and degrading treatment practices in health facilities (World Health Organization, 2011). This is coupled with denied civil and political rights, effectively disincorporating people with mental disorders from the conduct of public life (Bitanihirwe, 2015; World Health Organization, 2011). The exacerbation of marginalization coincides with the extent of homelessness and incarceration of people with mental health conditions. Mental illness among the homeless is greater than 50%, while one third of prison inmates have mental health conditions (World Health Organization, 2011).

[46] Abstract semantic qualifiers is critical reasoning where by representations can trigger patterns creating a predictable structure as an anchor point, analytic or non-analytic these descriptors can be used to compare and contrast (Bowen, Cox and Irby, 2006)

High-income countries navigate mental illness with policy, plan and legislation more profoundly than low-income and middle-income countries. This is presented with only 36% of people living in low-and middle-income countries are covered by dedicated mental health care legislation compared with 92% in high-income countries. Thus human resources in low-and middle-income countries are inadequate as the majority of the world's population lives where there is one psychiatrist for every 200 000 people (World Health Organization, 2011). Susceptible to human rights violations and abuse, with widespread recognition internationally, conclusive policies and resources to improve mental healthcare continue to be overlooked around the world (World Health Organization, 2011; Bitanihirwe, 2015).

2.2.1. The semantics of Mental Illness

The Burden of Disease study was a concept that was inaugurated in 1996 by the World Bank, the Harvard school of Public Health and the World Health Organisation to delineate loss of health and death due to disease, injuries and risk factors globally (World Health Organization, 2004a). Hence the concept the Global Burden of Disease (GBD). (Whiteford, 2013). The Global Burden of Disease concept quantifies reliable estimates to establish the burden of premature mortality and disability for major diseases or disease groups. The GBD concept distinguishes the more comprehensible and consistent set of estimates of morbidity and mortality produced (World Health Organisation, 2002). Martel and Steensma (2012) confirm there were a need to access data for health decision-making on a global scale, aiming to initiate an objective and comparable assessment of health status-concerning onset of injuries and diseases (Martel and Steensma, 2012). This concept was revolutionary as previous burden of disease concepts focused only on mortality (Chen *et al.*, 2015).

The GBD concept is a summary of measure using combined estimates of years of life lost (YLL) and years lived with disabilities (YLD) to equate to disability-adjusted life years (DALY) to consider mortality and loss of functional health due to health conditions including variables of age, sex and region (World Health Organisation, 2002). Estimates produced provides detail on disease and ranks the impact on global populations (Martel

and Steensma, 2012). This combined summary health measure (DALY) of mortality and morbidity aims to measure global burden of disease and effectiveness of health interventions (Whiteford, 2013; Chen *et al.*, 2015)

Disability-Adjusted Life Years (DALY) – a measure of burden of disease that quantifies premature mortality and functional health of a population and is not limited to years of life lost due to mortality but also includes years of healthy life lost by individuals who are disabled or in poor health. Adding together Years Lost due to Disability (YLD) and Years of life lost (YLL) will equal DALY. A DALY equates to one year of healthy life lost due to disability or death. (Martel and Steensma, 2012; World Health Organization, 2004)

Years Lost due to Disability (YLD) – is the number of years of healthy life lost due to time spent with a disability, having poor functional health status because of a health condition. (World Health Organization, 2004; Martel and Steensma, 2012)

Years of Life Lost (YLL) – is the number of years of life lost through premature mortality-dying early from a disease . (Martel and Steensma, 2012; World Health Organization, 2004)

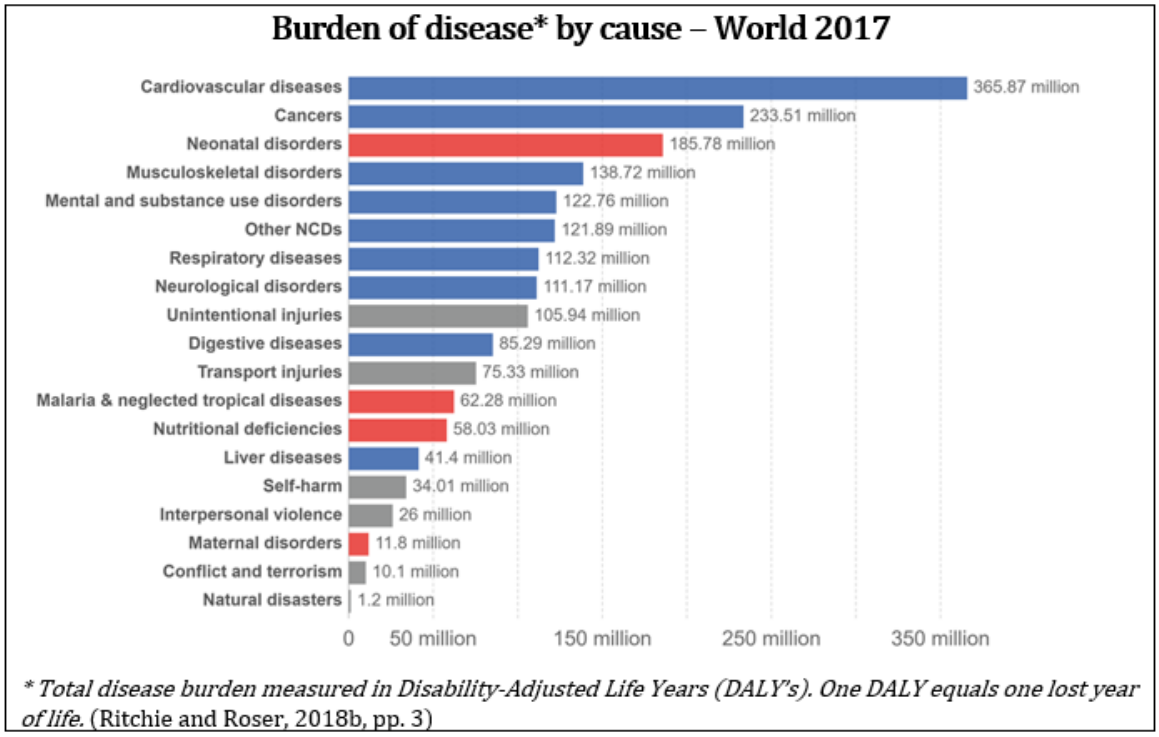
DALY = YLD + YLL

This concept of using DALY has revealed surprises when assessing a populations health. A perfect example of this is the global burden of disease study that suggests neuropsychiatric conditions to cause significant disability globally, accountable for a proximally 33% of all years lived with disability among adults 15 years and older, however only accounts for 2.2% of deaths and 13% of disability-adjusted life-years (Vigo, Thornicroft and Atun, 2016). Thus using DALY completely alters the dimension in which we review prospective health conditions. (Chen *et al.*, 2015; World Health Organization, 2004a). Neuropsychiatric disorders, coronary heart disease and stroke, Cancer and Endocrine disorders (mainly diabetes) are non-communicable[47] diseases that contribute significantly to disability and mortality as they all share a comorbidity. Non-communicable

[47] Non-communicable diseases are chronic diseases, tending to be lifelong duration. Can be a result genetic, physiological, environmental and behaviour factors (World Health Organization, 2004a)

diseases globally are a challenge being the leading cause of global death in high-income countries, with 80% of deaths in low-income and middle-income countries (Prince *et al.*, 2007) (See annexure 1).

Figure 5: Burden of Disease (Ritchie and Roser, 2018b, pp. 3)



** Total disease burden measured in Disability-Adjusted Life Years (DALY's). One DALY equals one lost year of life.* (Ritchie and Roser, 2018b, pp. 3)

Another classification/diagnostic tool used in mental illness is the *Diagnostic and Statistical Manual of Mental Disorders (DSM)* created by the American Psychiatric Association so mental health professionals would have a common language when diagnosing individuals with mental disorders (Blashfield *et al.*, 2014). The DSM-5 classification is: (Blashfield *et al.*, 2014; American Psychiatric Association, 2012)

Table 1: DSM-5 Mental Illness classifications (American Psychiatric Association, 2013)

Broad Mental disorder classification with Sub classification within mental disorder		Broad Mental disorder classification with Sub classification within mental disorder	
Neurodevelopmental disorders	***Intellectual disabilities*** • Intellectual disability • Global Developmental delay ***Communication Disorders*** • Language disorder • Speech sound disorder • Social communication disorder	**Neurocognitive (NC) Disorders**	• Delirium ***Major and Mild Neurocognitive Disorders*** • Major/Mild NC disorder due to Alzheimer's Disease • Major/Mild frontotemporal NC disorder • Major/Mild NC disorder with Lewy Bodies

	Autism spectrum Disorder ***ADHD*** ***Specific Learning Disorder*** ***Motor disorders*** • Developmental coordination disorder • Stereotypic movement disorder ***Tic Disorders*** • Tourette's disorder • Persistent (chronic) motor or vocal Tic disorder • Provisional Tic disorder ***Other Neurodevelopmental disorders*** • Other specified neurodevelopmental disorder • Unspecified neurodevelopmental disorder		• Major/Mild vascular NC disorder • Major/Mild NC disorder due to traumatic brain injury • Substance/Medication-induced Major/Mild NC disorder • Major/Mild NC disorder due to HIV infection • Major/Mild NC disorder due to prion disease • Major/Mild NC disorder due to Parkinson's Disease • Major/Mild NC disorder due to Huntington's Disease • Major/Mild NC disorder due to another medical condition • Major/Mild NC disorder due to multiple aetiologies • Unspecified NC disorder
Schizophrenia Spectrum and other Psychotic Disorders	• Schizotypal (personality) disorder • Delusional disorder • Brief psychotic disorder • Schizophreniform disorder • Schizophrenia • Schizoaffective disorder • Substance/medication-induced psychotic disorder • Psychotic disorder due to another medical condition ***Catatonia*** • Catatonia associated with another mental disorder • Catatonia disorder due to another medical condition • Unspecified catatonia	**Substance-related and Addictive Disorders**	***Substance related disorders*** • Substance use disorders • Substance-induced disorders • Substance/medication-induced medical disorder • Substance intoxication and withdrawal • Alcohol-related disorders • Caffeine-related disorders • Cannabis-related disorders • Hallucinogen-related disorders • Inhalant-related disorders • Opioid-related disorders • Sedative, hypnotic or anxiolytic-related disorders • Stimulant-related disorders • Tobacco-related disorders • Unknown substance-related disorder ***Non-substance related disorders*** • Gambling Disorder
Bipolar and related Disorders	• Bipolar I disorder • Bipolar II disorder • Cyclothymic disorder • Substance/Medication-induced Bipolar and related • Bipolar and related disorder due to another medical condition	**Depressive Disorders**	• Disruptive mood dysregulation disorder • Major depressive disorder, single and recurrent episodes • Persistent depressive disorder (dysthymia) • Premenstrual dysphoric disorder • Depressive disorder due to another medical condition
Paraphilic disorders	• Voyeuristic disorder • Exhibitionistic disorder • Frotteuristic disorder • Sexual Masochism disorder	**Obsessive-Compulsive and related Disorders**	• Obsessive-Compulsive disorder • Body dysmorphic disorder • Hoarding disorder • Trichotillomania (hair-pulling disorder)

	• Sexual Sadism disorder • Paedophilic disorder • Fetishistic disorder • Transvestic disorder		• Excoriation (skin-picking disorder) • Substance/Medication induced OCD • Obsessive Compulsive disorder due to another medical condition
Trauma-and Stressor-related Disorders	• Reactive attachment disorder • Disinhibited social engagement disorder • Posttraumatic stress disorder • Acute stress disorder • Adjustment disorder	**Dissociative Disorders**	• Dissociative identity disorder • Dissociative amnesia • Depersonalization/Derealization disorder
Somatic Symptom and related Disorders	• Somatic symptom and related disorder • Illness anxiety disorder • Conversion disorder • Psychological factors affecting other medical conditions • Factitious disorder	**Feeding and eating Disorders**	• Pica • Rumination disorder • Avoidant/Restrictive food intake disorder • Anorexia Nervosa • Bulimia Nervosa • Binge-eating disorder
Sleep-wake Disorders	• Insomnia disorder • Hypersomnolence disorder • Narcolepsy	**Elimination Disorders**	• Enuresis • Encopresis
Breathing-related Sleep Disorders	• Obstructive sleep apnea hypopnea • Central sleep apnea • Sleep-related hypoventilation • Circadian rhythm sleep-wake disorder	**Parasomnias**	• Non-REM sleep arousal disorder • Sleepwalking • Sleep terrors • Nightmare disorder • REM sleep behaviour disorder • Restless legs syndrome • Substance/Medication-induced sleep disorder
Gender Dysphoria	• Gender Dysphoria	**Other Mental Disorders**	• Other specified mental disorder due to another medical condition • Unspecified mental disorder due to another medical condition
Sexual Dysfunctions	• Delayed ejaculation • Erectile disorder • Female orgasmic disorder • Female sexual interest/arousal disorder • Genito-Pelvic pain disorder • Male hypoactive sexual desire disorder • Premature ejaculation • Substance/medication-induced sexual dysfunction	**Disruptive, Impulse-Control and Conduct Disorders**	• Oppositional defiant disorder • Intermittent explosive disorder • Conduct disorder • Antisocial personality disorder • Pyromania • Kleptomania
Personality Disorders	• General personality disorders ***Cluster A Personality Disorders***	**Anxiety Disorders**	• Separation anxiety disorder • Selective mutism • Specific phobia

• Paranoid • Schizoid • Schizotypal ***Cluster B Personality Disorders*** • Antisocial • Borderline • Histrionic • Narcissistic ***Cluster C Personality Disorders*** • Avoidant • Dependent • Obsessive-Compulsive ***Other Personality Disorders*** • Personality changes due to another medical condition	• Social anxiety disorder (social phobia) • Panic disorder • Panic attack • Agoraphobia • Generalized anxiety disorder • Substance/medication induced anxiety disorder • Anxiety disorder due to another medical condition

2.2.2. Global costs of Mental Illness

Mental illness costs governments trillions of US dollars. In 2010 the World Economic Forum stated the global cost of mental illness was US$ 2.5 trillion and projected to rise by 240% to US$ 6 trillion by 2030 (Bitanihirwe, 2015; Patel and Saxena, 2014). This burden of cost has a knock-on effect on low-and middle-income countries (Mnookin, 2016). A significant two-thirds majority of global costs are indirectly associated with loss of productivity and income due to death or disability, projecting the global cost of lost production to be more than 10 billion days of lost work annually-equivalent of US$ 1 trillion per year (Mnookin, 2016). The World Health Organisation ratifies the global impact of mental disorders in terms of lost economic output and will increase by US$ 16 000 billion over 20 years (World Health Organization, 2011).Mental illness leads individuals and families into poverty due to health care costs, while significant evidence shows social conditions associated to poverty create stress triggers for mental illness (World Health Organization, 2011; Mnookin, 2016).

High-income countries devote 5.1% of their health budget to mental health, while low-and middle-income countries only assign 0.5% of their health budget to mental health (Mnookin, 2016). Studies in high-income countries report total costs associated with mental illness between 2.3% and 4.4% of GDP and although associated with large economic and social costs, treating and preventing mental illness can exacerbate substantial health and economic gains (Mnookin, 2016).The World Health Organisation continue to suggest that countries show poor initiative in meeting mental health care

needs, particularly with financial and human resources, as inequitable distribution and inefficient use of resources is rife (Prince *et al.*, 2007; World Health Organization, 2011). Globally 67% of financial resources allocated to mental health is still directed to hospitals which are associated with human rights violations and poor health outcomes; community-based services would allow better cost-effective access to health care for more people, keeping with deinstitutionalising of mental health care patients (World Health Organization, 2011). The table below is an example to shed clarity in understanding the significance of mental health costs on the global population (Mnookin, 2016).

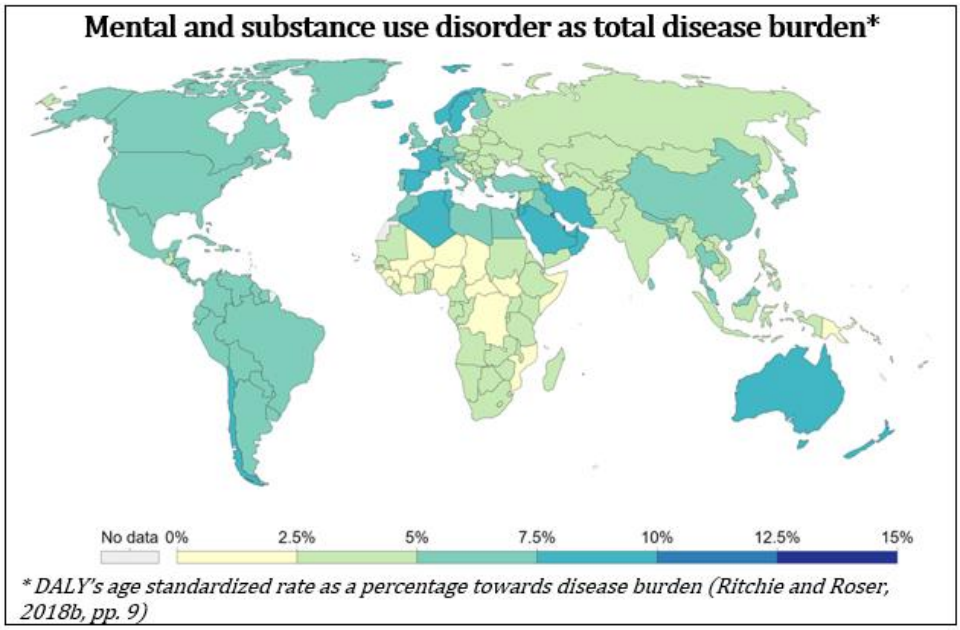
Table 2: Global Direct and Indirect costs of Mental Illness (Mnookin, 2016, pp. 7)

Direct and Indirect costs of Mental Illness					
Country	**Year**	**Direct costs in billions**	**Indirect costs in billions**	**Total costs in billions**	**% of GDP**
Canada (CAD)	2011	42.3 billion	6.3 billion	48.6 billion	4.4%
England (GBP)	2010	21.3 billion	30.3 billion	51.6 billion	4.1%
France (EUR)	2007	22.8 billion	21.3 billion	44.1 billion	2.3%
Global (USD)	2010	823 billion	1670 billion	2493 billion	4%

2.2.3. Universal Mental Illness

Prevalent mental illness looks at the most common mental illness and mental disorders globally. Annually anxiety disorders, depression, substance abuse, bipolar disorder, schizophrenia and eating disorders add to the burden of mental illness. In 2017 it was estimated between 792 and 970 million people lived or suffered from a mental illness. Statistically this equates to one in every ten people at 10.7% of people (Ritchie and Roser, 2018b). The prevalent mental disorders that will be discussed are those that feature more consistently in S.A. These will be anxiety disorders and depression (Ritchie and Roser, 2018b). The focus is on these two specific disorders as they have leading tendency to create poor mental health, leading to suicide. Substance abuse is rife and is added to mental illness when assessing the disease burden of a country. The figure below shows the disease burden of mental and substance abuse disorders in 2017. The disease burden is measured in DALY's, not only looking at the mortality but also years lived with the health burden. Mental and substance use disorders account for 5% of global disease burden in 2017, Australia, Saudi Arabia and Iran the most affected. Mental and substance abuse in South Africa features between 2.5 and 5% towards the burden of disease (Ritchie and Roser, 2018b).

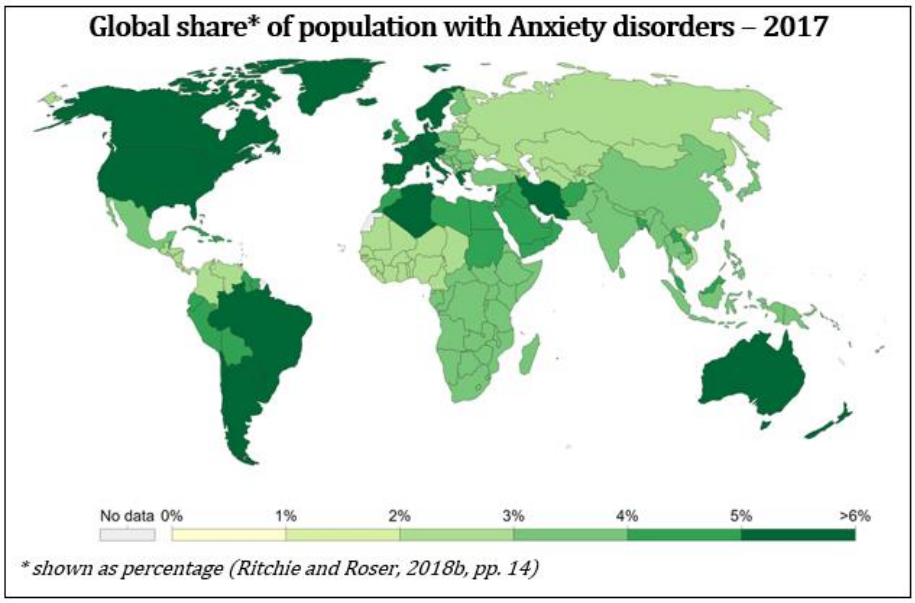
Figure 6: Mental and substance use disorder as total disease burden (Ritchie and Roser, 2018b, pp. 9)



2.2.3.1. Anxiety disorders

Anxiety disorders have become a leading cause of mental disorder in 2017. Anxiety disorders come in forms like post-traumatic stress, obsessive compulsive disorders or generalized anxiety disorders. The prevalence of anxiety disorders differs between country from 2.5 to 7% by country. In 2017, 284million people experienced an anxiety disorder. It was established that 179million people with an anxiety disorder were female and 105million were male. S.A represents between 3 and 4% of people with anxiety disorders (World Health Organization, 2017; Ritchie and Roser, 2018b).

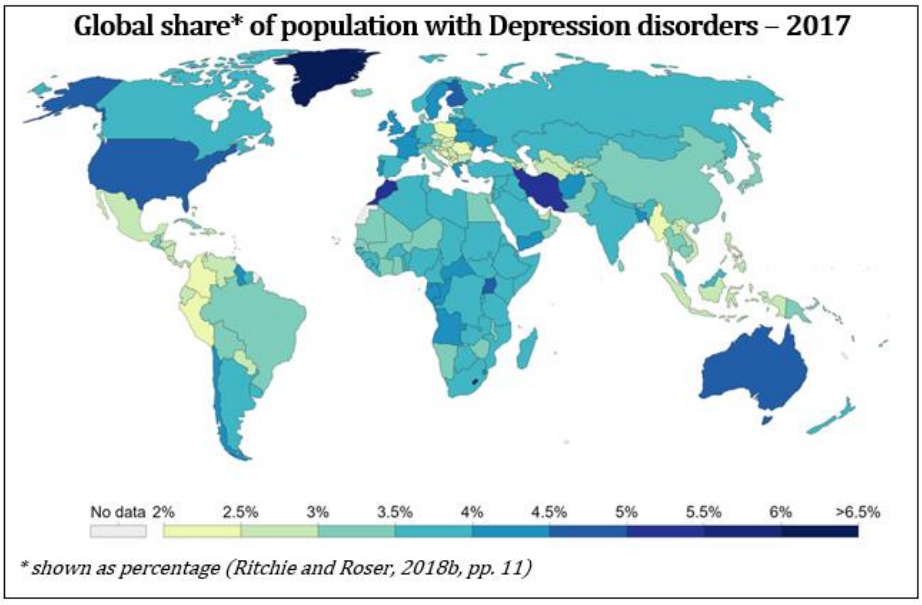
Figure 7: Share of global population with Anxiety disorders – 2017 (Ritchie and Roser, 2018b, pp. 14)



2.2.3.2. Depression

Depression effected 268million people in 2017. It was noted that 4.1% of people with depression were female and 2.7% male. Depression is diagnosed as mild persistent depression. Symptoms will be a depressed mood with loss of interest, while fatigue and self-harm may be present. This episode of depression normally lasts for 2 weeks (Ritchie and Roser, 2018b). Severe depression usually comes with considerable distress and agitation with loss of self-esteem and feeling of uselessness. Severe depression can be so severe that a person would not be able to continue with work, social and domestic activities. The older population of 70 years old have a higher likelihood of depression (World Health Organization, 2017; Ritchie and Roser, 2018b). Depression is recorded at 3.7% in S.A.

Figure 8: Share of global population with depression disorder – 2017 (Ritchie and Roser, 2018b, pp. 11)



2.2.4. Comorbidity of Mental Illness

Mental illness has roots in the social factors as well as comorbidity with communicable diseases, non-communicable diseases, reproduction, maternal and child health and injuries. Comorbidity has often been mistaken for somatisation as somatic symptoms and syndromes are usually associated with mental disorders aiding in the burden of underdiagnosed mental disorders (Prince *et al.*, 2007), however mental disorders impose a range of consequences for comorbid chronic conditions aiding in poor compliance with health regimes causing unfavourable disease outcomes and diminished immune functioning (World Health Organization, 2003b).

2.2.4.1. Non-communicable diseases

Cardiovascular disease and diabetes are two non-communicable diseases that share a comorbidity with mental illness. Systematic reviews have proven that there is a strong correlation between depression, anxiety and coronary heart disease with the increase of depression after a myocardial infarction by 15%-30%, normally within the first month of the event (Prince *et al.*, 2007). This makes comorbid depression a symptom of coronary

syndromes as well as for a person who experiences a stroke. The comorbidity between a mental disorder and diabetes is prevalent in schizophrenia, as notable abnormalities of glucose was seen before the use of antipsychotic medication as well as noted metabolic changes to the effects of typical and atypical antipsychotic medication, the hereditary genes of diabetes has been the most notable comorbidity to a mental disorder with noncompliance of medication regime, depression and schizophrenia can exacerbate diabetes and vice versa (Prince *et al.*, 2007).

2.2.4.2. Communicable diseases

The communicable diseases that share a comorbidity with mental illness are HIV/AIDS and Tuberculosis. Prince et al (2007) suggest that people with mental disorders have a proven risk for HIV/AIDS as their behavioural risk factors eludes to lack of precaution through unprotected sex or communicable substance abuse needle sharing, heightening the prevalence of HIV (Prince *et al.*, 2007). It is further established that the HIV/AIDS infection has direct effects on the central nervous system, causing neuropsychiatric complications like depression, mania, cognitive disorder and frank dementia (Prince *et al.*, 2007). However with highly active anti-retroviral therapy (HAART) HIV dementia has halved, but can create side effects including depression, psychosis and hallucinations putting people at risk of a mental disorder (Prince *et al.*, 2007). Tuberculosis is a communicable disease often linked with the HIV/AIDS infection, causing a high prevalence of comorbidity. Tuberculosis has been found to be a comorbidity to mental illness as it is exacerbated through commune[48], while mental health users behavioural factors presume incomplete treatment regimes, while depression has been found to be the most significant comorbidity with tuberculosis, however under-educating people with mental illness is the greatest cause of comorbidity of communicable diseases and mental illness (Prince *et al.*, 2007).

[48] Commune refers to patients institutionalized

2.2.4.3. Reproduction

Reproduction has comorbidity with mental illness in the form of hereditary mental disorders passed from generation to generation. The factor of man to woman ratio transcends the norms of gender based inequality, subjecting woman to having a higher prevalence of depression as woman are considered unequal to men in many cultures, suggesting a woman is far more vulnerable to a mental illness than men, also being subjected to gender based violence (Prince *et al.*, 2007). Substance abuse and drug psychosis have had adverse effects on sexual reproduction and maternity, often causing the explicable incurable foetal alcohol syndrome, which is a leading cause of mental illness in S.A (WHO, 2003; Prince *et al.*, 2007).

2.2.4.4. Maternal and Child Health

Infant growth and survival is affected by maternal psychosis, with preterm delivery and low birth weight associated with maternal schizophrenia, stillbirth or infant mortality (Bitanihirwe, 2015; Prince *et al.*, 2007). Postpartum depression affects 10%-15% of woman, creating devastating effects for early mother-infant relationship nuancing psychological development in children, while maternal depression is associated with suboptimal breastfeeding enhancing increased hospital admissions for children in early stages of life (Prince *et al.*, 2007), thus maternal psychosis or common maternal mental disorders are imperative to cure as it contributes to mental disorders in the next generation.

2.2.4.5. Injuries and mental health

According to the World Health Organisation, mental health problems is a cause and a consequence of injury thus aiding in comorbidity (WHO, 2003). Injury and mental disorders share the determinants of poverty, alcohol abuse and conflict violence, thus preserving the prevalence for mental illness when dealing with injury control (Prince *et al.*, 2007). Maternal postnatal depression is associated with burns and scalds while 98% of child injury deaths is in low-and middle-income countries, perpetuated through mental disorders in care givers and post maternal mental depression (Prince *et al.*, 2007). Injury

and violence enhance the prevalence of mental illness as post-traumatic stress is a recognised consequence of injury, when exacerbated can come from post war conflict, child abuse, sexual abuse, violence and substance abuse enhancing the consequences of depression, behavioural problems and suicide. Post-traumatic stress disorder increases with each traumatic event (Prince *et al.*, 2007).

2.2.4.6. Mental health and Covid-19 (2019-nCoV / SARS-CoV-2)

The research done for this thesis was conducted over a period (2017-2019) before the novel SARS-CoV-2 (Covid-19) pandemic crippled the world. The idea of this section is a basic briefing on the concept of Covid-19 and mental health. Notably, the long-term effects of Covid-19 on mental health are unknown and will need to be researched.

The formidable effect created by Covid-19 (Coronavirus) pandemic has provided a threat to humankind's existence, creating a global volatile market. The volatility can create trauma for people in many ways, at individual and collective levels. This could result in mental health challenges (Otu, Charles and Yaya, 2020). Notably mental health problems account for one-third of the worlds disability in adults and is closely associated to deadly disease outbreaks (Otu, Charles and Yaya, 2020). Mental health problems have been found to be experienced by health care consumers, front line health care workers and communities, with elevated levels of stress, anxiety and depression occurring (Otu, Charles and Yaya, 2020). It is known that infectious disease outbreaks have been associated with xenophobia and stigma, while a rise in depression, self-harm, alcohol/drug abuse and psychological consequences are predicted (Otu, Charles and Yaya, 2020).

In a study done in Soweto, S.A, adults were twice as likely to develop depressive symptoms after contracting Covid-19, experiencing anxiety, financial insecurity and fear of contracting infection (Kim, Nyengerai and Mendenhall, 2020). Higher risk of Covid-19 infection was associated with greater depressive symptoms in the 6 weeks of quarantine (lockdown), (Kim, Nyengerai and Mendenhall, 2020). Evidence from previous pandemics (SARS, MERS) insists people with poor mental health status before quarantine (lockdown) were at major risk of worsening psychiatric morbidity after quarantine (Kim,

Nyengerai and Mendenhall, 2020). Knowing the S.A mental health milieu of only 27% of people with severe mental illness on treatment, 16% of citizens having medical aid and only 0.31 psychiatrists per 100 000 population (Kim, Nyengerai and Mendenhall, 2020), suggests that a poor mental health dilemma could arise with no official mental health response planned.

In a study done in Wuhan, China, it was discovered that health care workers, patients with Covid-19 and other illness, children, adults and elderly had experienced PTSD, depression, insomnia and anxiety due to physical distancing, stigma, illness, discrimination and job losses (Semo and Frissa, 2020). In China the prevalence of anxiety in health care workers was 45%, depression 51%, insomnia 36% and PTSD 74% (De Brier *et al.*, 2020; Semo and Frissa, 2020). The USA reported that 45% of adults experienced anxiety and stress due to social distancing and anticipatory grief. The UK found 33% of people to have experienced severe anxiety since the pandemic while Italy recorded PTSD in 37%, severe anxiety in 20%, stress in 21%, depression in 17% and insomnia in 7% of respondents to a survey on Covid-19 (Semo and Frissa, 2020). In India and Singapore a strong association was found between persistent throat pain, headaches, lethargy and mental health problems among health care workers (Semo and Frissa, 2020). Thus, it must be noted that Covid-19 and its long-term effects of mental health need to be researched (De Brier *et al.*, 2020).

2.2.5. Stigma around Mental Illness

Stigma of mental illness aids in discrimination against mental health care users, leading to poor development in mental health care policy and reform (Zartaloudi and Madianos, 2010). Stigma comes from the Greek word stigmata meaning the mark of shame and when referenced with mental illness is a multifaceted constructs involving feelings, attitudes and behaviours (Corrigan and Bink, 2015). Cognitive behavioural constructs explain the term stigma in mental illness as stereotypes, prejudice and discrimination (Corrigan and Bink, 2015). Stereotypes are presumed fact-based knowledge structures in any culture which has negative evaluative components, which with evolution, becomes prejudice when people develop negative emotions. The behavioural results of prejudice

causes discrimination, typically taking a punitive form, restricting access to a rightful opportunity (Corrigan and Bink, 2015).

Stigma can also be broken down into categories known as public-sigma, self-stigma and structural-stigma rendering the study of stigma in mental health colossal to improving human rights (Overton and Medina, 2008). In a notable study on *"Attitudes towards stigma"* it was concluded that stigma has resulted in less prioritization of public resources to mental health care services and diminished quality of care delivered to mental health care users (Southgate, 1993). Public-stigma focuses on how individuals in the public endorse the stereotypes of mental illness and act in a discriminatory manner, elevating the concept of self-stigma, the process which a person with mental illness internalizes prejudice and discrimination from public stigma (Corrigan and Bink, 2015). Structural-stigma elaborates the concept of policies of private and governmental institutions that intentionally restrict opportunities of people with mental illness(Corrigan and Bink, 2015).

2.2.6. Deliberate Self-Harm, Attempted Suicide and Suicide

Deliberate Self-Harm (DSH) is an intentional act of creating physical injury to oneself. Usually there is no intention to die (Lauw, How and Loh, 2015). DSH has been believed to be the causation of personal distress, where by an individual would inflict bodily harm to themselves, deliberately to cause injury. This is usually done with cutting (knife/blade), scratching or hitting oneself and overdose (usually drugs). Risk factors (distal) play a part in DSH origins. Current mental illness and chronic disease, physical and sexual abuse and a history of being bullied all presented to be distal risk factors before DSH has occurred (Arkins *et al.*, 2013). Many studies have proven DSH to be associated to poor interpersonal conflict styles, risk taking behaviour and substance abuse. Arkins *et al* (2013) states that presenting to Emergency Departments (ED) for DSH has increased, mainly among 15- to 24-year-olds. It is noted that many of these people repeated visits to the ED for DSH. This signals that the underlaying problem of this recurrent crisis is not being addressed (Arkins *et al.*, 2013; Lauw, How and Loh, 2015; Centre for Suicide Prevention, 2017).

With elucidation, it's been stated that having a history of DSH, has proven to be a main indicator for suicide, admittingly that suicide is the most severe form of DSH. Suicide is among the leading causes of death among 15 to 24 year olds with researchers classifying all DSH on a suicidal continuum (Arkins *et al.*, 2013; Centre for Suicide Prevention, 2017). Notably, people who DSH are not always having suicidal thoughts when they are busy self-injuring, however DSH can provoke suicidal ideation (thoughts) and behaviours, with intent to die becoming an outcome over time. A study has found that half the population that DSH have attempted a suicide attempted. DSH becomes dangerous when the self-inflicted pain provides no relief, ceasing to offset pain, relief caused by stress and trauma fails to provide an escape. This eventually leads to harsher DSH practice and ultimately suicide. Due to the risk of suicide, people that DSH need to have constant suicide risk assessments (Centre for Suicide Prevention, 2017).

Important facts about DSH from Canada has proven that without prevention, a crisis could loom. Statistical facts have put 5% of the adult population to have inflicted DSH and 15% of the youth. DSH usually begins between 12 to 15 years of age. Hospitalisation of DSH occurs four times more often for girls 14 to 17 years of age than boys. Females are more likely to cut, while males usually adopt burning and hitting themselves (Centre for Suicide Prevention, 2017). DSH may not be considered a mental illness, but sure is an indication of someone who is experiencing poor mental health. This poor mental health could lead to mental illness and ultimately suicide.

DSH has many common terms, often providing the nuance of treating the condition correctly. Parasuicide is one of these terms added to the group of self-inflicting harm or DSH. Today parasuicide is rather labelled under the term attempted suicide. Suicide was seen as fatal, but not all attempts at suicide was failed suicide (De Leo *et al.*, 2006). This denoted the term parasuicide and was seen as manipulative or as an attempt to seek attention. This is where the confusion of attempted suicide (parasuicide) being classified as DSH. Parasuicide (attempted suicide) was later defined as

> "…an act with a nonfatal outcome in which an individual deliberately initiates a non-habitual behaviour that, without intervention from others, will cause self-harm, or deliberately ingests a substance in excess of the prescribed or generally recognized therapeutic dosage, and which is aimed at realizing changes which the

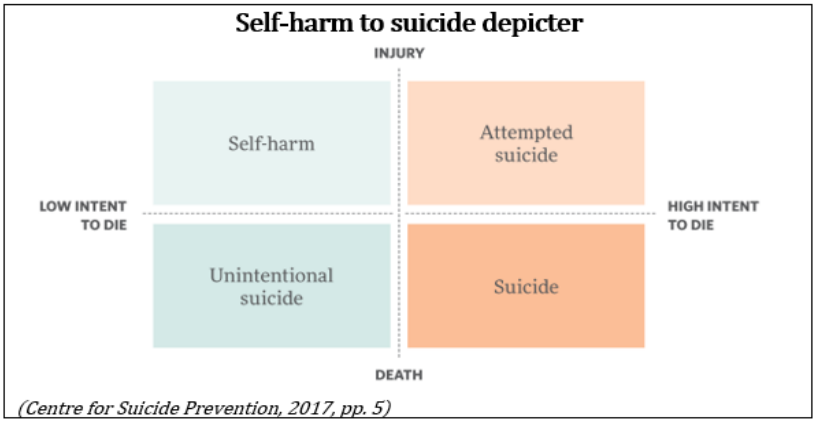
> subject desired, via the actual or expected physical consequences…" (De Leo *et al.*, 2006, pp. 8)

Parasuicide provided confusion and has been termed interchangeably with attempted suicide since 1994 (De Leo *et al.*, 2006). It has become more evident that DSH and deliberate self-poisoning could also be categorised as a parasuicide with consistency in DSH leading to eventual fatality. At what number attempt of DSH, would you consider it parasuicide? Subsequently parasuicide, attempted suicide, DSH and deliberate self-poisoning could be grouped under the category of 'non-fatal suicidal behaviour, with or without injuries' (De Leo *et al.*, 2006). De Leo *et al* (2006) defines this new category as:

> "…a nonhabitual act with nonfatal outcome that the individual, expecting to, or taking the risk to die or to inflict bodily harm, initiated and carried out with the purpose of bringing about wanted changes…" (De Leo *et al.*, 2006, pp. 14).

It must be understood that self-harm is not attempted suicide and attempted suicide is not always failed suicide. DSH is not suicide but can become suicide. These three components are all interrelated. DSH, once it has become unreleasing, can lead to attempts at suicide and these attempts can become suicide.

Figure 9: DSH, Attempted Suicide and Suicide depicter (Centre for Suicide Prevention, 2017, pp. 5)



(Centre for Suicide Prevention, 2017, pp. 5)

"Suicide is an act with fatal outcome, which the deceased, knowing or expecting a potentially fatal outcome, has initiated and carried out with the purpose of bringing about wanted changes" (De Leo *et al.*, 2006, pp. 12). The word suicide authenticated in the 17th century from the Latin words *sui* (of oneself) and *caedere* (to kill). Suicide was used to distinguish between homicide of oneself and murder of another (De Leo *et al.*, 2006). The

conceptualisation of suicide as it is today has been shaped over history. Suicide in antiquity used to be accepted and recommended, as with the early Roman culture of *mors voluntaria*[49]*.* Through the Middle-Ages suicide had been seen as criminality with harsh punishments existing for families of suicide victims. Attempted suicide victims were taken to trial and tried on *non-compos mentis*[50] for a person believed to have mental illness or on *felo de se*[51], tried in violation of the laws of God and man (De Leo *et al.*, 2006).

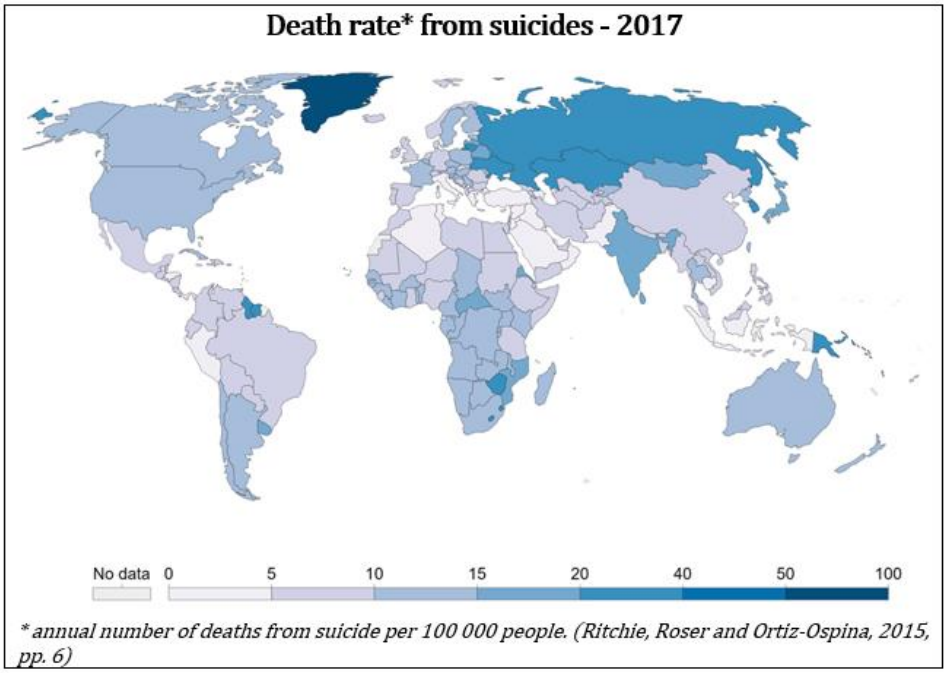
Suicidal ideation and progression from ideation to suicide attempts are two distinct phenomena that produce explanations and predictors towards eventual suicide. An ideation-to-action framework provides literature behind dealing with suicide ideation and has proven DSH and depression to be an accurate indication for early suicide and suicidal ideation (Klonsky, May and Saffer, 2016). Suicide is the most fatal outcome of poor mental health, mental illness and DSH. It has been revealed that many people who have committed suicide have had mental illness, however mental illness is not the only cause. In developed countries bipolar disorder, posttraumatic stress disorder and major depression disorder are usually associated to suicide deaths. In developing countries posttraumatic stress disorder, conduct disorder and substance abuse disorder are usually associated to suicide deaths (Klonsky, May and Saffer, 2016).

Suicidal thoughts (ideation) and attempted suicides are a huge burden to society and the economy. The global lifetime prevalence of suicide ideation is 9.2% and 2.7% for attempted suicides. This suicidal ideation and attempts are a strong predictor of suicide, often hospitalising many people each year. This adds to the financial burden of a country. (Klonsky, May and Saffer, 2016). About 800 thousand people commit suicide yearly, averaging one person every 40 seconds. Suicide rates are higher in developed countries (high income) than in developing countries (low-and middle-income), however developing countries account for over 75% of all global suicides (Klonsky, May and Saffer, 2016). See figure 10 of Global Death rate from suicides in 2017. It has been proven that men are more likely to commit suicide than woman while woman are more likely to suffer from

[49] Antient Roman practice of committing suicide willingly
[50] Of unsound mind.
[51] Felons of themselves

depression and DSH. Suicide rates are highest amongst adults 70 and older, however a dipropionate amounts of suicides between the ages 15-29 years, the second leading cause of death for this age (Klonsky, May and Saffer, 2016). See figure 11 and 12. These two figures portray global suicide by gender and by age. This is significant to understand what the researcher is dealing with when conducting this research.

Figure 10: Global Death rate from Suicides (Ritchie, Roser and Ortiz-Ospina, 2015, pp. 6)



** annual number of deaths from suicide per 100 000 people. (Ritchie, Roser and Ortiz-Ospina, 2015, pp. 6)*

Figure 11: Global Suicide rate by age (Ritchie, Roser and Ortiz-Ospina, 2015, pp. 8)

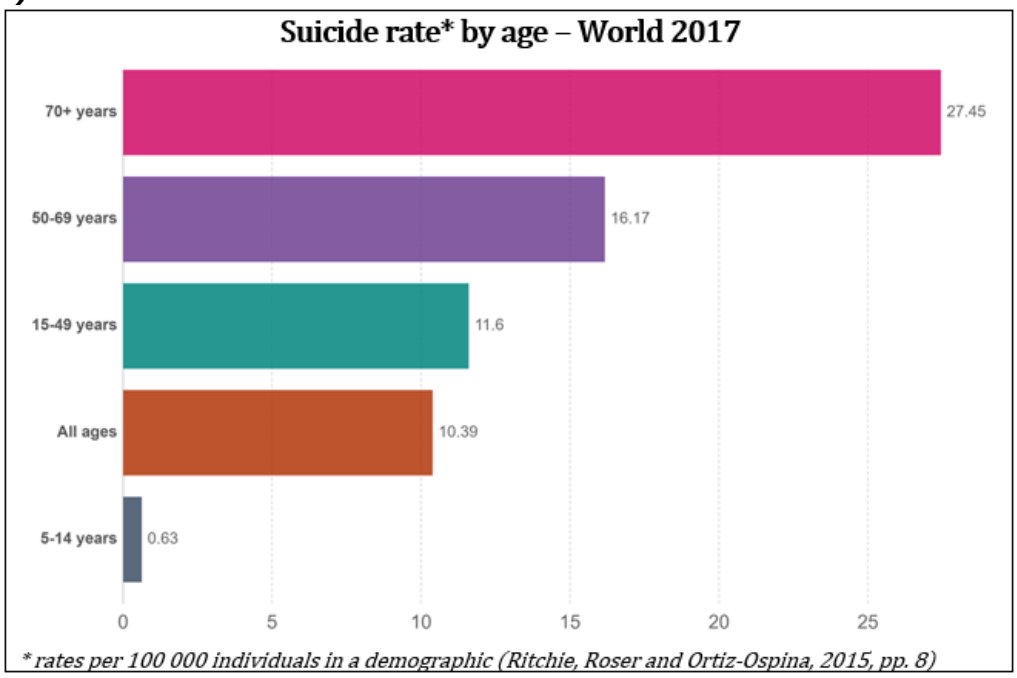
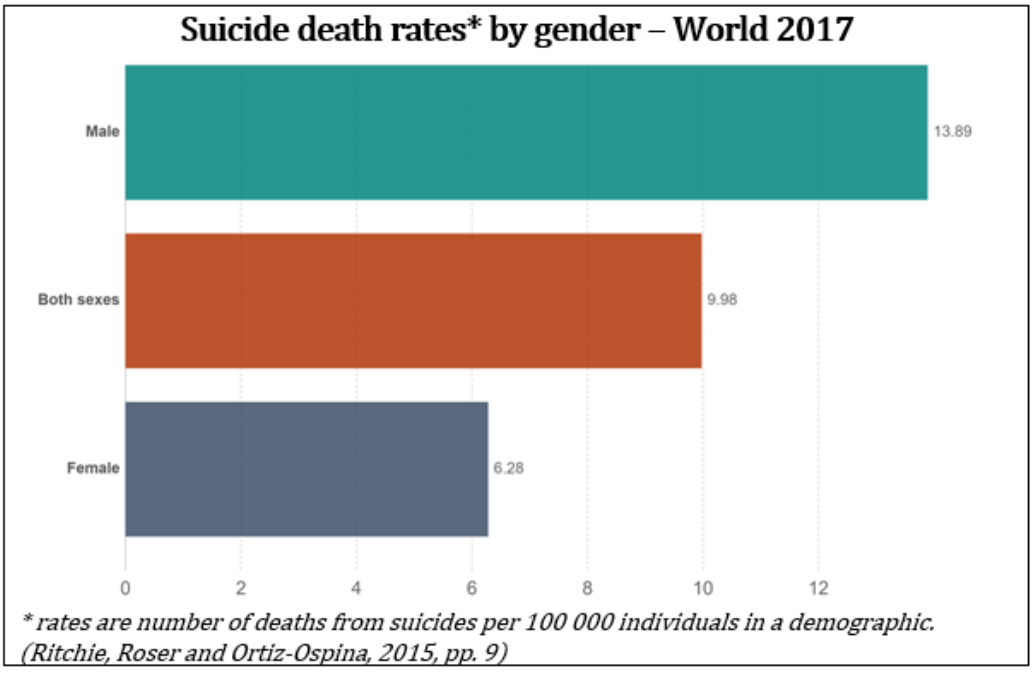


Figure 12: Global Suicide rate by gender (Ritchie, Roser and Ortiz-Ospina, 2015, pp. 9)



2.3. Determinants of Mental Health

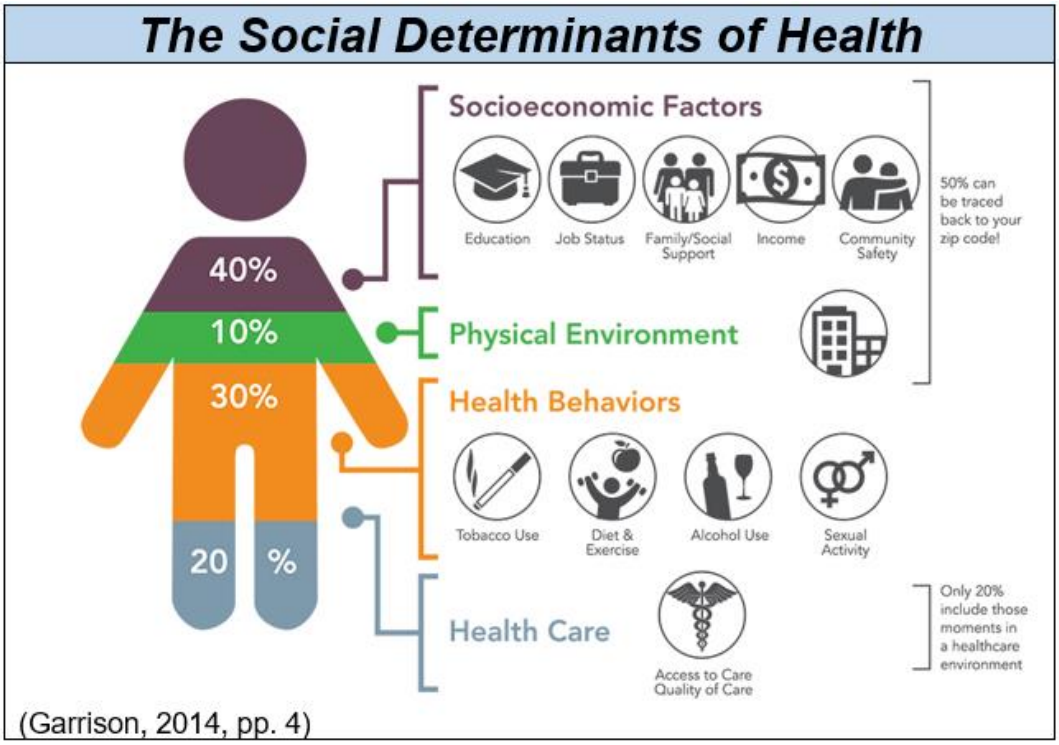
The Determinants of Mental Health focuses on factors of life that can aid in positive or poor mental health. These determinants can have detrimental effects to one's life and mental status. This section first explains the Social Determinants of Health, an underlying factor of poor health. Poor health can create poor mental health, developing into mental illness. Indirectly the social determinants of health influence the social determinants of mental health which influences mental illness. The public EMS operates within this poor socio-economic milieu, often responding to social determinants of health and mental health complaints.

It is understood that one's health is not solely affected by healthcare or lack of access to healthcare services but could be a result of multidimensional complex factors namely the "social determinants of health" (Ataguba, Day and McIntyre, 2015)**.** These determinants include a range of social, economic, environmental, political and cultural factors. The unfair distribution of money, resources and power at global and national levels are significant creators of this phenomenon-being indirectly responsible for health inequalities (World Health Organization, 2013). The World Health Organisation defines the social determinants of health as:

> "…the poor health of the poor, the social gradient in health within countries and the marked health inequities between countries are caused by the unequal distribution of power, income goods and services, globally and nationally, the consequent unfairness in the immediate, visible circumstances of people's lives – their access to health care, schools and education, their conditions of work and leisure, their homes, communities, towns or cities – and their chances of leading a flourishing life. This unequal distribution of health-damaging experiences is not in any sense a natural phenomenon. Together, the structural determinants and conditions of daily life constitute the social determinants of health…" (Marmot *et al.*, 2008, pp. 14).

These social determinants can affect mental health and intern create poor mental health. Poor mental health can lead to mental illness exacerbation (Keyes, 2014). Improving and promoting mental health has been seen as a step in preventing mental illness sequela (Keyes, 2007). The social determinants of mental health are a reality that the public EMS has to navigate on a daily basis.

Figure 13: The Social Determinants of Health Description (Garrison, 2014, pp. 4)



Mental health problems can be a result of social factors like unemployment and poverty or increase the prevalence of these social factors. Therefore, socio-economic factors contribute to mental health and mental health inequalities (Mental Health Foundation, 2016). These social determinants of health and health inequalities are indirectly related to an increase in mental disorders. This phenomenon or "Social Determinants of Mental Health" is elucidated by Compton and Shim (2017) as they aim to explain that social factors affect the risk for mental illness and substance use disorders (Compton and Shim, 2017). Being cognizant that the aetiologies of mental illness and substance abuse disorders are due to social risk factors, Compton and Shim (2017) stress that the social determinants of health and the social determinants of mental health exert their effects greatly at a societal level (Compton and Shim, 2017). The social determinants of mental health consider the holistic view in cause and effect for mental illness. This concept recognises certain population subgroups and are subjected to increased risk of mental illness with prolific exposure to tainted social, economic and environmental factors. Marginalised groups are the most exposed as gender, ethnicity and disability are factors that intersect social determinants of mental health (Mental Health Foundation, 2016).

Life circumstances have a major effect on mental health causing inequalities between communities and societies (Mental Health Foundation, 2016). Therefore, this section explains the social determinants of mental health through the social factors that create this concept. These social factors are *education, unemployment, urbanisation, substance abuse, poverty and inequality***.** Studies present a significant relationship between common mental disorders and poor education levels. This poor level of education prevents access to professional jobs causing an increase in vulnerability and insecurity. This causes low social capital while illiteracy and illness aids in poverty (WHO, 2003). Education can help provide key opportunities to people with mental disorders. Education is a tool for empowerment and social development, suspected of helping to alleviate the need of guardianship. Reducing the risk of exploitation, education develops a person and aids in rehabilitation and reintegration of people with mental illness (Bitanihirwe, 2015). A lack of education aids in social costs, creating a diminished quality of life for a person with a mental disorder as well as their carer, families and communities, while poor cognitive development is exacerbated through children of parents with mental disorders (World Health Organization, 2003b). Therefore, education is a human right directed at the full development of human personality while strengthening respect for human rights and fundamental emancipation. Education will empower people with mental disorders making them less vulnerable (Bitanihirwe, 2015).

2.3.1. Unemployment and mental ill-health

In a developed country it is estimated 5-6 million workers between the ages of 16-54 years fail to find employment, fail to seek for employment or lose employment due to mental illness (WHO, 2003). Further study has supplemented the premise of economically inactive people having a high prevalence of a psychotic disorder than those whom are employed (Mental Health Foundation, 2016). Being unemployed increases the risk of depression, showing increased rates of suicide and self-harming behaviour. While depression ranks highest among unemployed woman, unemployed men are more susceptible to suicide. Older adults suffer poor mental health with unemployment as prospects of re-entering the job market are unsuccessful (World Health Organization, 2003b; Mental Health Foundation, 2016). Unemployment due to poor reforms, poverty,

inequality and bad governance can have negative effects on a countries income as well as increase the likelihood of mental disorders (Mental Health Foundation, 2016). In developing countries poverty and unemployment aids in poor mental health, inciting mental illness. Only recently has a study on mental illness and unemployment become available from developing countries (Lund *et al.*, 2010).

2.3.2. Urbanisation linkage to mental health

The concept of urbanisation is associated with an increase in mental disorders. Urbanisation supplements the risk of poverty and homelessness with exposure to environmental adversities also disrupting established family patterns creating decreased social support (World Health Organization, 2003b). The World Health Organisation reiterates that in developing countries, urbanisation was accompanied with rapid industrialisation and economic development suggesting that governments had not given substantiate hindsight in to early reforms, with urgent policies needed to address living conditions of urban populations (WHO, 2003; World Health Organization, 2003b). Urbanisation can affect homelessness making homelessness a risk for and a result of mental disorders. People without homes or living in poor housing conditions are more likely to have psychological distress with a higher prevalence of mental disorders. Housing related legislation has a huge effect on housing crisis in poor countries and comes with a high prevalence of poor mental health (World Health Organization, 2003b).

2.3.3. Substance Abuse

Substance abuse is a social determinant of mental health and a comorbidity for disease. Substance abuse is a prognosis from poor societal issues as well as kakistocracy[52], inflicted through poverty, aiding in mental disability/illness (World Health Organization, 2005). Globally, around 76.3 million persons are diagnosed with alcohol disorders annually, while 15.3 million people have drug related disorders. 5%-10% of new global HIV infections is transmitted through drug injected reused needles (WHO, 2003). In South Africa alone, 25%-30% of hospital admissions are indirectly or directly related to alcohol

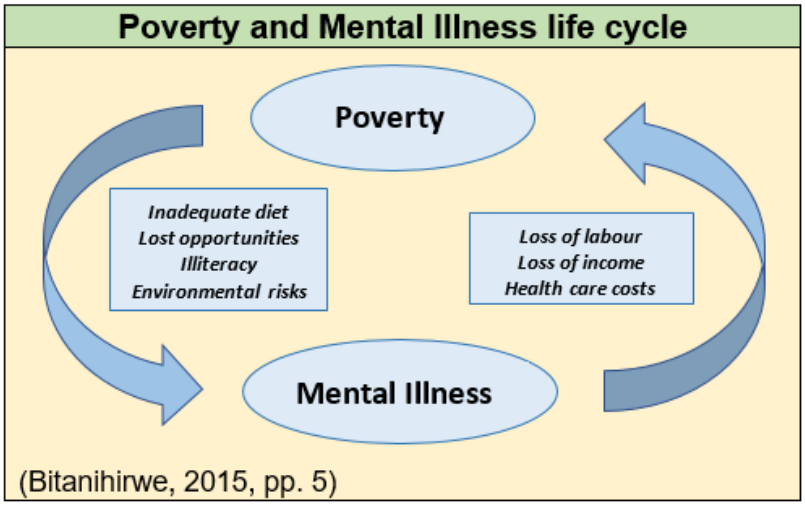
[52] government by the least suitable or competent citizens of a state.

abuse, making 80% of all assault patients presenting to a trauma unit in Cape Town were injured due to alcohol related violence or were under the influence of alcohol (WHO, 2003). These statistics are coupled with the alarming growth of foetal alcohol syndrome, the most common cause of mental disability in South Africa and quickest aid in earliest start to social determinants of mental health for unborn babies (WHO, 2003).To ratify the effects of substance abuse, 20% of mental illness is due to substance abuse disorders while roughly 1.8 million people die annually from alcohol related risks and 205 000 deaths due to illicit drug use (Patel and Saxena, 2014; WHO, 2003).

2.3.4. Poverty

Poverty is a huge determinant of mental disorders. Poverty influences mental disorders in high-income countries and low-and middle-income countries. Environmental and psychological adversity is difficult for poor people increasing their vulnerability to mental disorders. Impoverished people face significant barriers to mental health services like unaffordability, availability and low responsiveness to their needs. People with mental illness are at risk at homelessness, unemployment and social exclusion with poverty the result (World Health Organization, 2003b; Prince *et al.*, 2007). Poverty and mental illness is a vicious cycle as people in poverty are at risk of developing a mental disorder through stress of living in poverty, increased obstetric risk, exposure to violence and poor physical health, while people with mental illness live in poverty from their mental illness due to increased health expenditure, lost income, reduced productivity, lost employment and social exclusion due to sigma (Motsoaledi and Matsoso, 2013). There is a growing body of evidence that suggests people with less income tend to have more physical health conditions and/or mental illness and from a socioeconomic disadvantage enhance the likelihood of a mental disorder. It is important to understand that a low income does not lead to higher rates of mental health problems, but the social problems associated with a lower income can cause a mental disorder (Mental Health Foundation, 2016).

Figure 14: Poverty and Mental Illness life cycle depicter (Bitanihirwe, 2015, pp. 5)



2.3.5. Inequality as a determinant of health

Social and economic inequalities across generations can result in mental health inequalities, laying claim to increase vulnerability to experience a mental disorder. National levels of income inequality can aid in effecting the prevalence of mental illness in societies as it is predicted those with a lower status (socioeconomically) are more likely to have health problems (Mental Health Foundation, 2016). Data from the World Health Organisations World Mental Health Surveys suggest mental illness increases as countries get richer due to the inequality gap between rich and poor increasing. Income differences aid in the inability to afford mental health care, perpetuated through unemployment, exacerbated inequality can reduce social capital[53] (Mental Health Foundation, 2016).

Compounding factors such as race, gender, historical inequalities and segregation of a society are significant factors in aiding in inequality in general, while also exacerbating inequalities in mental health care treatment. Health systems in Low-and middle-income countries lack the infrastructure necessary to treat and maintain mental illness, suggesting mental illness to be incurable as these people are seen as lost productivity and unable to contribute to society (Bitanihirwe, 2015). Poor social, political and economic

[53] Social capital is the links that bind and connects people within communities (Mental Health Foundation, 2016)

reforms have led to poor efficiency of policy, recruiting an inequality in availability of necessary distribution of mental health care resources aiding in health inequalities for a marginalised group (Bitanihirwe, 2015). The inequality of access to mental health care has occurred due to geographical region, race, gender and socioeconomic status (Bitanihirwe, 2015) and the sheer shortage of resources undermines the bigger problem that inequality has enforced towards mental illness, segregating the need for treatment and the concept of incurable. Therefore, inequality sums up the concept of the social determinants of mental health, as each concept listed above stems from inequality or aids in inequality and completely effectuates the way the universe sees mental illness.

2.4. The Burden of Mental Illness in South Africa

The Burden of Mental Illness in South Africa (S.A) looks at the literature around mental illness in S.A. As this research takes place in S.A it is necessary to notice that most of the secondary evidence pertained to hospital treatment. The author uses this literature to provide a background as to why appraising access to health care for health care consumers who present to a public EMS with mental health needs is important. This section explains the severity of mental illness and the mental health expenditure gap in the South African milieu.

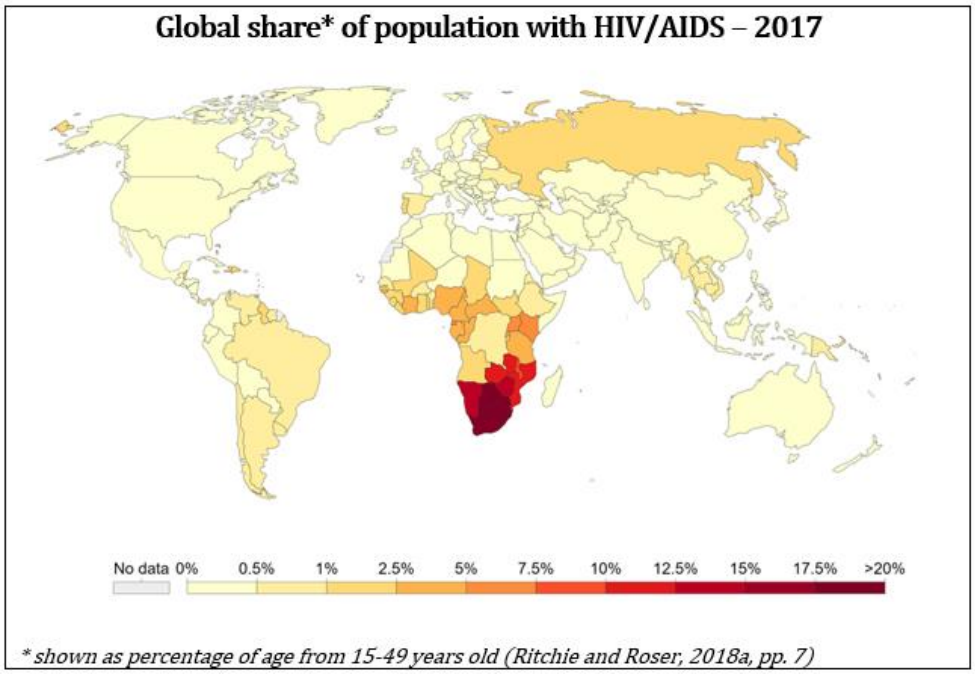
South Africa (S.A) is a middle-income country plagued by social, political and economic injustices. With a population of 58million (Stats SA, 2019), S.A has numerous societal-level socioeconomic risk factors for mental illness (Burns, 2011). S.A has a quadruple disease burden, antagonising mental illness comorbidity and exacerbating mental illness through compounding variables[54] (Motsoaledi and Matsoso, 2013). Neuropsychiatric disorders (Mental Disorders) rank 3rd in their contribution to burden of disease in S.A, after HIV/AIDS and other infectious diseases (Motsoaledi and Matsoso, 2013). S.A ranks 13th highest in the world with 50% of the population living under the poverty line, second highest in income inequality, 19th highest unemployment rate (24%), (The World Bank, 2018) and has one of the highest road accident death rates in the world (Burns, 2011; Road Traffic Management Corporation, 2018). S.A is at the epicentre of the HIV/AIDS

[54] These variables pertain to violence and crime, poverty, trauma and inequality (Burns, 2011).

pandemic in Sub-Saharan Africa with the largest number of people living with HIV/AIDS worldwide, 4th highest HIV/AIDS prevalence rate (18%), (World Health Organization, 2016; United Nations, 2019), 4th highest in drug related offences-ranking within the top 30% of countries with opiate addiction (SAPS and Stats SA, 2019) and 1st highest in Rape statistics, averaging 72.1 per 100 000 population, at 116 rapes per day (SAPS and Stats SA, 2019). This is very significant as HIV/AIDS and substance abuse is associated with increased burden of neuropsychiatric disease as HIV/AIDS is clinically proven to enhance depression, anxiety, psychosis and dementia (Burns, 2008, 2011; United Nations, 2019).

Mental illness and mental ill-health have been proven to feature in a high level of comorbidity with infectious diseases, thus exacerbating the health landscape in S.A. Infectious diseases like HIV/AIDS and tuberculosis (communicable diseases) also show association with non-communicable diseases, high levels of violence and injury and maternal and child illness, thus aiding neuropsychiatric disorders, polarising created comorbidity as a major burden in S.A (World Health Organization, 2003b; Motsoaledi and Matsoso, 2013). The coexistence of the relationship between mental illness and HIV/AIDS has been proven, as mental health impacts on and is exacerbated by the HIV/AIDS epidemic-mental health problems prove a common problem in the HIV disease-causing morbidity because mental illness often goes undetected by physicians (dos Santos and Wolvaardt, 2016; Motsoaledi and Matsoso, 2013). The HIV/AIDS disease causes mortality, orphaning many children each year aiding in child headed households nuancing mental health, beginning the cycle of poverty and mental illness (Burns, 2011). In S.A poverty, inequality, unemployment, urbanisation, substance abuse, trauma and violence are all factors exposing society to the burden of mental illness (Burns, 2011). Figure 15 below puts S.A as an epicentre for HIV/AIDS in the world.

Figure 15: Percentage of global population living with HIV/AIDS (Ritchie and Roser, 2018a, pp. 7)



According to Motsoaledi and Matsoso (2013), mental disorders in S.A have origins from childhood and adolescence with 50% of mental disorders beginning before 14 years old (Motsoaledi and Matsoso, 2013). The adversity faced in childhood was associated with mood disorders, major depression, posttraumatic stress disorder and substance abuse disorder and can be related to the vicious cycle of poverty, heralding unemployment, poor physical health and inability to live a normal life (Motsoaledi and Matsoso, 2013). Poverty is present in S.A and has been exacerbated by the history of violence, exclusion and racial discrimination during apartheid and colonialism thus opening the door for poor mental health (Motsoaledi and Matsoso, 2013) as poverty wields violence and crime. Crime and violence in S.A are high and exacerbates mental illness, while substance abuse helps prescribe to the problem of crime and violence effecting a vicious cycle. S.A has the highest alcohol abuse rate in the world after the Ukraine, with areas in the Western Cape having the highest foetal alcohol syndrome in the world, (Motsoaledi and Matsoso, 2013) also notably lying within the tik (methamphetamine) epidemic. Substance abuse can cause, create and enhance risk for mental disorders, crime and violence and motor vehicle accidents (Burns, 2011; Motsoaledi and Matsoso, 2013).

Injuries and violence are a leading cause of premature death in S.A. In 1998 it was recorded that 2 in 1000 South Africans has experienced a violent injury and 9 in 1000 households have witnessed a violent death (Stein *et al.*, 2009). These numbers have increased, with murders in S.A at 35.6 people per 100 000 population. This equates to 58 murders everyday (SAPS and Stats SA, 2019). S.A has emphatic gender-based violence, sexual assault and rape statistics with perpetration of this violence associated with mental illness. A systematic review subscripts perpetration of violence and violence victimisation remaining most common with mentally ill people than general society (Stein *et al.*, 2009). Perpetration of violence shares a relationship with substance abuse particularly among men, aiding in physical violence, however evidence shows perpetrators themselves had been victims to child abuse, trauma and marital violence or suffer from post-traumatic stress disorder (PTSD) (Stein *et al.*, 2009; Burns, 2011). Therefore, S.A social status, history and social determinants provides plenty social factors for suicide, explaining the suicide rate at 15.4 per 100 000 population, 22nd in the world in 2010 (Burns, 2011). According to SADAG[55] 11% of non-natural deaths in S.A are due to suicide with 23 known suicides happening daily and 230 attempted suicides recorded daily (Bateman, 2015). SADAG further express that 6 million South Africans suffer from post-traumatic stress disorder while medical aid claims paid out between 2006 to 2011 suggest a 228% increase in incidence of bipolar disorder (Bateman, 2015). Thus, PTSD is a huge factor in S.A as vehicle accidents[56] and witnessing trauma are two unavoidable impacts on mental health and ultimately PTSD that effects large populations in society (Bateman, 2015).

Although social factors from the past have had effect on the present, Motsoaledi and Matsoso (2013) have acknowledged that mental health has biological, psychological and social determinates that occur across all ethnic, social and age boundaries (Motsoaledi and Matsoso, 2013) expressing the World Health Organisations stance as governments are obligated to promote, fulfil and respect the fundamental rights of people with mental health disorders (World Health Organization, 2005).

[55] South African Depression and Anxiety Group, largest NGO of its kind in South Africa (Bateman, 2015)
[56] Road traffic deaths is 33.2 per 100 000 population, 24th highest in the world (Burns, 2011)

2.4.1. The Mental Health care gap in South Africa

The 12-month prevalence of a mental disorder in S.A stands at 16.5%, with a lifetime prevalence of a common mental disorder at 30.3% noting that woman are more at risk of depression compared to men who are more at risk of substance abuse (Bateman, 2015). SADAG express significance in this prevalence stating inadequate and uncoordinated government spending on mental illness treatment has crippled every 1 in 6 South Africans, costing 2.2% of S.A annual GDP (Bateman, 2015; Motsoaledi and Matsoso, 2013). Mental illness proves expensive and is increasing as Discovery Health, a private medical aid company in S.A, has expressed an increase of 41% in mental disorder pay-outs with a figure of R96.7 million in 2008. This is projected to rise to R494.6 million by 2012. This only covers people with medical aid, providing statistics for only 20% of the South African population, leaving 80% of the population unaccounted for (Bateman, 2015).

Research by the Department of Psychiatry and Mental Health at the University of Cape Town suggests three-quarters of people living with mental illness in S.A do not receive treatment or are not being treated (Bateman, 2015). The idea of decentralisation has reduced mental hospitals, reducing beds by 7.7% fewer, as community based mental health facilities were not increased (World Health Organization, 2003b; Bateman, 2015). Depression costs the country millions in lost earnings as severe mental illness (major depression/anxiety disorders) costs about R54 121 per affected adult per annum at R40.6 billion, dwarfing the R665.52 million the department of health spends on mental health care annually (Lund *et al.*, 2012). Prof. Lund further ratifies that mental illness has effects on the economy as the average days out of work is estimated at 28 days per year for anxiety disorders and 27 days per year for depression (Lund *et al.*, 2012; Bateman, 2015). Depression is prevalent in S.A and creates major social and economic impacts but with treatment can improve individual and household economic circumstances. Poverty is a factor of and a factor for depression and mental illness. Thus it costs more to not treat than to treat mental illness (Lund *et al.*, 2012; Bateman, 2015; Lund *et al.*, 2011).

S.A is supposed to have 646 psychiatrists and 466 psychologists. A recent survey done revealed that per 100 000 population, S.A has only 0.28 psychiatrists, 0.32 psychologists, 0.4 social workers, 0.13 occupational therapists and 10 nurses (Burns, 2011; Bateman, 2015), thus suggesting S.A has less than 30% of the number of psychiatrists required to comply with national norms of 1 per 100 000 population and 5 per 100 000 population within middle-income World Health Organisation standards (Burns, 2011). However a suggested solution is not to train more psychiatrists and psychologists, but to train normal health care workers to manage and detect common mental health issues, thus being able to narrow the 75% treatment gap (Bateman, 2015).

The significance of the mental health care gap in S.A is due to poor prioritisation of mental health as a burden with no national mental health care plan at provincial level while the mental health care budget is dictated from the general health budget (Burns, 2011). S.A has 2.1 beds per 10 000 population of mental health care consumers of which 1.8 beds are in psychiatric hospitals and 0.3 beds are in general hospitals (Burns, 2011; Lund *et al.*, 2012). In addition to the norm, community-based services consist of 80-day treatment facilities, with 0.36 bed per 10 000 population within 63 community residential facilities run by non-governmental organisations (Burns, 2011). It is also important to know that resources structured for treatment of children and adolescents possess inadequateness as only 1.4% of outpatient facilities, 3.8% of acute beds in hospitals and 1% of beds in psychiatric hospitals is for children (Bateman, 2015; Burns, 2011).

Logistical layout of resources in S.A has been neglected. Resources have been centred around urban areas, leaving rural areas unequipped with specialised services. This is most notably seen in Kwa-Zulu Natal where 36 psychiatrists are employed and only 6 are located rurally (Burns, 2011).Therefore mental health care is inadequate in S.A and while socioeconomic conditions, poverty, inequality, violence and infectious disease all subscribe to the burden of mental illness, there is a huge gap between needs and services (Bateman, 2015; Burns, 2011; Lund *et al.*, 2012).

2.5. S.A Mental Health Care policy, Human Rights awareness and the EMS

The literature around mental illness and mental health policy in South Africa is governed by the Mental Health Care Act 17 of 2002. This section intends to show literature on mental health policy, government gazettes and human rights policy. This part of the literature review pertains to the legislation governing medical practice with mentally ill health care consumers, their rights and how procedure should be conducted. This section of the literature also highlights the significance of 'patients' rights' and 'human rights awareness'. This section explains the patients' rights to access to health care.

2.5.1. The Mental Health Care Act (Act 17 of 2002) of South Africa

Mental Illness in S.A is governed by the Mental Health Care Act of 2002. S.A replaced the Apartheid-era old act and in 2004 the Mental Health Care Act (No17 of 2002) was promulgated. This act focused on eradicating stigmatisation, disempowerment and alienation through core principles: human rights; decentralisation and integration; health care at primary, secondary and tertiary levels of care; treatment and rehabilitation (Burns, 2008). This was considered a major achievement at the time, as the South African Mental Health Care Act 17 of 2002 was seen as a first for its time and a first for Africa, however Lund et al (2011) state that Mental Health Care Act of 2002 hasn't been as successful as planned, as no Mental Health Care regulations were incorporated into law, thus jeopardising the significance of the act (Lund *et al.*, 2011). The Mental Health Care Act mandates the integration of mental health services at primary health care however barriers exist such as shortage of trained professionals, stigma around mental illness, lack of knowledge and the high prevalence of comorbidity with communicable diseases (Jacob and Coetzee, 2018)

Although suggestive of failure, the vigour of the Mental Health Care Act came at a time to renew and do away with old apartheid regime laws, emanating from a concept of human rights and morals ushering in a new era of human rights expectations (Burns, 2008). The Mental Health Care Act focused on stand out principles stating that people with mental health problems are regarded as users and services should offer rehabilitation, care and treatment. The human rights of mental health care users are not

inferior to general society, integrating mental health care with primary health care as users have a right to be treated close to home with optimal treatment and care with least restriction on freedom. Mental health care users have a right to representation, knowledge of their rights and have a right to appeal decisions made by mental health care practitioners, while mental health review boards should be created to act in the best interests for mental health care users. Health care practitioners are also regarded as mental health care practitioners and should take some responsibility for the mental health care needs of people and their community (Burns, 2008; Parliament of South Africa, 2002).

For purpose of this research thesis and literature, the author has included the objectives of the Mental Health Care Act 17 of 2002 to reciprocate the expression of access to mental health care, as appraising access to health care for mental health care users will hinge on the objectives that the Mental Health Care Act purposes (Figure 16).

Figure 16: Objectives of the Mental Health Care Act 17 of 2002 (Parliament of South Africa, 2002, pp.8)

a) Regulate the mental health care environment in a manner which:
   (i) Enables the provision of the best possible mental health care, treatment and rehabilitation that available resources can afford;
   (ii) Makes effective mental health care, treatment and rehabilitation services available to the population equitably, effectively and in the best interests of the mental health care user;
   (iii) Co-ordinate access to and the provision of mental health care, treatment and rehabilitation services; and
   (iv) Integrate access to and the provision of mental health care services within the general health environment
b) Set out the rights and obligations of mental health care users and obligations of mental health care providers;
c) Regulate access to and the provision of mental health care and treatment to:
   (i) Voluntary, assisted and involuntary mental health care users;
   (ii) State patients (unfit to stand trial or of comprehending their criminal actions);
   (iii) Mentally ill prisoners;
d) Regulate the way the property of those with a mental illness may be dealt with by courts of law.

(Parliament of South Africa, 2002; World Health Organization, 2005)

2.5.2. The Mental Health Care Act (Act 17 of 2002) and the EMS

In S.A, the state ran EMS are responsible for the care and transport of public[57] mental health care users as well as being first on scene responders for mental health care consumers with mental health disorder emergencies (Van Huyssteen, 2016). The role of the EMS is statute to the socio-economic[58] rights in the bill of rights, whereby the rights of access to basic services and needs is fully envisaged in section 27 of the constitution (Hassim, Heywood and Berger, 2007; RSA Constitution, 2005). This governance is corroborated with section 40 of the Mental Health Care Act, in terms of governance for out-of-hospital management for voluntary and involuntary mental health care users (Mental Health Care Act 17 of 2002, 2002). The Mental Health Care Act of 2002 makes huge previsions for in hospital patients, while little emphasis encompasses elaborate guidelines for prehospital treatment. The Mental Health Care Act of 2002 (section 40) states that in the case where a mentally incapacitated patient is seen to be of harm to themselves or their surroundings, the South African Police service (SAPS) must be contacted for assistance in relation to restraint (mechanical or chemical). The SAPS and the Emergency Medical Provider will transport the patient to the appropriate facility (Parliament of South Africa, 2002; Thom, 2003). The HPCSA further incorporated that safety of the Emergency Care Provider is prioritized; de-escalation of the situation should be priority; Appropriate restraint should be used (chemical or mechanical); safe dosages of chemical restraint must be used, while mechanical restraint should not be used for longer than 30minutes; immediate transfer to appropriate facility (HPCSA, 2017)

Section 40 may nuance the concept of human rights, allowing police to manage involuntary mental health care users, challenging a division between policy and implementation (L. Naidoo, 2017)-prescribing the idea of injustice towards the core principles of the Mental Health Care Act (Van Huyssteen, 2016). With increase in mental illness, crime and poverty coupled by public service sector staff shortage[59] the plausibility

[57] Referring to communities who can't afford private treatment

[58] Fundamental rights consisting of civil, political, social, economic rights. Social and economic rights function together and focus on "rights of access", section 24 to 29 (Constitution of South Africa, 2005)

[59] Public service sector staff shortage is described as skills shortages to do certain jobs, affecting the greater scheme of staff shortages in the public service (Daniels, 2007)

of dual service attending the same scene is implausible-section 40 prescribes for no alternative for emergency medical services (Van Huyssteen, 2016; Parliament of South Africa, 2002).

2.5.3. Humans Rights awareness and the Socio-economic rights

The human rights awareness that needs to be examined for the purpose of this research, is the intersection of the EMS and human rights where the constitution governs the functioning of these human rights. It is thus necessary to look at three court cases that espoused the way for the state to determine how the socio-economic rights would be exercised to benefit the state and population within the country. Human rights are significant in the ordinal life of an individual and even more important to an individual in a marginalised group. Without human rights, people with mental illness would normalise to stigma and could remain institutionalised without precedence of cure. Therefore, the socio-economic rights intersect the function of the EMS which intersects mental health users.

The fundamental rights in the Bill of Rights are known as the socio-economic rights, in which the state has a duty to fulfil these rights. The word access is a term brought up consistently as the phrase “right to access” is found in section 25, 26, 27 and 28 of the Bill of Rights and deals with the access people have to basic services and needs (Jansen van Rensburg, 2003; Moyo, 2013). The EMS is statute to the socio-economic rights in the bill of rights, expressing the rights of access to basic services as a priority, as section 27 of the constitution ushers the normalisation for daily operation by the EMS (Hassim, Heywood and Berger, 2007; RSA Constitution, 2005). The socio-economic rights by constitution negates the necessity and constitutional obligation of government to deliver on the socio-economic rights diligently and without delay (SA Government, 2007). However as the state has a duty to fulfil with responsibility and carry out the socio-economic rights, the plausibility of immediate satisfaction of implementation is constricted by availability of resources therefore defining access to socio-economic rights as unqualified and qualified, maintaining that through available resources and progressive realisation, each right could be achieved (Moyo, 2013).

Unqualified rights - Rights the state must carry out (e.g. children's right to basic services) (SA Government, 2007).

Qualified rights - Delivery of these rights depends on factors like availability of money (e.g. the right of access to health care) (SA Government, 2007).

Available resources - Available resources include things like people, materials, technology and money (SA Government, 2007)

Progressive realisation - is the state's responsibility to make provision within its available resources to give people their qualified socio-economic rights over a period of time (SA Government, 2007)

Thus, it is an unqualified socio-economic right to access of emergency medical care and a qualified right to access of chronic health care depending progressive realisation and available resources-realisation of access to health care is a human right (Jansen van Rensburg, 2003). The socio-economic rights are:

- 24 – The right to a health environment.
- 25 – The right of access to land and land restitution (25(5) – (9)).
- 26 – The right of access to adequate housing.
- 27 – The right of access to health care services, food, water and social security.
- 28 – Children's right to nutrition, shelter, basic health care services and social services.
- 29 – The right to a basic education, including adult education. (SA Government, 2007; RSA Constitution, 2005; Jansen van Rensburg, 2003)

Section 27 in the bill of rights harbours the functionality of the EMS, disposing the governance of the constitution to effecting access of health care to the citizens of S.A. Section 27 is the focus of health care, food, water and social security, as the socio-economic rights explain access to basic human rights. However, section 27 states the

significance of access to health care, the gateway to health care for many public health care users (Constitution of South Africa, 2005), thus making section 27 important to know:

Figure 17: Section 27 of the Constitution of S.A (Constitution of South Africa, 2005, pp. 13)

Section 27. (1) Everyone has the right to have access to-

(a) health care services, including reproductive health care;

(b) sufficient food and water;

(c) social security, including, if they are unable to support themselves and their dependents, appropriate social assistance

(2) The state must take reasonable legislative and other measures, within its available resources to achieve progressive realisation of each of these rights.

(3) No one may be refused emergency medical treatment.

(Constitution of South Africa, 2005)

The defining of the socio-economic rights was established with two constitutional court case decisions known as the *Soobramoney* and *Grootboom* cases which when corroborated, defines the "right of access" to the socio-economic rights as an imperative (Hassim, Heywood and Berger, 2007). The constitution of South Africa encompasses the validity of these two cases to effect health policy, however, still provokes between grey area and astuteness, thus on the completion of a constitutional court case known as the *TAC* case, the Government was provided the chance to fully effect the findings of the *Soobramoney* and *Grootboom* cases. The Treatment Action Campaign (*TAC)* case became the champion of realising the ideology of the socio-economic rights, obligating the government to refer to these three cases when deciding the priority of the socio-economic rights and health policy. (Jansen van Rensburg, 2003; Moyo, 2013; Hassim, Heywood and Berger, 2007) Therefore, to understand the impression created by these cases a brief breakdown of each case is presented for knowledge on the imperative of access to human rights from a medical perspective.

2.5.3.1. Soobramoney v Minister of Health (KwaZulu-Natal) 1998 (1) SA 765 (CC)

The *Soobramoney* case is the first socio-economic rights case in the constitutional court, defended by the state the case consisted of access to renal dialysis in the public sector, of whom if the patient satisfices the strict medical criteria the state would cover the

expenditure. Not all who require access can be accommodated (Hassim, Heywood and Berger, 2007).

Basic facts – Mr Soobramoney did not meet medical criteria and was denied access to renal dialysis. The application was taken to the constitutional court on the bases of right 11 a right to life and section 27(3) no person may be refused emergency treatment. The constitutional court decided that the claim needs to be reviewed under section 27(2) where the state sets out positive duties regarding provision of health care services. The state had complied as access to renal dialysis is limited and guidelines to suffice the country were reasonably in place (Hassim, Heywood and Berger, 2007; SA Government, 2007).

Court decision – the court sees section 27(3) main purpose is ensuring emergency medical treatment is indeed given, while bureaucratic requirements or other formalities does not negate the provision of emergency treatment. The court ruled that emergency treatment does not include chronic ongoing treatment, such as the deterioration of renal function, although dialysis is need urgently, it is not an emergency and seen as incurable. The court needs to rule on this fact as if section 27(3) were interpreted in accordance with the Soobramoney claim, the state would be obligated to ensure access to health services all round. With progressive realisation, the state is not obligated to provide immediate access to health care services whenever to whoever demanded (Hassim, Heywood and Berger, 2007).

Learning from the case – The *Soobramoney* case recognises that the state is not imposed to provide the right of access to health care to everyone at once while the government balances limited resources with the larger needs of society, instead for one specific individual need. Using the available resources argument, the state didn't need to provide treatment for specific medical conditions. Using the limited resources claim, the state is obligated to prioritise treatment for more critical emergency burdens (SA Government, 2007; Hassim, Heywood and Berger, 2007).

2.5.3.2. Government of the Republic of South Africa v Grootboom 2001 (1) SA 46 (CC)

The *Grootboom* case is the first constitutional court case that ruled the state had breached its duties in respect to the socio-economic rights. The Grootboom case sets the framework for claims against the state in respect of all socio-economic rights including the right of access to health care services (Hassim, Heywood and Berger, 2007; Moyo, 2013)

Basic facts - Due to poor living conditions the applicants were evicted from vacant land by the state and on return to their original place of residence an informal settlement, it was fully occupied rendering *Grootboom* and her family truly homeless. The state ordered the community centre by a sports field where they were camping be made available until pending the outcome of the case. To judge the application the court used section 28(1)(c) of the constitution dealing with a child's right to shelter, obligating the state to provide shelter for the children whose parents could join them. The state was reprimanded for not facilitating its duty under section 28(1)(c) to provide the right of shelter for children an unqualified constitutional right. Section 26 (right of access to adequate housing) was initially the right used to preside over this case, however after the *Soobramoney* case section 26 does not automatically mean the state is obligated to provide housing immediately whereby section 26(2) mandates the state to devise a plan with in available resources to progressively realise right of access to adequate housing, therefore using section 28 provided the state with questions (Jansen van Rensburg, 2003; Moyo, 2013).

Court decision – The *Grootboom* case analysed the right of access to adequate housing in section 26(1) in relationship to right of access to adequate shelter for every child in section 28(1)(c). The court found the state's housing program needed to include measures that provided relief for people who have no access to land, no roof over their heads, who live in intolerable conditions and that the state had not provided to these measure was found unconstitutional (Hassim, Heywood and Berger, 2007; Moyo, 2013).

Learning from the case – The *Grootboom* case effected the state obligated, to develop and implement reasonable plans to ensure rights are realised, thus developing the

"reasonable plan" that subjects the state to have sufficient flexibility to deal with emergency short medium and long term while having appropriate financial and human resources available to initiate the plan. Therefore the state has a duty to provide access to socio-economic rights, if not immediately a framework needs to be assemble to facilitate progressive realisation of obtaining those rights (Hassim, Heywood and Berger, 2007; Moyo, 2013; Jansen van Rensburg, 2003)

2.5.3.3. Minister of Health v Treatment Action Campaign (No 2) 2002 (5) SA 721 (CC)

The *TAC* case is the most politicised of the socio-economic rights cases to reach the constitutional court which incorporates the public challenge to the states response to HIV/AIDS and the campaign of misinformation against the use of antiretroviral (ARV) medicine. The issue with this case was the Department of health's policy on the use of ARV medicine to prevent mother to child HIV infection transmission(PMTCT) (Hassim, Heywood and Berger, 2007).

Basic facts – The government identified nevirapine as its ARV drug of choice which was limited to two research and training facilities in each of the nine provinces. Nevirapine was not provided to other public health care facilities with health care practitioners prohibited from using the drug even if it was available with the government adopting a wait and see approach indefinitely postponing a decision on the use of nevirapine beyond the research sites with no progressive plans to enrol the medicine to the entire country. The *TAC* filed papers and won its appeal to allow nevirapine to be used where capacity existed for its safe and effective use (Moyo, 2013; Hassim, Heywood and Berger, 2007).

Court decision - The two key issues facing the constitutional court was: are the state entitled to limit nevirapine for the purpose of PMTCT to 18 test sites even when it is medically indicated with adequate facilities to test the drug existing around the country; and did the state devise and implement within its available resources a co-ordinated programme to realise progressively the rights of pregnant woman and their new-born to have access to PMTCT services. The court decided the government's policy to limit nevirapine to research sites was inflexible, as a potentially lifesaving drug was available

within available resources, without known harm to mother and child and that the ban of the drug to other facilities be overturned as it added value to life. The second issue the court ruled that the governments inflexibility on the first issue affected the policy as a whole, suggesting the state had no reasonable PMTCT plan and obliged the state to make available progressively the use of nevirapine to all facilities while training health care practitioners in the use of nevirapine while making testing and counselling services available (Hassim, Heywood and Berger, 2007).

Learning from the case – The *TAC* case uses case principles from the *Grootboom* case to advance socio-economic rights in three main ways. It confirms the state must prioritise major public health needs clarifying the principle raised in the Soobramoney case by noting that HIV/AIDS is one of many illnesses that needs attention but is not considered an ordinary health problem making it a priority. The state then recognises that emergency short, medium- and long-term plans are a necessity. The third main point is the state clarifies the relationship between general socio-economic rights and rights relating to children (Moyo, 2013; Jansen van Rensburg, 2003; Hassim, Heywood and Berger, 2007).

Therefore, these three cases corroborated confirm the right of access to the socio-economic rights as a champion for the state to provide on key policies prescribed by the constitution and the bill of rights. These three cases provide an understanding of how the EMS should function in regard to providing access to health care for the population of S.A.

CONCLUSION

This literature review is interlinked between Holistic approach to Mental Illness, Global burden of Mental Illness, Determinants of Mental Health, Burden of Mental Illness in South Africa and South Africa Mental Health care policy, human rights awareness and the EMS. Each section of the narrative review provides literature on what the author envisaged would help provide an answer to the aims and the objectives. The holistic approach to mental illness provides linkage between mental health and mental illness. The idea of considering the two as a holistic entity. Providing promotion and prevention for both is the key to reduction in mental illness sequela. The global burden of mental

illness is a phenomenon present in many countries and often underfunded and nuanced by poor polices. The determinants of mental health are a good indicator of poor mental health manifestations and could provide early recognition of mental illness prevalence. South Africa is poverty stricken, unequal and has a quadruple disease burden, a breeding ground for poor mental health. Policies are in place to protect peoples and more importantly health care consumers with mental health needs. However, the policy governing the EMS and involuntary mental health care users may need updating to provide guidance in a changing environment. This literature provides one ultimate blow, suicide. Suicide is ultimately the fatal blow to a person with poor mental health or uncontrolled mental illness.

This concept needs to be exacerbated as the World Health Organisation (WHO) postulate untreated mental health problems will amount to 15% of total global burden of disease by 2020, projecting mental health problems to be the leading cause of global morbidity and mortality by 2030-suggesting depression to be greatest cause of disease burden globally (Mental Health Foundation, 2016; World Health Organization, 2011). In: *"Setting the agenda in emergency medicine in the southern African region: Conference assumptions and recommendations, Emergency Medicine Conference 2014: Gaborone, Botswana"* (Christopher et al., 2014), the value proposition of EMS in the southern African region is proposed.

> "…Little research has been done in lower-and middle-income countries on the burden of disease reduction attributable to emergency care, whether through injury treatment and prevention, urgent and emergency treatment of acute conditions, or emergency treatment of complications from chronic conditions…" (Christopher *et al.*, 2014, pp. 156)

This statement is synonymous with an interpreted theoretical lacuna, whereby a vast landscape of evidence-based medicine subjected to South African prehospital mental illness treatment, transport or management, is not available. More research is needed in evolving epidemiology of mental illness in a modern setting, from undiagnosed symptoms in a prehospital environment to transport to hospital, focused on emergency medical care from emergency care providers. The WHO makes recommendations to deal with mental illness which endeavours the ideology of an ideal world and can be applied to establish

evidence and literature in the EMS setting. WHO suggest expanded evidence-based mental health research to provide a sustainable service, incorporating the reflective needs of mental illness and improving access for people at risk of mental disorders from an early stage (World Health Organization, 2011).

> "…Emergency medicine is the only discipline with 'universality' and 'responsivity' at the point of need. This implies the widespread potential for facilitation of access to health care…" (Christopher *et al.*, 2014, pp. 156)

This statement projects the stability of the EMS to provide access to health care, however the lacuna present in literature around mental illness in the South African EMS setting nuances the ability of the EMS. Research is needed on prehospital systems roles in promoting health care to prevent morbidity and mortality (N. Naidoo, 2017) in mental illness. The EMS functions in the health sector, and can be a champion for human rights prerogative (N. Naidoo, 2017), acting as an exponent to provide access to health care for a marginalised group. All social determinants of mental health, consequences of deliberate self-harm and suicide are all prehospital presentations. Therefore, research needs to be produced to substantiate a full commitment to access to health care for mental health care users presenting to a South African public EMS.

CHAPTER THREE: RESEARCH METHODOLOGY

INTRODUCTION

This chapter provides the methodology of the research. Here a robust understanding of how the research was carried out, from the paradigm lens to the design and sampling of the study. Methodology can focus on a quantitative approach providing numeric description of trends, options or attitudes. As mentioned in Chapter One mental illness, poor mental health and DSH are an increasing burden on society (Keyes, 2005; Keyes, Dhingra and Simoes, 2010; Arkins *et al.*, 2013). This burden has been proven for many countries. The aim of this study was to appraise access to health care for health care consumers who present to a public EMS with mental health needs. People with mental health needs and more importantly mental illness are an historically marginalised group. That there is minimal prehospital statistics to demonstrate access, reach or role played constitutes the motivation for this study. This research needed to follow the quantitative methodology to provide quantifiable data around an increasing phenomenon.

3.1. Research Approach

The research approach chosen for this study was a quantitative observational Retrospective Cross-sectional Study viewed through the Critical Theory paradigm. The data for the study was obtained by undertaking a census (100% sample) of EMS cases from the years 2017 to 2019 from the GRD that met the inclusion criteria. Sampling—drawing a subset of units from the population of cases—was deemed unnecessary since, although labour-intensive, it was feasible to obtain and capture data on the whole target population of cases over this three-year period. Data was collected with a checklist-styled data collection instrument. This data was then captured manually into an Excel® spreadsheet, which was cleaned and analysed in R statistical software (R Core Team, 2020). The research was conducted in the district of the GRD in the Western Cape Province through the WCEMS. The WCEMS (functioning as the provincial ambulance service for this district) ambulance duties are directed through a Communication Centre.

This communication centre files IMR pertaining to every health care consumer requesting access to health care, directing ambulance services accordingly.

This research approach looked at retrospective data archived by communication centre dispatchers. This data carries information pertaining to all health care consumers requiring the EMS. Using the communication centres database, a census (100% sample) was undertaken of all cases that met the inclusion criteria, namely that fell under one of the following four categories in the database: Psychiatric/Behavioural Problems, Self-Harm-other, Self-Harm-poisoning and Inter-facility transfer (IFT)-psychiatric/behavioural problem[60]. These categories (incident types) focus on the health care consumers with mental health needs and covered three (3) years (2017, 2018, 2019) of the retrospective data from the four categories. This data collection took three (3) consecutive months. Evaluands[61] where taken from 2 976 (N) IMR. Data was extracted from the database using a query. A data collection instrument (Annexure 3) was used to consistently interpret and code the information on each case. Information captured on the instrument was then captured manually into an Excel® spreadsheet. Data validation was used in the spreadsheet to minimise capturing errors.

3.2. Research Paradigm

The research paradigm is *Critical Theory.*

A paradigm directs research efforts with a deeper philosophical position related to social phenomena and social structures. Paradigms direct epistemological stance, while contentiously blinding or enabling researchers to aspects of social phenomena or even new phenomena (Feilzer, 2010), however Critical Theory provides a champion for transformation, standing firm that many truths exist (Bergman *et al.*, 2012). Paradigms in contrast focus on defining a world of views, viewing the nature of the world through many different lenses. These lenses and world views have been shaped by ontological[62],

[60] This usually pertains to health care consumers who have mental health needs.
[61] Evaluands refers to whatever is being evaluated
[62] "The nature of our beliefs about reality" … the theory how we view reality, asking … "what is the nature of physical and social reality" (Rehman and Alharthi, 2016, pp. 51; Bergman *et al.*, 2012, pp. 545)

epistemological[63] and methodological[64] dimensions, providing paradigmatic pretence in research perspectives (Asghar, 2013).

The research that was conducted needed a paradigm to champion transformation, and enable voice for a marginalised group. As with the novelty of research most researchers tend to use a positivist approach of numerical and empirical facts or a constructivist approach of being descriptive with language to explain research (Rehman and Alharthi, 2016). However non-critical paradigms only present what can be observed and recorded from a phenomenon. With Critical Theory the researcher is able to strive to reform and provide transformation on a phenomenon due to its reformative and emancipating nature (Rehman and Alharthi, 2016). Critical Theory is distinctive in its approach, being comprehensive in grappling with social reality and diagnosis of social pathologies. Thompson (2017) elucidates critical theory "not by *a priori*[65] ethical or political values that it seeks to assert in the world, but by its capacity to grasp the totality of individual and social life, as well as the social processes that constitute them" (Thompson, 2017, pp. 1). Thompson further ratifies

> "…the concept of critical theory in society maintains that any valid, true form of knowledge about society and its products is one that is aware not only of the object of consciousness and its various dynamics, but also of the subjective factors of cognition that determine the knowledge of that object…" (Thompson, 2017, pp. 2).

Critical Theory pursues human emancipation, providing liberation from social circumstances. The paradigmatic contrast of critical theory provides a challenger to status quo, whereby improvement of a democratic society is publicised through concerns of power relations in a society. Embedded in this power dynamic gender, class, race, economy, education, religion and other social institutions are all championed. Critical theorists do not simply look for the problem, they aim to provide change to a problem

[63] "The branch of philosophy that studies the nature of knowledge and the process by which knowledge is acquired and validated" … the theory of knowledge, asking … "What are the origin, nature and limits of knowledge about reality" (Rehman and Alharthi, 2016, pp. 52; Bergman *et al.*, 2012, pp. 545)

[64] "An articulated, theoretically informed approach to the production of data" (Rehman and Alharthi, 2016, pp. 52)

[65] Relating to, or donating reasoning or knowledge which proceeds from theoretical deduction rather than from observation or experience, based on theoretical deduction, rather than empirical observation.

(Asghar, 2013). Ontologically, critical theorists position is one of historical realism[66], assuming a reality exists, however shaped by structures of political, cultural, economic, social, gender and ethnic factors (Bergman *et al.*, 2012). Historically, the mentally ill have been ostracised from society, with changes to mental illness and mental health policy only recently been adopted (World Health Organization, 2005). S.A has many historical injustices, inequality and racial divide. The very roots of the South African history of inequality and poverty embed a prospect for mental illness development. These inequalities have created a difficulty towards access to health care, especially in the black homeland provinces during apartheid (Sobuwa and Christopher, 2019). Post-apartheid S.A has seen further development of the EMS while the practice of Emergency Care and improvement of, has seen an increase in development of improved prehospital care (Sobuwa and Christopher, 2019). The public EMS has become a champion of access to health care for the public who have been historically unjustified, improving the rights of poverty-stricken South Africans. Critical theory's historical realism is embedded in the historical reality of mental illness and the EMS in South Africa.

Critical theory follows relative subjectivism[67] as its epistemology, with the assumption that an object researched is affected by the researcher and influenced by power relations (Bergman *et al.*, 2012), as would be the endeavour of this research. The methodology of critical theory is transformative, whereby knowledge is gained through emancipation and empowering participants. The main aim of critical theory methodology is not to explain a phenomenon but to change a phenomenon, working to an emancipatory goal, unlike the positivist approach, endeavouring to lay bare beliefs and actions that limit human freedom (Rehman and Alharthi, 2016; Bergman *et al.*, 2012). Rehman and Alharthi (2016) put it perfectly when understanding critical theory, elucidating action research to "refer to ways of investigating an immediate problem by identifying a problem, planning an intervention,

[66] Historical realism suggests: "Reality is shaped by structures of social, political, cultural, economic, ethnic and gender factors" (Bergman *et al.*, 2012, pp. 545)… this suggests that reality as it is, stems from the history of injustice from the past. The present is because the past was. Historical realism's view on reality (ontology) fits the mental illness South African milieu.

[67] Relative subjectivism's theory of knowledge (epistemology) is value dependent and influenced by power relations (Bergman *et al.*, 2012, pp. 545)… this suggests knowledge is gained from the value of the participant/research and influenced through power relations and interaction.

implementing the plan, observing changes and reflecting on the changes observed" (Rehman and Alharthi, 2016, pp. 57).

Critical theorists usually use a qualitative approach to study design, however a quantitative approach can also be adopted, providing flexibility to any methodology as long as the research ameliorates the social system (Hussain, Elyas and Nasseef, 2013; Asghar, 2013). The critical theory paradigm aligned with this research through the ontological perspective of historical realism (historical retrospective archive data) and championed the desire for transformation. Critical theory is associated to potential and actual social struggles of oppressed and exploited groups (Fuchs, 2015), providing a perfect paradigm to research a marginalised group like people with mental illness. People with mental illness or mental health needs are always vulnerable; critical theory prioritises the vulnerable.

3.3. Research Design

The research design chosen for this study was: *A Retrospective Cross-Sectional Study.*

A retrospective cross-sectional study is classified under observational research, as it does not manipulate variables, but rather studies what exists. The focus of such a design is to describe a phenomenon and document prevalence around this phenomenon. These studies document status quo, producing a needs assessment of a phenomenon (Belli, 2012). As mentioned in the previous chapter, mental illness and poor mental health is an increasing burden on society.

This burden needed to be documented from a prehospital EMS perspective as it appeared to be lacking in the literature. The EMS attends to and documents many health care consumers requiring mental health care needs, providing a data base to do a descriptive study. This data base has electronic health care consumer IMR created by communication centre dispatchers who work for the WCEMS. These records contain details of health care consumers and their health care needs as they present to the public EMS; how their transport to hospital transpires. The design of this research targeted this retrospective archived data that has been created over time. The retrospective data stored in the WCEMS communication centres archive, has been stored according to

category. These categories are sub-divided by certain medical, trauma or emergency options. This database of retrospective data is established in such a way, that a researcher could find a previous IMR using an incident number, the date, a name, incident type or which ambulance attended which incident, similar to census sampling. Using a census (100% sample), the retrospective data covered a span of three (3) years (2017, 2018, 2019) and the research was conducted over three (3) consecutive months. Evaluands where taken from 2 976 (N) The data collection instrument interpreted and coded information on each case. These evaluands were manually captured into an Excel® spreadsheet for statistical analysis. Statistical analysis took place in R statistical software after data validation in the Excel® spreadsheet

Drummond and Murphey-Reyes (2017) suggest an observational cross-sectional study can be used to develop theory and identify problems of current practice and phenomena. Usually with a cross-sectional study, information about prevalence and distribution is provided and usually looks at research over one point in time amongst different respondents. Retrospective research however looks back in time at data that has already been created to explain or explore new phenomena (Drummond and Murphey-Reyes, 2017; Belli, 2012). This provides alignment with the study design as the researcher endeavoured to quantify a prevalence in a rising phenomenon. The retrospective aspect focused on the previous three years of archived data. The research design focused on description and thus no hypothesis was needed (Belli, 2012). A descriptive study is useful for public health planning and estimating prevalence and risk factors of outcomes of interest (Drummond and Murphey-Reyes, 2017).

3.4. Research Study Setting

The research study site sets the scene for the study. The study locale is in the Garden Route District of the Western Cape and the institution through which the research was conducted was the Western Cape EMS Communications Centre. A basic clarification of the Garden Route District, WCEMS, Communications Centre, Incident Management Record and Dispatcher are given to provide a fuller understanding of how the methodology worked. These terms are mainly used in the methodology.

3.4.1. Garden Route District (GRD)

The Garden Route District (GRD) is one of the six district municipalities of the Western Cape, and contains seven local municipalities, namely Bitou, George, Hessequa, Kannaland, Knysna, Mossel Bay and Oudtshoorn. Kannaland and Oudtshoorn area make the Klein Karoo. The main towns in this area with EMS stations are Ladismith and Carlitzdorp (Kannaland), Oudtshoorn and Dysselsdorp. Hessequa consists of Heidelberg and Riversdale. Mosselbay area has one main station with many little feeder towns, while Uniondale also falls under George main station. Knysna has its own station also feeding smaller towns while Bitou area houses Plettenberg Bay station. The GRD has a population of approximately 622 664 people (Western Cape Government, 2019). The GRD is the locale where the author works. Knowing the area and the people the author could make better judgements pertaining to the research. Working and living in the area made research site accessible. The phenomenon of mental illness and the increase was first noticed whilst the author was working. The GRD provides an urban and rural demographic with many of the smaller hospitals in the smaller towns usually refer serious patients to one main hospital in George, the main industrial city/town of the GRD. The demographics of the GRD are estimated at 168 884 children between 0-14 years; 402 784 working age 16-65 years; 50 997 people 65 years and over. The population density of the GRD is 69 people/km^2 in Knysna area; 66 people/km^2 in Bitou area; 48 people/km^2 in Mossel bay area; 42 people/km^2 in George area; 26 people/km^2 in the Oudtshoorn area; 9 people/km^2 in the Hessequa area; 5 people/km^2 in the Kannaland area (Western Cape Government, 2019); (Refer to Figure 19).

Figure 18: Geography of the Garden Route District (Western Cape Government, 2019)

3.4.2. Western Cape Emergency Medical Services (WCEMS)

The Western Cape Emergency Medical Services is the EMS provided by the Western Cape Government Department of Health, and provides an emergency care service to communities within the Western Cape. The Western Cape Emergency Medical Services will be referred to as WCEMS for this thesis, and also referred to as the “public EMS” in this thesis. The WCEMS has two main divisions that pertained to this research- Communications and Operations. It is pertinent to acknowledge that the WCEMS in the GRD has a health care consumer volume on average of 7000 health care consumers per month. The private sector EMS in the GRD (ER24/Eden 911) attend to a minority of the population within the GRD, compared to the majority serviced by the WCEMS. Rural living comes with low income and often many communities cannot afford the private sector EMS. This researched focused on the EMS in the GRD that services majority of the GRD population. This doesn’t stipulate the private EMS does not service poor communities, the WCEMS just services more health care consumers and communities within the GRD each year; providing a larger target population.

Figure 19: WCEMS divisions

3.4.2.1. WCEMS Communications Centre

WCEMS Communications Centre, referred to as the Communications Centre in this research, refers to control area of the ambulances and emergency dispatch, whereby the necessary personnel are sent out to emergency scenes and was the source of data for this study. In this study the Communications Centre stationed in George, controls the dispatch of WCEMS for the entire GRD towns. The Communications Centre runs on a modern electronic relay and dispatch system. When a call (incident) comes in from the public, a call centre agent in the communications centre will obtain the information from the caller and formulate the electronic Incident Management Record. The dispatch

software will then prioritise the severity of the call, P1 or P2. Once the Incident Management Record (IMR) is created it is ready to be dispatched to the appropriate ambulance crew.

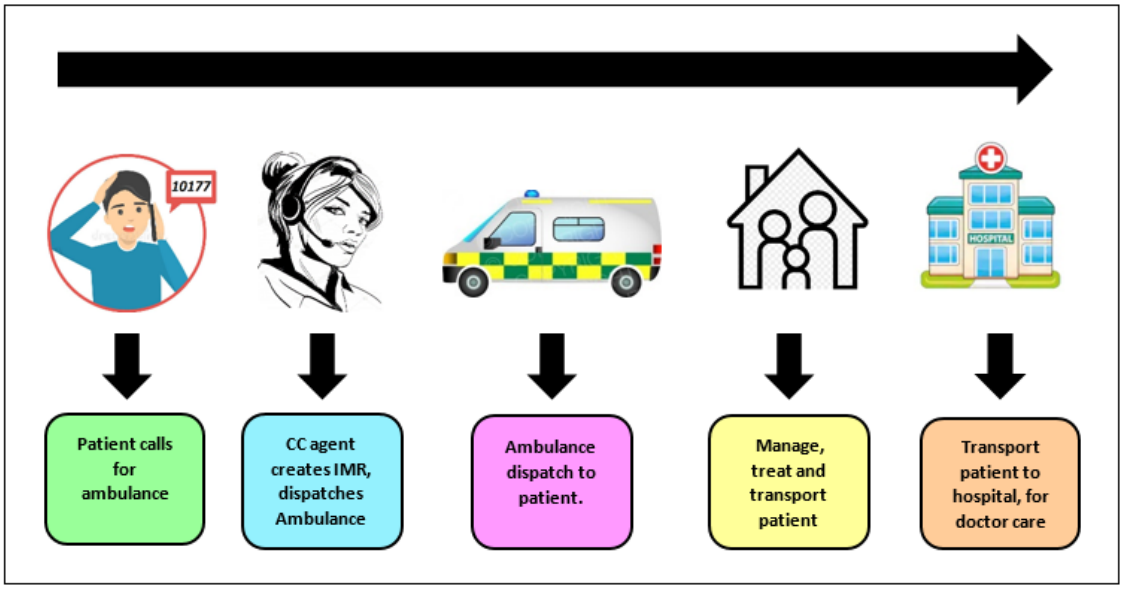
The dispatcher (Emergency Call Centre Agent) has discretion of this Incident Management Record and will be responsible in ensuring the health care consumer (Incident Management Record) is attended to by ambulance personal. The incident is dispatched to the ambulance via computer aided dispatch system. In the ambulance there is a smartphone Tab that the emergency care personal in the ambulance need to confirm acceptance of the incident, enroute themselves to the incident, arrive at the incident address, depart the incident address, arrive at hospital and complete call at hospital. These are all options required to select on the smartphone Tab as per the standard operating policy of the WCEMS. This computer aided program that runs the ambulance workings also has the option of standing down at a scene for cases like where no health care consumer is found or transported by private ambulance or used own transport.

When the Incident Management Record is created, the health care consumer's signs and symptoms or complaint will fit the description of a set of medical conditions. These medical conditions will fit the description of certain categories or incident types. These categories or incident types is the computers system to group certain medical and trauma emergencies. This provides the database to find any health care consumer with any problem, at any time, provided you know exactly what you require. Certain conditions and problems are saved in certain categories. If a person requires an ambulance for a heart attack, this "incident" will be filed under incident type cardiac emergency (See annexure 8).

Mental illness, poor mental health and DSH provide health care consumers with mental health needs. The majority of the health care consumers who present to the WCEMS with mental health needs are categorised in 4 main categories (incident types). These categories (incident types) are Psychiatric/Behavioural problems, Self-Harm-other, Self-Harm-poisoning and IFT-psychiatric/behavioural problem. These four incident types are where health care consumers with mental health needs would be categorised depending on what complaint is received. Psychiatric/Behavioural problems houses the health care

consumers who are known with psychiatric problems and have called in for a psychiatric problem. This is also where newly diagnosed psychiatric people or people who are doing strange things according to family are grouped. Self-Harm-other houses the health care consumers who inflict self-harm to themselves. Incidents like attempted and suicide, self-cutting, overdoses and poisoning overdoses are grouped here. Self-Harm-poisoning is the incident type for all overdoses (deliberate and accidental). IFT-psychiatric/behavioural problem is the incident type that houses all interfacility transfers around the district of mental health consumers who present to a medical facility with signs of psychiatric problems and require an upgrade in facility. Usually, this transport takes place between government provincial primary health care clinics, regional and district hospitals and tertiary hospitals.

Figure 20: Process map of a health care consumer's EMS journey[68]



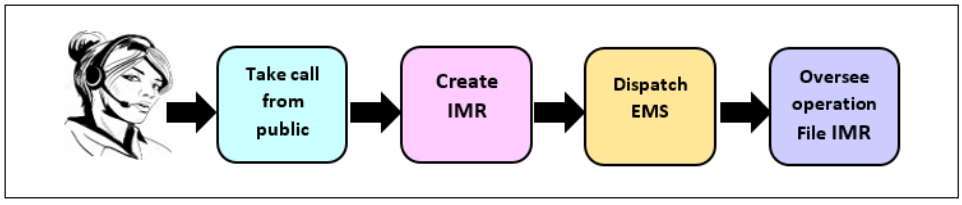
3.4.2.1.1. Emergency Call Centre Agent

Emergency Call Centre Agent refers to the person responsible for coordinating the movement of emergency personal and is more commonly known as a Dispatcher. An Emergency Call Centre Agent usually has a Basic Life Support qualification and has training to use the computer system that generates the IMR. In this thesis an Emergency

[68] After manage and treatment the patient may refuse transport if they wish

Call Centre Agent will refer to a dispatcher who coordinates the movement of EMS personal/emergency vehicles. The dispatcher is very important in coordinating the correct qualification to the required health care consumer as well as understanding their complaint in order to generate the correct response. In essence the dispatcher needs to be highly reliable in order to coordinate the correct sequence of events to save a life. Remember a person who is having a heart attack is seen as severe and prompt, swift activation of the ambulance is required. A person having a mental psychiatric episode is just as vulnerable as the person with the heart attack, although one is more severe, both require immediate ambulance transport. The dispatcher has to navigate this grey area and choose which health care consumer gets helped first. Working in the government sector there is staff shortages and ambulance/equipment shortages. Thus, the dispatcher has to navigate the minimum number of ambulances for the maximum number of calls, often doing a dual function dispatch of all the towns in the GRD. Annexure 9 (Figures 41-45) displays the call taking protocols required by call takers for certain conditions. These protocols are for drug overdose, poisoning, psychiatric/behavioural problem and suicide. This protocol is a set of prompts that call centre agents follow when a health care consumer calls for assistance (WCEMS Communications Centre-GRD, 2003).

Figure 21: Process map of Emergency Call Centre Agent duty



3.4.2.1.2. Incident Management Record (IMR)

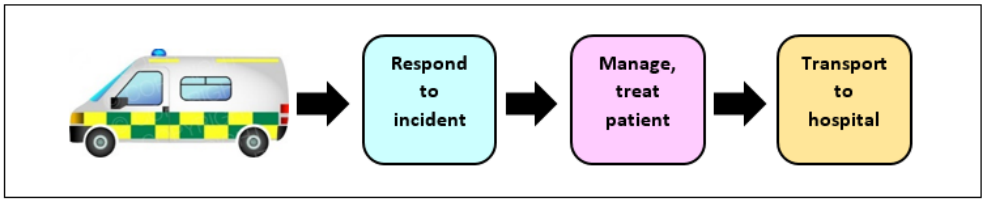
The Incident Management Record (IMR) is a record created every time a health care consumer requires the ambulance. The record is created when they call for an ambulance. The record houses health care consumers' details, address, complaint of the caller and the incident type (category). The complaint of the caller will distinguish between which incident type they are. The IMR has a reference number, date and created by component. The IMR also houses a dispatch detail area, defining the movement of the ambulance to and from health care consumer to hospital. This dispatch detail records

what ambulance or service was used, who worked on that ambulance, when they arrived on scene, when they leave scene and when they arrive at hospital. The Triage colour will also be present (please see annexures for example copy of how an Incident Management Record looks). This IMR theoretically is the electronic version of the health care consumer and the retrospective data used for the research of this study. The IMR are categorised by incident type (category). Depending the complaint and problem of the health care consumer, they will fall into an incident type. The IMR is filed according to incident type (See annexure 8).

3.4.2.2. WCEMS Operations

The WCEMS Operations refers to the division in the WCEMS that has the employ of Emergency Care providers (EC provider) who work on the ambulances or response vehicles. The operations unit is responsible for the management, treatment and transportation of sick and injured health care consumers from incident scenes to health care facilities-usually hospital. WCEMS Operations is directed by the WCEMS Communications Centre. The configuration of the WCEMS Operations consists of Basic Life Support, Intermediate Life Support and Advanced Life Support (EC providers). EC providers work within their scope of practice to provide emergency care at the point of need. The author of this research is employed as part of the WCEMS operations, and thus focused the research of this thesis through the communications centre, as to remove any bias and assumption of data influence, removing conflict of interest. The WCEMS in the GRD has EMS stations based in eleven of the main towns in the GRD, namely: George; Knysna; Mosselbay; Heidelberg; Carlitzdorp; Dysselsdorp; Plettenburg Bay; Uniondale; Riversdale; Ladismith; Oudtshoorn. The daily work proceedings for the WCEMS ambulances are conducted by an Emergency Call Centre Agent (dispatcher) in the Communications Centre. The WCEMS attends to Priority one (P1) calls, termed as severe cases; Priority two (P2) calls, of mild to moderate severity and Inter Facility Transfers (IFT) by Operational EMS staff.

Figure 22: Process map of WCEMS Operations



3.5. Research Sample Strategy

The sample method, study population, population size, sample frame and inclusion/exclusion criteria are explained here.

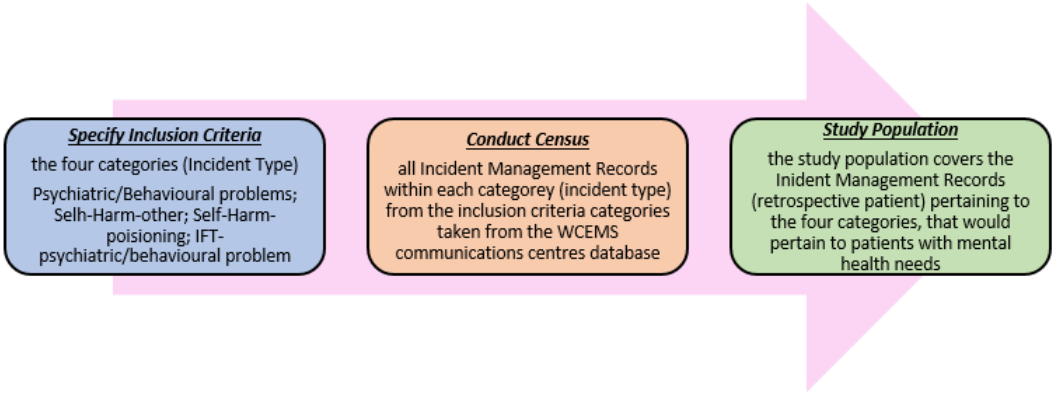
3.5.1. Sample Method

No sampling method was required for this study because the entire target population (i.e., all EMS cases from the study period and study location that met the inclusion criteria) was included. In other words, a census was used. A census may be defined as "an attempt to list all elements in a group and to measure one or more characteristics of those elements" (Cantwell, 2008, pp. 90). The term is most commonly used in national surveys, used to produce official government statistics, but can be used in any context. The premise for use of sampling methods in quantitative research is that the target population is too large or too inaccessible to study in full under the constraints of time and cost. However, since a sample is an incomplete representation of the population, sampling error is introduced. A census is thus preferable to a sample in cases where the population is small enough, and data collection easy enough, to be feasible (Cooper and Schindler, 2014).

The key to a census (100% sample) is to include the whole population while providing quality data. Quality data is defined as fitness for use, protracting that assessment of quality should be abstract, acknowledging that data in raw form has no quality but potential value if it has a purpose. Census quality is seen as a multi-dimensional construct which describes information of what is being researched. Census quality is looked at in six main elements: relevance, accuracy, timeliness, accessibility, interpretability and coherence (Baffour, King and Valente, 2012).

The Communications Centres database provided the retrospective data categorised into incident types (categories). The four incident types (or sample category) chosen were Psychiatric/Behavioural problems, Self-Harm-other, Self-Harm-poisoning and IFT-psychiatric/behavioural problem. These incident types best pertain to health care consumers with mental health needs. The Census method used included every IMR (health care consumer) with in these incident type categories. Each IMR pertains to a health care consumer, and is retrospectively archived. The census (100% sample) included three years of IMR from each incident type. The process of querying the database for the IMR, assessing each IMR to create a structured dataset using a checklist was conducted over three months. (Annexure 8)

Figure 23: Census (100% sample) Method



3.5.2. Study Population

The study population for this research was all the IMR (retrospective patient) that pertained to the four categories (incident type) of Psychiatric/Behavioural problems, Self-Harm-other, Self-Harm-poisoning and IFT-psychiatric/behavioural problem. Although an IMR was retrospective, they represented a health care consumer who had mental health needs. Using a census (100% sample) and the WCEMS communications centres database, a study population from the GRD who had mental health needs was the premium target. The study population focused on the retrospective archive data that had been captured over three years. These categories (incident types) house retrospective archive data pertaining to health care consumers known with psychiatric problems, committed self-harm, overdosed, committed suicide or needed ambulance transfer to

psychiatric facility. Usually if a health care consumer has mental health issues/needs it would be recorded and saved under one of these categories.

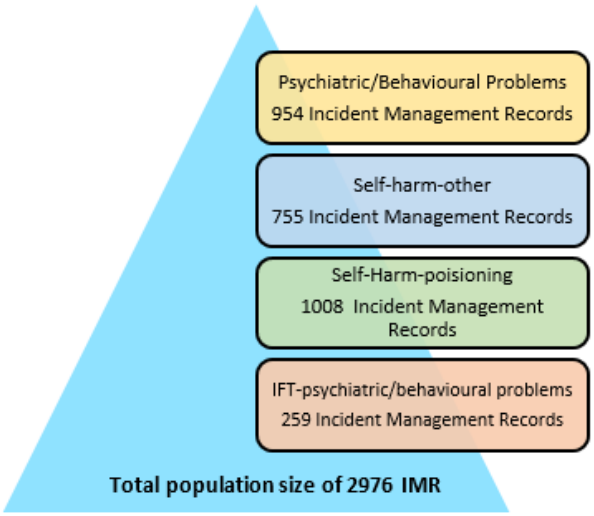
The population of the GRD consists on average of 622 664 people (Western Cape Government, 2019), with the WCEMS servicing on average 84 000[69] patients/health care consumers a year from this population. The study population came from the average 84 000 health care consumers per year from the GRD; focusing on health care consumers with mental health needs that presented to the WCEMS, that pertained to the census within the three years of retrospective data. Being a census, any health care consumer that fitted into the four categories was considered part of the study population. All records were anonymised and as no health care consumer follow ups were intended, a waiver of direct informed consent was sought. Permissions were sought from the WCEMS, Provincial DoH (WC_201911_033) and CPUT (CPUT/HW-REC 2019/H17); (Annexures 4 and 5).

3.5.3. Population Size

Due to the feasibility of retrospective data, the researcher decided to use three (3) years of retrospective data (2017-2019). The population size included all the Incident Management Records (IMR) (retrospective patient) from each category (incident type), created over three years. This amounted to 2 976 IMR. This sample size covered the health care consumers who required the WCEMS for mental health needs in the GRD. The sample size (all retrospective patients) of each category was Psychiatric/Behavioural problems: 954 IMR; Self-Harm-other: 755 IMR; Self-Harm-poisoning: 1 008 IMR; IFT-psychiatric/behavioural problems: 260 IMR.

[69] WCEMS services roughly 7000 patients/health care consumers a month. This averages out 84 000 a year. These figures are averages and can vary between month, year and seasonal fluctuations.

Figure 24: Population Size



3.5.4. Census Frame

The census frame consists of all 2976 cases (IMR) in the three years of retrospective data that met the inclusion criteria. Since a census was used in this case, the records in the sampling frame correspond exactly to those in the data set that was analysed.

Table 3: Census Frame

Categories (Incident type)	Years and sample sizes			
	2017	2018	2019	Total over 3 years
Psychiatric/Behavioural problems	310	314	330	954
Self-Harm-other	262	278	214	755
Self-Harm-poisoning	350	350	308	1008
IFT[64]-psychiatric/behavioural problem	72	86	102	259
Total sample frame size				2976

3.5.5. Inclusion and Exclusion Criteria

Inclusion criteria consisted of IMR (retrospective patients) with in the four categories chosen in the sample. As the aim of the study was to focus on health care consumers with mental health needs, these categories (incident types) of Psychiatric/Behavioural problems, Self-Harm-other, Self-Harm-poisoning and IFT-psychiatric/behavioural problem are best suited to achieve this. These categories house IMR of health care consumers who are known psychiatric patients needing the ambulance, who have self-

harmed, who may have attempted or committed suicide, substance abused, overdosed and or have mental health needs. This was all inclusion criteria.

During the data collection it was noticed that some IMR had been created twice, known as a double booking, and only one IMR was considered for this situation. Usually, the Incident Management Records are registered as P1, severe, and P2, not so severe. It was noticed in the category (incident type) of Self-Harm-other that IMR registered as P2 pertained to accidental self-harm and did not meet the criteria of health care consumers with mental health needs, thus exclusion of P2 IMR from the category of Self-Harm-other was needed. Deliberate self-harm, overdoses, attempted and suicide was registered as P1, indicating inclusion from exclusion. In category (incident type) Self-Harm-poisoning there was many IMR with children under the age of eight. These IMR were excluded as it was acknowledged as accidental rather than premeditated due to the age[70]. It was also noticed that some IMR in the data base pertaining to the four categories (incident types) would have a cancelled status attached. These cancelled records were not included. Any other IMR from different categories (incident types) within the WCEMS Communications Centre database that were not found in the four categories (incident types) of the census was not included.

3.6. Data Collection Instrument

Data collection took place with a checklist data collection instrument. The instrument has been adapted from Michael Scrivens adaptation of the key evaluation checklist methodology (Scriven, 2007; Schröter, 2010; Scriven, 2009). Scriven suggests checklists help reduce the chances of forgetting to check valuable inferences, thus reducing errors of omission directly and errors of commission indirectly (Scriven, 2007b). Checklists reduce influence of the halo effect-where the tendency to allow the presence of a strong feature to over influence ones judgement of merit-prescribing the evaluator to consider separately and allocate appropriate merit to each dimension/category of the checklist (Scriven, 2007b). Checklists incorporate huge amounts of specific knowledge about

[70] This was stated in the IMR as accidental.

evaluands[71] for which they were developed aiding in improvement of validity, reliability and credibility of an evaluation (Scriven, 2007b; Scriven, 2015; Scriven, 2007a). Scriven uses the prospect of Key Evaluation Checklist to set a mode of checklist formation. Through the concept of deep evaluation, Scriven suggests evaluation of the evaluands is needed to prescribe the right outcome and success to checklist creation (Scriven, 2007a).

The concept of the said data collection instrument requires scrutinising before full evaluation can take place. Scriven suggests navigating the background and context, defining descriptions and definitions, who does it impact, who are the resources and what is the values, evaluate the process, evaluate the outcome, cost effectiveness and exportability (Scriven, 2007a). The concept of these points needs to draw the main conclusion, the main evaluation concern. What are the main areas the evaluand is lacking and doing well? Is it the most cost-effective available resource to address the identified needs without inordinate adverse impact? (Scriven, 2007b; Scriven, 2007a), (See Annexure 2). The aim of the data collection instrument was to sieve out evaluands from the IMR (retrospective patients). As stated, all IMR pertained to health care consumers with mental health care needs. The data collection instrument was divided into key sections to evaluate key aspects of health care consumers with mental health care needs. The data collection instrument focused on four main areas of interest needed to answer the research question (see Annexure 3 for checklist data collection instrument).

The first section of the checklist looks at the severity of the health care consumer, usually determined by the triage colour. Blue is dead, Red is server, Orange is moderate to server, Yellow is moderate with minor injury and Green is minor injury. The requisition number is the file number for the IMR. Instructions to use the checklist are found here, as elucidated by Scriven (Scriven, 2015).

Table 4: Section One-Data Collection Instrument beginning

Requisition No. / Date	Tick the appropriate box Fill in the Requisition No. Fill in the date. Fill in age. Specify where possible.	Triage Colour B R O Y G

[71] Evaluands refers to whatever is being evaluated

The second section of the instrument focused on What the presenting problem and medical history of the health care consumer was. The most common mental health problems were listed and included known psychiatric, schizophrenia, bipolar disorder, autism, depression, suicidal, substance abuse, anxiety, PTSD, delirium, Alzheimer's, dementia, behavioural problem, overdose, commit suicide and attempted suicide. This provided the reason for needing the ambulance. The option of noting any comorbidities was present here. These diagnoses are usually told to the dispatcher/call taker when they ask prompts as per the protocol of the Communications Centre.

Table 5: Section Two-Presenting problem and history of patient

WHAT IS THE PRESENTING PROBLEM AND HISTORY OF PATIENT?

Known Psychiatric	Substance Abuse
Schizophrenia	Anxiety
Bipolar disorder	PTSD
Autism	Delirium
Depression	Alzheimer's
Suicidal	Dementia
Behavioural Problem:	
Overdose:	
Commit Suicide:	
Attempted Suicide:	
Other:	

Any other Medical condition?	
Diabetes	Hypertension
Cardiac problems	HIV
Asthma	TB
Epilepsy	CVA
Other:	

Specify type if applicable

The third section of the data collection instrument looked at age and gender[72] of the health care consumer to document demographic data. Note that the age was of interest because they are epidemiological descriptors that may be associated with illness.

Table 6: Section Three-Age and Gender of patient

WHAT IS THE AGE AND GENDER OF THE PATIENT?

AGE		Unknown
GENDER		
Male	Female	Unknown

The fourth section looked at which emergency services were dispatched to the health care consumer. This section with section five was important as it would be the section used to provide the answer to aim: To appraise access to health care for health care

[72] Age and gender data, when associated with other variables may promote ageist or sexist stereotypes or harm to the vulnerable groups. The author is acutely aware of such risk but sought to unpack what data parameters were documented in relation to the topic. The conditions under which I examine such phenomena is criticality and potential for redress.

consumers who present to a public EMS with mental health needs. This section provided evidence if this marginalised group received ambulance treatment or SAPS service.

Table 7: Section Four-Dispatch of Emergency Service

WHAT EMERGENCY SERVICE IS DISPATCHED?			
Private EMS	WC Gov. EMS	SAPS	AMS Helicopter

The fifth section looked at the demographics of the health care consumer, providing the locale of the health care consumers presenting with mental health needs. The demographics pertained to the towns in the GRD. This section also provides if the patient was transported to hospital by the EMS, SAPS or took own transport. The data collection checklist also provides the option for refusal of transports and if the ambulance was no longer required. No patient found was also an option.

Table 8: Section Five-Demographic and outcome of patient

WHAT IS THE DEMOGRAPHIC AND OUTCOME OF THE PATIENT?

Transported to hospital by EMS	Transported by SAPS	Patient refused transport
Patient took own transport	Ambulance no longer required	Unknown
		No patient found

George	Plettenburg
Knysna	Uniondale
Mosselbay	Riversdale
Heidelberg	Ladismith
Carlitzdorp	Oudtshoorn
Dysselsdorp	Other:

FILL IN SUBURB UNDER EACH TOWN AND NAVIGATION CATEGORY BELOW

The data collection instrument sought to collect the necessary information needed to provide data around a marginalised group. The data collection instrument was used to consistently interpret and code the information from each IMR. Information captured on the instrument was then captured manually into an Excel® spreadsheet using coding of 'yes' and 'no'. Data validation was used in the spreadsheet to minimise capturing errors. The data collection instrument collected data from 2 976 IMR (See Annexure 3).

Table 9: Data Collection Method and analysis, Census inclusion criteria and Objective to be achieved

Data Collection Method and analysis	Census Inclusion Criteria	Objective looking to be achieved
DESCRIPTIVE RETROSPECTIVE STUDY		
Checklist data collection instrument	Psychiatric/Behavioural incident type (954 Incident Management records) IFT-psychiatric/behavioural problems incident type (260 Incident Management Records)	1) Quantify the burden of mental illness cases for the EMS. 2) Describe the problem space that emergency medical services are located in with regards to care and transportation of patients with mental illness. 4) Investigate the association between EMS practice and health care consumer poor mental health, deliberate self-harm and mental illness burden.
Checklist data collection instrument	Self-Harm-other incident type (754 Incident Management Records) Self-Harm-poisoning incident type (1008 Incident Management Records)	3)Describe the problem space that emergency medical services are located in with regards deliberate self-harm and poor mental health. 4) Investigate the association between EMS practice and health care consumer poor mental health, deliberate self-harm and mental illness burden.
Data Analysis with R statistical software and Logistic Regression	Psychiatric/Behavioural incident type (954 Incident Management records) IFT-psychiatric/behavioural problems incident type (260 Incident Management Records Self-Harm-other incident type (754 Incident Management Records) Self-Harm-poisoning incident type (1008 Incident Management Records)	How can the Emergency Medical Services increase its value proposition for access to health care for patients suffering from mental illness, poor mental health and deliberate self-harm? To appraise access to health care for patients who present to a public EMS with mental health needs.

3.7. Data Analysis

After capturing and checking the data in Microsoft Excel®, the data file was imported into R statistical software (R Core Team, 2020) for cleaning and analysis. Data cleaning consisted of checking for and resolving any inconsistencies in the data (e.g., spelling, spacing, and lowercase/uppercase for textual data), and in some cases, merging similar categories into one for ease of interpretation (e.g., different types of self-harm merged into one; different types of poisoning merged into one). Dates in the data were also checked for correctness and errors corrected. Analysis consisted of generating a frequency table and bar graph for each categorical variable. In the case of Age (the only numerical variable in the data), a histogram was generated and the mean and median age of health care consumers were calculated. A histogram was also generated to show the distribution of dates in the study. Associations of interest between categorical variables were visualised using overlapping histograms and two-way frequency tables,

and analysed statistically using Pearson's chi-square test of association (Conover, 1999) and logistic regression (Hosmer and Lemeshow, 2000). Logistic regression is a method that allows analysis of the relationship between a binary response variable (e.g., Overdose or No Overdose) and one or more predictor variables, which could be numerical (e.g., Age) or categorical (e.g., Gender). The p-value of a significance test on the model coefficient(s) allows one to infer whether a relationship exists between the response variable and the predictor(s). The magnitude of the effect (if present) is typically expressed in the form of an expected odds ratio.

Pearson's Chi-square p-value on its own can provide data that relationships exist, but provides no nature or direction of the relationship. The logistic regression p-value taken together with the coefficient(s) estimate adds more inferences about nature and direction of the relationship. This provided the need to consider both statistical analyses. A multinominal logistic regression model, Fisher's Exact Test, ANOVA and Tukey's post hoc method were used to find smaller associations between gender, age and suicide/attempted suicide.

3.7.1. Pearson's Chi-square (χ^2) test of association (independence)

The Pearson's Chi-square (χ^2) test draws on assumptions that data is of a random population and that the sample size must be big. There is no limit to sample size. If a third assumption is not met a continuity correction called Yates' correction is usually applied in the case of a 2x2 table. It was also stated that the square number of observations equate to the power of ten, being 10 times higher than the amount of categories (Bolboacă *et al.*, 2011). Pearson's Chi-square test of association looks at whether something is dependent or independent and compares frequencies of ordinal and nominal data for a sample population (Bolboacă *et al.*, 2011). The null hypothesis (H_0) states there is no association between two variables while the alternative hypothesis (H_a) states there is association between two variables (Bolboacă *et al.*, 2011, pp. 530). The Equation for Pearson's Chi-square test of association is:

$$\chi^2 = \sum_{i=1}^{r}\sum_{j=1}^{c}\frac{(O_{i,j} - E_{i,j})^2}{E_{i,j}}$$

χ^2 is the Chi-square critical parameter and equals the equation whereby $O_{i,j}$ are the observed frequencies for (*i,j*) pair of factors and $E_{i,j}$ are the expected frequencies for (*i,j*) pair of factors (Bolboacă *et al.*, 2011, pp. 531). This test requires a contingency table where rows represent categories of one variable and columns represent categories of a second variable. With this equation there are degrees of freedom for the chi-square distribution (Nowacki, 2017). These degrees of freedom are: $df = (r-1) \times (c-1)$. This equation provides a *r* by *c* contingency table where *r* equals the number of rows in the contingency table and *c* is the number of columns in the contingency table. These degrees of freedom state $1 \leq i \leq r$ is the indices of observations associated to the first factor, while $1 \leq j \leq c$ is the indices of observation associated to the second factor (Bolboacă *et al.*, 2011, pp. 531). The statistic approximately follows a Chi-square distribution. The p-value is $Pr(\chi^2 > \chi^2_{1-\alpha})$, where $\chi^2_{1-\alpha}$ is the 1-α quantile of the Chi-square distribution with (r-1)(c-1) degrees of freedom. α is referred to as the significance level of the test. If the *p*-value is < α then we reject the null hypothesis of independence; if the *p*-value is > α then we retain the null hypothesis of independence (Bolboacă *et al.*, 2011; Nowacki, 2017). In this study we use a significance level of 0.05.

3.7.2. Fisher's Exact Test

Fisher's Exact Test is a statistical significance test used in the analysis of contingency tables. Fisher's Exact Test is usually used when sample sizes are too small for the distributional assumption of the Pearson chi-square test to be accurate (Bolboacă *et al.*, 2011). When Fisher's Exact Test is applied to a 2x2 contingency table, the p-value is computed using the following formula where 'a', 'b', 'c' and 'd' are individual values; 'p' equals p-value, 'a', 'b', 'c' and 'd' are individual values in contingency table and 'n' is the total frequency (Bower, 2003; Freeman and Campbell, 2007). The Fisher's Exact Test formula is:

$$p = \frac{(a+b)!\,(c+d)!\,(a+c)!\,(b+d)!}{a!\,b!\,c!\,d!\,n!}$$

This formula obtains the probability of a combination of frequencies found, usually finding the probability of every combination possible. This provides more evidence for associations (Freeman and Campbell, 2007). The Fisher's Exact Test is based on the assumptions that the null hypothesis of independence is true and that the marginal totals of the observed table are fixed (Nowacki, 2017). Factorial mathematical operation is used to calculate the probability of the observed cell frequencies. Factorial is notated with '!', which means multiply the number by all integers smaller than the number (Bolboacă *et al.*, 2011; Nowacki, 2017). The directional hypothesis assumed is such, that it predicts either a positive or negative association, whereas the value of the first unit/items being sampled doesn't affect the value of the second unit/items being sampled. This suggests the Fisher's Exact Test has mutual exclusivity within observations (Freeman and Campbell, 2007; Nowacki, 2017).

3.7.3. Analysis of Variance (ANOVA)

ANOVA is Analysis of variance. This is a collection of statistical models and their associated estimation procedures used to analyze the differences among group means in a sample (Hosmer and Lemeshow, 2000). ANOVA is a strong statistical technique used to show differences between two or more components through significance tests, making comparisons between populations (Sawyer, 2009). The ANOVA test compares variation between sample means and variation within each of the samples. The formula for ANOVA is:

$$F = \frac{MST}{\mathrm{MSE}}$$

$$MST = \frac{\sum_{i=1}^{k}\left(T_i^2/n_i\right) - G^2\,/\,n}{k-1}$$

$$\mathrm{MSE} = \frac{\sum_{\mathrm{i}=1}^{\mathrm{k}} \sum_{j=1}^{n_i} y_{ij}^2 - \sum_{i=1}^{k} (T_i^2/n_i)}{\mathrm{n} - \mathrm{k}}$$

'F' is the ANOVA ratio statistic, 'MST' is the mean sum total and 'MSE' is the mean sum of errors. The ANOVA ratio statistic is donated 'F' because it is compared with an 'F' distribution. Low p-values are indications of strong evidence against the null hypothesis that the group means are all equal.

3.7.4. Tukey's *post hoc* method

The Tukey *post hoc* method or the Tukey's Honest significant Different test is a *post hoc* test based on the studentized range distribution. This test accentuates an ANOVA test which tells you if your results are significant, but doesn't show where those differences are. The Tukey test will show you where those differences lie (Hilton, 2006). Tukey's test compares the means of all units to the mean of every other units, usually when sample sizes are unequal (Hilton, 2006). The test statistic for Tukey's test is the denoted 'q' and is a modified t-statistic that corrects for multiple comparisons, as such:

$$q_{\alpha,k,N-k}$$

The studentized range distribution of 'q' is:

$$q = \frac{Ymax - Ymin}{\mathrm{SE}}$$

Y_{max} and Y_{min} are the larger and smaller means of the two groups of comparison. 'SE' is the standard error of the entire design (Hosmer and Lemeshow, 2000; Hilton, 2006).

3.7.5. Coherence between Analysis, Objectives and Results

This table provides coherence between statistical analysis done, what is trying to be achieved and where the results are positioned in Chapter Four. R statistical software analysis was used to answer the research question, aim and objectives 1, 2, 3, 4. These results are covered in section 4.2. Logistic regression models were used to answer the

research question, objectives 2, 3, 4. These results are covered in section 4.3, 4.4, 4.5. Pearson' Chi-square test of association was used to answer the research question and objectives 2, 3, 4. The results are covered in section 4.4. Fisher's Exact test, ANOVA and Tukey's *post hoc* method was used to answer the research question and objectives 2, 3, 4. These results are covered in section 4.5.

Table 10: Coherence of Statistical Analysis, Objectives and Results

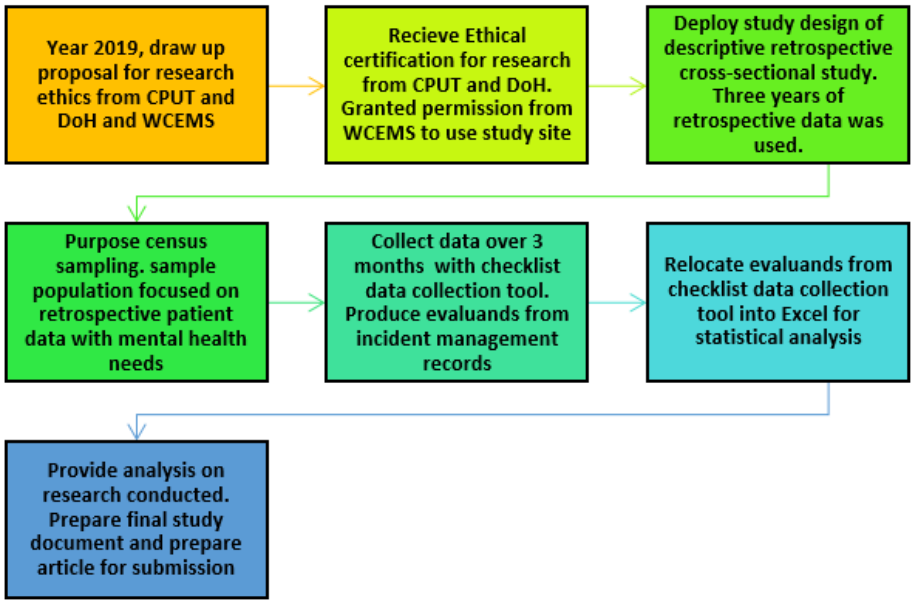
Analysis Method	What is trying to be achieved	Placement of results in Chapter 4
Frequency Tables	***Research Question*** How can the Emergency Medical Services increase its value proposition for access to health care for health care consumers suffering from mental illness, poor mental health and deliberate self-harm? ***Aim*** To appraise access to health care for health care consumers who present to a public EMS with mental health needs. ***Objectives*** 1) Quantify the burden of mental illness cases for the EMS. 2) Describe the problem space that emergency medical services are located in with regards to care and transportation of health care consumers with mental illness. 3) Describe the problem space that emergency medical services are located in with regards deliberate self-harm and poor mental health. 4) Investigate the association between EMS practice and health care consumer poor mental health, deliberate self-harm and mental illness burden.	4.2. Categorical Variable Results 4.2.1. Triage and time frame 4.2.2. Presenting problem 4.2.3. Medical History of IMR 4.2.4. Age and Gender 4.4.5. Dispatch of Emergency Service 4.2.6. Outcome of the IMR 4.2.7. Demographic of the IMR 4.2.8. Percentage of IMR per Census sample category
Logistic regression model	***Research Question*** How can the Emergency Medical Services increase its value proposition for access to health care for health care consumers suffering from mental illness, poor mental health and deliberate self-harm? ***Objectives*** 2) Describe the problem space that emergency medical services are located in with regards to care and transportation of health care consumers with mental illness. 3) Describe the problem space that emergency medical services are located in with regards deliberate self-harm and poor mental health. 4) Investigate the association between EMS practice and health care consumer poor mental health, deliberate self-harm and mental illness burden.	4.3. Association of interest – Age Relationships 4.3.1. Age distribution for Attempted Suicide 4.3.2. Age distribution for Suicide 4.3.3. Age distribution by DSH status 4.3.4. Age distribution by Overdose status 4.4. Association of interest – Gender Relationships 4.4.1. Gender relationship to Attempted Suicide 4.4.2. Gender relationship to Suicide 4.4.3. Gender relationship to DSH 4.4.4. Gender relationship to Overdose 4.5. Association of interest – Gender and Age relationship with type of Suicide
	Research Question How can the Emergency Medical Services increase its value proposition for access to health care for health care providers	4.4. Association of interest – Gender Relationships

Pearson's Chi-square test of association	suffering from mental illness, poor mental health and deliberate self-harm? ***Objectives*** 2) Describe the problem space that emergency medical services are located in with regards to care and transportation of health care providers with mental illness. 3) Describe the problem space that emergency medical services are located in with regards deliberate self-harm and poor mental health. 4) Investigate the association between EMS practice and health care consumer poor mental health, deliberate self-harm and mental illness burden.	4.4.1. Gender relationship to Attempted Suicide 4.4.2. Gender relationship to Suicide 4.4.3. Gender relationship to DSH 4.4.4. Gender relationship to Overdose
Multinomial regression model, Fisher's Exact Test, ANOVA and Tukey's post hoc method	***Research Question*** How can the Emergency Medical Services increase its value proposition for access to health care for health care consumers suffering from mental illness, poor mental health and deliberate self-harm? ***Objectives*** 2) Describe the problem space that emergency medical services are located in with regards to care and transportation of health care consumers with mental illness. 3) Describe the problem space that emergency medical services are located in with regards deliberate self-harm and poor mental health. 4) Investigate the association between EMS practice and health care consumer poor mental health, deliberate self-harm and mental illness burden.	4.5. Association of interest – Gender and Age relationship with type of Suicide

3.8. Alignment and procedure of methodology

The procedure of the methodology and alignment of the study started with submission of a research proposal. Ethical certification was granted by CPUT, and required permission and ethical certification from WCEMS and the Western Cape Department of Health for site usage (see annexures 4-7). This was granted and research commenced. The methodology was a descriptive retrospective study with purposeful census sampling. The data collected was from IMR pertaining to health care consumers with mental health needs. These IMR served as retrospective data and the health care consumer. All IMR (retrospective patient) within each category over three years (2017; 2018; 2019) was considered depending inclusion and exclusion criteria. Evaluands were collected with the checklist data collection instrument by the researcher over three months and entered into an Excel Spreadsheet to be analysed by a statistician.

Figure 25: Alignment and procedure of methodology



3.9. Ethical Considerations

Medical research is synonymous with the Declaration of Helsinki, where by the primary purpose of medical research involving human participants was to ameliorate prophylactic, diagnostic and therapeutic procedures, equipping the researcher with a better knowledge of pathogenesis and aetiologies of a disease or problem (World Medical Association, 2013; World Medical Association, 2001). Medical research requires ethical standards, to aggrandize respect for human rights and human subjects, where by the researcher is prominent in protecting the life, health, dignity and integrity through promotion of self-determination, privacy and confidentiality of personal information of research subjects (World Medical Organization, 1996; World Medical Association, 2013). The declaration further illuminates the essence of medical research involving human subjects must be negated only by individuals with the appropriate ethics and qualifications (World Medical Association, 2013), thus prescribing to the ethics required for this research. These ethical considerations are in line with the South African department of health (RSA Department of Health, 2015).

3.9.1. Approval

Approval to conduct research at the WCEMS was obtained from the Director of the WCEMS and Department of Health. Annexures 4 focuses on the approval from the institution to conduct the research at their facilities. Ethics approval was also granted by the CPUT ethics committee through submission of a proposal *(CPUT/HW-REC 2019/H17)*; (please see ethics certificate in annexure). Ethics permission to use site was granted by the department of health *(WC_201911_033)*; (Please see annexure 4 and 5 for ethical permission for site usage).

3.9.2. Informed Consent

Informed consent is established with the ethical code laid out by the CPUT ethics committee, where by informed consent is required and pertaining to this study that informed consent from the department of health to conduct research with retrospective data is gained and that anonymity of reporting will be exclusive, with no personal data, names or numbers being made available (CPUT Research Ethics Committee, 2015). As suggested by the declaration of Helsinki, informed consent must be voluntary, while each subject must be informed of aims, methods, conflicts of interest and sources of funding (World Medical Association, 2013). The waiver of individual consent (by health care consumers whose medical interaction is reported on) was approved on the basis of anonymity, practical challenge of accessing such health care consumers, and the potential lack of ability to consent. Formal consent was given by a health care consumer to be transported in an ambulance or by the WCEMS, (Please see annexure 6 and 7).

3.9.3. Privacy and Confidentiality

Privacy and confidentiality were cast, with no personal identifiers such as numbers or names published. Results will be made available to the institutions of CPUT, DoH and WCEMS. EMS staff was also de-identified.

3.9.4. Vulnerable individuals and group harms

Certain groups and individuals are more vulnerable to the likelihood of being wrong done. The medical research with a vulnerable group was only justified if the research was responsive to health needs and seeks to improve the life of said vulnerable person (World Medical Association, 2013). The data collection was taken from retrospective incident management records. These records pertained to health care consumers with mental health needs. This is a marginalised group and the study was conducted in so, that no vulnerability was deployed or objectified. Group harms needs to be negated as to make no reference to negative characteristics. Divulging in race has proven to be a group harm. For this research making specific similarities between race and mental illness was not feasible when critical theory is a voice for emancipation and not marginalisation. The importance was to look at values and look at what was being researched, providing a balance between emancipation and causing victimisation. As was considered for this research, ICAS a counselling system used for public servant employees was available, from WCEMS, if needed.

3.9.5. Risks, benefits and burdens

Medical research does involve risks, however medical research involving human subjects may only be conducted if the benefits of the objectives far outweighs the risks and burdens (World Medical Association, 2013). Using retrospective data there was no direct risk or burden but a benefit to try champion a marginalised group. The risk and burden would be if this marginalised group information was exposed or data interoperated in a wrong way. These risks and burdens were nullified.

3.9.6. CPUT ethical considerations, if the research participant is an informant

i. The aims of the investigation should be communicated as well as possible to informants.

ii. Informants should have the right to remain anonymous.

iii. Questions asked should not be insulting or embarrassing.

iv. The use of monitoring devices such as tape recorders and cameras should be open, and fully understood by the people concerned. They should be free to reject them if they wish.

v. Results should be consonant with the informant's right to dignity and privacy.

vi. There should be no exploitation of informants for personal gain. Fair returns should be given to them for all services.

vii. There is an obligation to reflect on the foreseeable repercussions of research and publication on those studied.

viii. The privacy and wishes of informants should at all times be respected.

ix. No reports should be provided to sponsors that are not also available to the general public and, where possible, to the group studied itself, subject to the protocol laid down in the Protocol on Matters Relating to Sensitive and Confidential Research.

(CPUT Research Ethics Committee, 2015, pp. 2)

Therefore, to fully consider the ethical conundrum behind ethical research the researcher guaranteed:

1) Anonymity in reporting was guaranteed.
2) The Western Cape EMS, Department of Health and CPUT was required to sign a confidentiality undertaking disclosure to allow researcher to conduct research. This was also acknowledged with site ethics approval *(CPUT/HW-REC 2019/H17) (WC_201911_033).*
3) Incident Management Records and checklists were kept in a safe space, accessible only to researchers.

3.9.7. Consideration of ethical principles

Consideration was taken for the vulnerability of individuals with this type of research. This research looked at a marginalised group. There is a need to champion mental health and

mental illness as it is a growing phenomenon. The consideration of ethical principles was to negate the need to not further enhance vulnerability. The endeavour of this research is to consider the epoch towards mental illness in the prehospital emergency medical care milieu. Risks, benefits and burdens were considered, and adjusted to provide benefit towards the EMS and mental health care consumers. Confidentiality was kept with all IMR, as pertaining to ethical privacy and confidentiality. Being retrospective, no health care consumer or participants were seen or engaged and thus enhanced confidentiality. Ethical disclosure was guaranteed through undertaking of ethical clearance from research site and CPUT research ethics council. All documentation is available from Annexures 4 to 7.

3.10. Study Limitations

A limitation that presented during the research was that of retrospective data. The retrospective data is archived. The retrospective data used from the WCEMS archive database could only be used as is and posed a few limitations. There was the nuance of Emergency Care Providers working on the ambulance not doing 'patient care reports' for some health care consumers, while reports that were filled in were either not complete or inconclusive. This limited the retrospective data to the Incident Management Reports created by the communications centre agent. The information here was limited to what was said by the caller for the health care consumers.

CONCLUSION

A Descriptive Retrospective Study with the paradigmatic lens of Critical Theory. This was the quantitative methodology chosen to answer the research question and aim of the study. The Critical Theory paradigm provided a milieu for transformation and emancipation. The aim of the research was to appraise access to health care for health care consumers who present to a public EMS with mental health needs, and thus required a paradigm for transformation and empowerment, a voice for a marginalised group. A Census (100% sample) focused on the retrospective archived IMR that pertained to health care consumers with mental health needs, seeking a public EMS. A Census (100% sample) allowed the researcher to look at specific inclusion criteria of all IMR

(retrospective patient) with in the categories (incident type) of Psychiatric/Behavioural problems, Self-Harm-other, Self-Harm-poisoning and IFT-psychiatric/behavioural problem that pertained to health care consumers needing the public EMS with mental health needs. This provided the ideal sample population. Data was extracted from the database using a query. The data collection instrument interpreted and coded data from each IMR. This information was manually captured in an Excel® spreadsheet. The statistical analysis was done in R statistical software to create relations, frequencies and prevalence's. The need to use quantitative methodology came with the need to quantify a burden from a prehospital EMS perspective. This best answered the question, aim and objectives.

Chapter Four presents the results from the quantitative research. Each evaluand that was presented in the data collection analysed and produced numerically to table graphs and frequencies. Chapter Five provides the comprehensive discussion around the results presented in Chapter Four.

CHAPTER FOUR: RESULTS

INTRODUCTION

Considering the contextual evidence from the WHO and the evidence of poor mental health inducing mental illness (Keyes, Dhingra and Simoes, 2010), the EMS needed to appraise access[73] to health care for health care consumers with mental health needs. There was a need to quantify the burden of mental illness and poor mental health from the perspective of the EMS in the Garden Route District (GRD); appraising the EMS exposure to mental health care users, and how the EMS may be predisposed to ameliorate human rights and attenuate stigma. This provided the aim of the research: To appraise access to health care for health care consumers who present to a public EMS with mental health needs.

4.1. Categorical Variable[74] Results

This section shows the results generated from the data analysis with R statistical software and is laid out in accordance to the sequence from the data collection instrument. Here frequencies are presented with graphs, histograms and frequency tables.

4.1.1. Triage and time frame

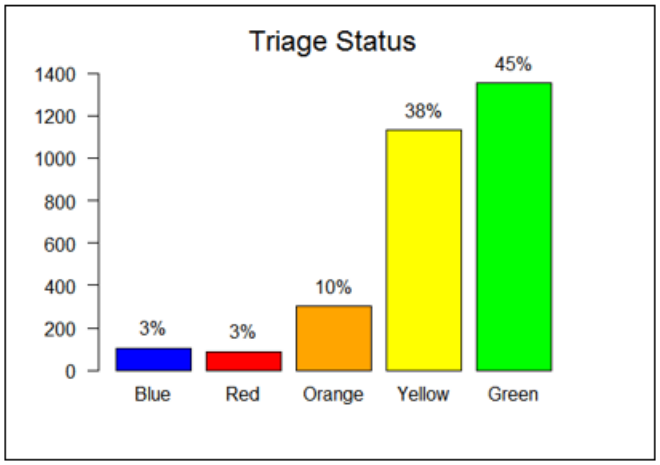
Triage is a French word meaning: to sort. It is the system used in EMS to colour code severity of health care consumer emergencies. A system that allows prioritised treatment to be given to the more severe of health care consumers. Blue means dead, Red is severe, Orange is moderate to severe, Yellow means moderate with minor injury and Green means minor injury. From the census (100% sample) of 2976 (N) Incident Management Records (IMR), 45% or 1352 (n) IMR triaged green, 38% or 1131(n) IMR

[73] In terms of "rights of access", this relates to the socio-economic rights (contained in the Bill of Rights) and the right of access to health care services (Hassim, Heywood and Berger, 2007)

[74] Categorical Variable refers to the categories as per the data collection instrument, as explained in Data Collection Instrument in chapter three

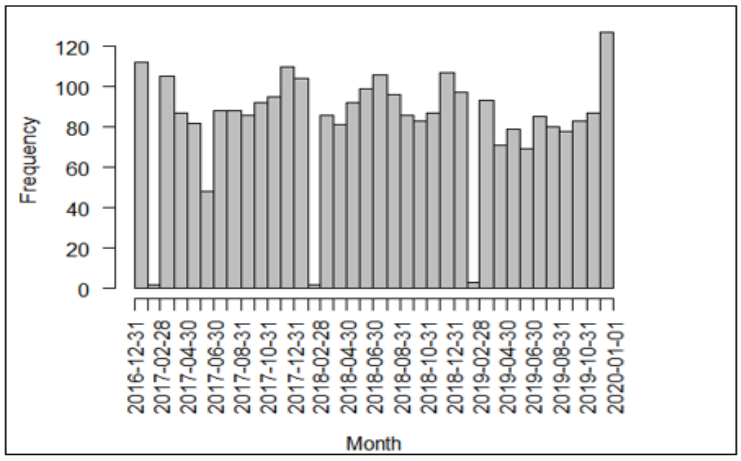
triaged yellow, 10% or 302 (n) IMR triaged orange, 3% or 87 (n) IMR triaged red and 3.5% or 104 (n) IMR triaged blue.

Graph 1: Triage Status



A histogram was created to resemble the period timeline. Data collected was over a three year period from the 1st of January 2017 to the 31st of December 2019. The histogram provides the timeline of data percentage, detailing the freguency of IMR (health care consumer cases) over the three year period. This provides data on which time frame presented with the most records.

Histogram 1: Frequency of IMR over 3-year period[75]



[75] It is acknowledged that there are very few cases in the February months. This is how the database presented cases with the census that was used. This anomaly was scrutinised and reported to the manger in control of the database system.

4.1.2. Presenting problem

The presenting problem provides the researcher with the presenting complaint from the health care consumers as recorded in the IMR. The presenting problem provides the researcher with an idea of medical problems faced by health care consumers with mental health needs. This section in the data collection instrument provided all the most common basic mental illness and poor mental health problems to choose from. Notably, known psychiatric and behavioural problem had the highest frequency compared to the more common mental illness. Behavioural problem, overdose, attempted suicide and committed suicide are options that presented with a specify option.

4.1.2.1. Minority frequency cases

The results from the data collection provide low frequencies for '*Suicidal' (ideation), 'Depression', 'Substance abuse', 'Anxiety', 'Bipolar disorder', 'Schizophrenia', 'Alzheimer's', 'Delirium', 'Post-Traumatic Stress Disorder' (PTSD), 'Dementia'* and '*Autism'*. This was grouped together due to the constituency of low frequency.

Frequency Table 1: Minority frequency cases

Category	Frequency	Relative Frequency
Suicidal	227	7.6
Depression	89	3
Substance Abuse	77	2.6
Anxiety	59	2
Bipolar disorder	21	0.7
Schizophrenia	19	0.6
Alzheimer's	5	0.2
Delirium	5	0.2
Post-traumatic stress disorder	3	0.1
Dementia	2	0.1
Autism	1	0

From 2976 (N) IMR from the census over 3-years: 'Suicidal' (ideation) presented 227 (n) times at a proportion of 7.6%. 'Depression' presented 89 (n) times at a proportion of 3%. 'Substance abuse' presented 77 (n) times at a proportion of 2.6%. 'Anxiety' presented 59 (n) times at a proportion of 2%. 'Bipolar disorder' presented 21 (n) times at a proportion of 0.7%. 'Schizophrenia' presented 19 (n) times at a proportion of 0.6%. 'Alzheimer's' presented 5 (n) times at a proportion of 0.2%. 'Delirium' presented 5 (n) times at a

proportion of 0.2%. ‘PTSD’ presented 3 (n) times at a proportion of 0.1%. ‘Dementia’ presented 2 (n) times at a proportion of 0.1%. ‘Autism’ presented 1 (n) times.

4.1.2.2. Known Psychiatric

“Known Psychiatric” is a general term used in the Communications Centre to classify a health care consumer that had a mental illness. “Known Psychiatric” presented 432 (n) times from 2976 (N) IMR. This provided a proportion of 14.5% of the IMR from the census over the 3-year period.

Frequency Table 2: Known Psychiatric

Category	Frequency	Relative Frequency
No	2544	85.5
Yes	432	14.5

4.1.2.3. Behavioural Problem

“Behavioural problem” provided a larger frequency of variance. “Behavioural problem” is the term used in the Communications Centre for a health care consumer that is displaying “different” or “weird” behaviour. The behavioural problem option is usually given to health care consumers with no known medical condition or unknown medical condition. “Behavioural Problem” presented 1115 (n) times from 2976 (N) IMR, at a proportion of 37.5% of the IMR from the census over the 3-year period.

Frequency Table 3: Behavioural Problem

Category	Frequency	Relative Frequency
No	1861	62.5
Yes	1115	37.5

The option of behavioural problem allowed for specification. These specifications were collectively analysed and given a broader category name to aid in statistic production. From 1115 (n) IMR pertaining to behavioural problems, eight sub categories were distinguished. These categories were ‘*Symptoms of psychosis*[76]*’, ‘poisoning*[77]*’, ‘deliberate*

[76] This category covers health care consumers behaviour that presented in an almost psychotic nature
[77] Poisoning refers to drinking poison like pesticides and household detergents

self-harm[78]*', 'substance abuse', 'socio-economic circumstances*[79]*', 'medical condition*[80]*'* and *'trauma condition*[81]*'*.

4.1.2.3.1. Symptoms of psychosis

"Symptoms of Psychosis" presented 721 (n) times from 1115 behavioural problem incidents from the census over the 3-year period. This provide a proportion of 67% of IMR (health care consumers) who were regarded to present with a behavioural problem, presenting with "symptoms of psychosis".

4.1.2.3.2. Poisoning

Poisoning (self-poisoning) presented 214 (n) times from 1115 behavioural problem incidents from the census over the 3-year period. This provided a proportion of 20% of IMR who were regarded to present with a behavioural problem, presenting to have self-poisoned.

4.1.2.3.3. Deliberate Self-Harm (DSH)

DSH presented 82 (n) times from 1115 behavioural problem incidents from the census over the 3-year period. This provided a proportion of 8% of IMR who were regarded to present with a behavioural problem, had deliberately self-harmed.

4.1.2.3.4. Substance Abuse

Substance abuse presented 31 (n) times from 1115 behavioural problem incidents from the census over the 3-year period. This provided a proportion of 3% of IMR who were regarded to present with a behavioural problem, had substance abused. This research didn't mean these health care consumers were chronic substance abusers. It literally

[78] This covered self-cutting, eating glass and deliberate self-harm caused to oneself.
[79] Socio-economic circumstances would be circumstances like poverty, social determinates of mental health, crime, violence and circumstance created by inequality and poor governance of communities by government. These circumstances can have a huge effect on mental health and create behavioural like problems.
[80] Medical condition refers to a medically induced behavioural problem, usually due to chronic problem.
[81] Trauma condition refers to a trauma induced behavioural problem. This category was mainly profuse bleeding.

presents that at that given time, they presented with a behavioural problem, due to abusing substance at that time (these health care consumers could become chronic).

4.1.2.3.5. Socio-economic circumstances

Socio-economic circumstances (socio-economic affected behaviour) presented 13 (n) times from 1115 behavioural problem incidents from the census over the 3-year period. This provided a proportion of 1% of IMR who were regarded to present with a behavioural problem, had been affected by a socio-economic circumstance.

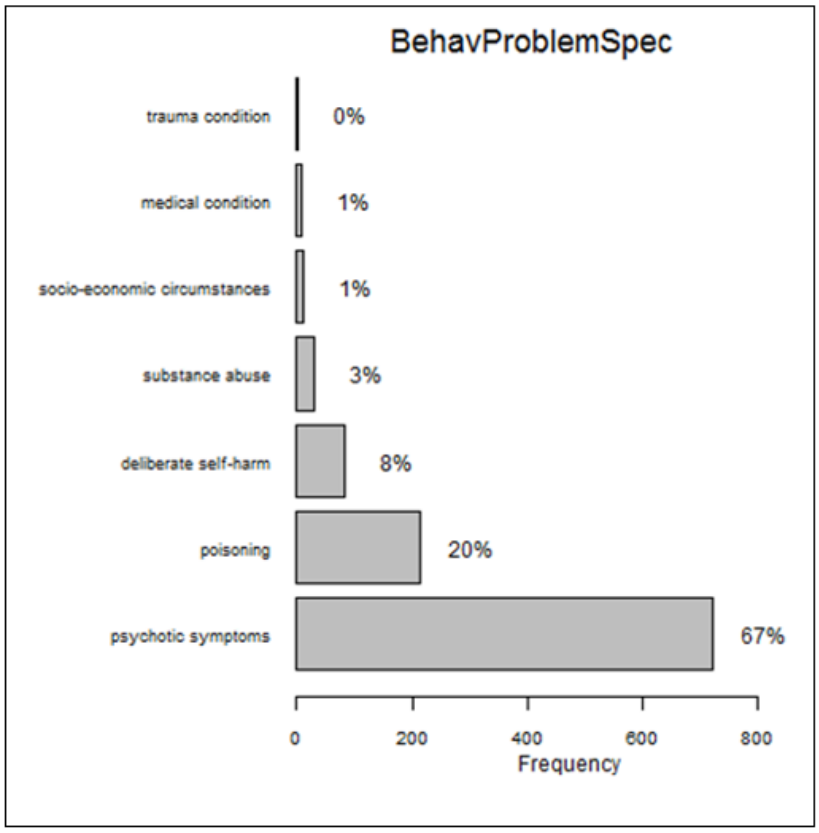
4.1.2.3.6. Medical condition

Medical condition presented 9 (n) times from 1115 behavioural problem incidents from the census over the 3-year period. This provided a proportion of 0.8% of IMR who were regarded to present with a behavioural problem, presented to have a medically induced behavioural problem due to underlying medical condition.

4.1.2.3.7. Trauma condition

Trauma condition presented 2 (n) times from 1115 behavioural problem incidents from the census over the 3-year period. This provided a proportion of 0.2% of IMR who were regarded to present with a behavioural problem, presented to have a trauma induced behavioural problem. This was mainly from blood loss as presented in the IMR.

Graph 2: Frequency of specific Behavioural Problems



4.1.2.4. Overdose

Overdose is the broad category name for a person who ingested medication or drugs. Overdose as a mental health problem presented 1336 (n) times from 2976 (N) IMR. This provided a proportion of 44.9% of IMR presenting to the WCEMS from the census over the 3-year period. This presented the largest frequency of a presenting problem.

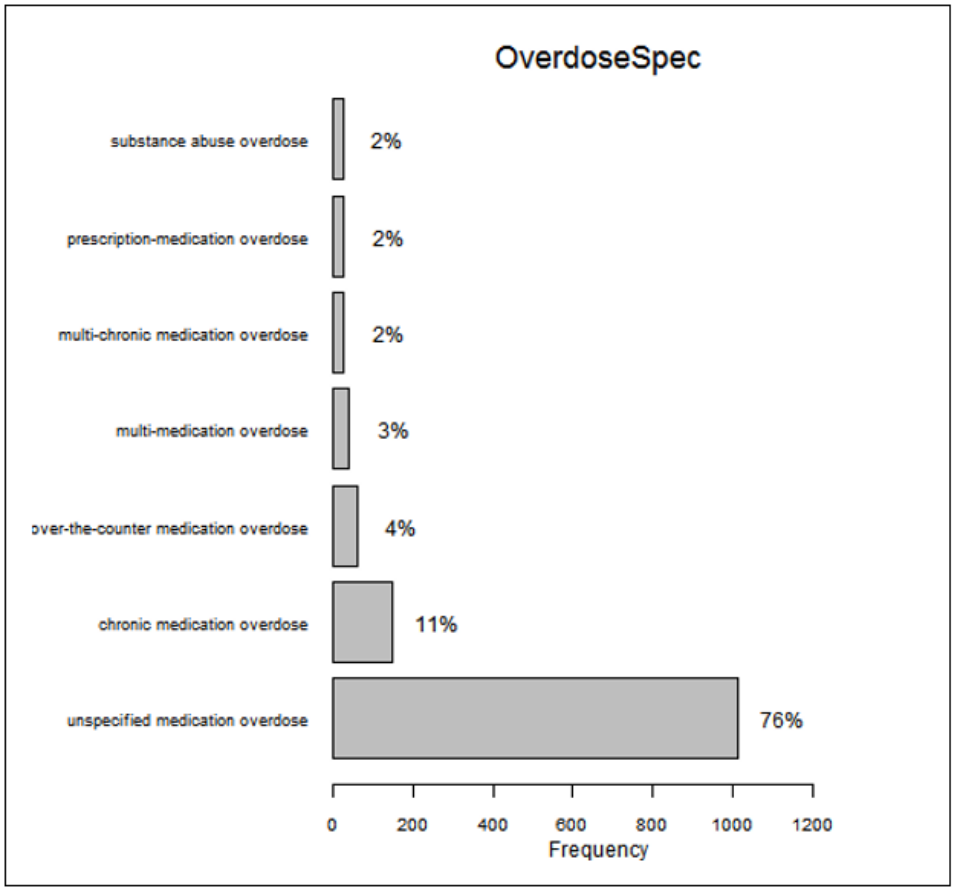
Frequency Table 4: Overdose

Category	Frequency	Relative Frequency
No	1640	55.1
Yes	1336	44.9

Usually all overdoses (DSP) are specified providing information on mechanism of overdose. The categories that are provided are a broad category name, grouping the type of substances together. This was to provide better statistical analysis on the overdose

problem. These substance groupings are '*unspecified*[82] *medication overdose', 'chronic*[83] *medication overdose', 'over-the-counter*[84] *medication overdose', 'multi-medication*[85] *overdose', 'multi-chronic*[86] *medication overdose', 'prescription-medication*[87] *overdose'* and *'substance abuse*[88] *overdose'.*

Graph 3: Frequency of specific Overdose type



[82] Unspecified is when no reference is made to medication used to overdose. Usually, family is unsure.
[83] Chronic refers to medication usually used by health care consumers with a long-term illness. E.g., diabetes or hypertension medicine
[84] Over-the-counter refers to medication one can buy off the shelves at a pharmacy. No prescription is required.
[85] Multi-medication refers to many different medications at once overdose. Layman's terms "cocktail"
[86] Multi-chronic refers to overdose of many chronic medications.
[87] Prescription medication refers to the medication that is scheduled and required a doctor's prescription to acquire such medicine.
[88] Substance abuse refers to recreational drugs overdose.

4.1.2.4.1. Unspecified medication overdose

'Unspecified medication overdose' presented 1013 (n) times from 1336 overdose incidents from the census over the 3-year period. This provided a proportion of 76% of IMR who were regarded to have overdosed, were recorded as unspecified substance.

4.1.2.4.2. Chronic medication overdose

'Chronic medication overdose' presented 148 (n) times from 1336 overdose incidents from the census over the 3-year period. This provided a proportion of 11% of IMR who were regarded to have overdosed, had used chronic medication.

4.1.2.4.3. Over-the-counter medication overdose

'Over-the-counter medication overdose' presented 59 (n) times from 1336 overdose incidents from the census over the 3-year period. This provided a proportion of 4% of IMR who were regarded to have overdosed, had used over-the-counter medication.

4.1.2.4.4. Multi-medication overdose

'Multi-medication overdose' presented 39 (n) times from 1336 overdose incidents from the census over the 3-year period. This provided a proportion of 3% of the IMR who were regarded to have overdosed, had used multi-medications.

4.1.2.4.5. Multi-chronic medication overdose

'Multi-chronic medication overdose' presented 26 (n) times from 1336 overdose incidents from the census over the 3-year period. This provided a proportion of 2% of the IMR who were regarded to have overdosed, had used multi-chronic medication.

4.1.2.4.6. Prescription-medication overdose

'Prescription-medication overdose' presented 26 (n) times from 1336 overdose incidents from the census over the 3-year period. This provided a proportion of 2% of the IMR who were regarded to have overdosed, had used prescription-medication.

4.1.2.4.7. Substance abuse overdose

'Substance abuse overdose' presented 24 (n) times from 1336 overdose incidents from the census over the 3-year period. This provided a proportion of 1.8% of the IMR who were regarded to have overdosed, had used drugs or alcohol (substance abuse).

4.1.2.5. Attempted Suicide

'Attempted Suicide' presented 83 (n) times from 2976 (N) IMR. This provided a proportion of 2.8% of IMR from the census over the 3-year period. The case for 'attempted suicide' is usually how a bystander or family member would perceive the situation when they call for help.

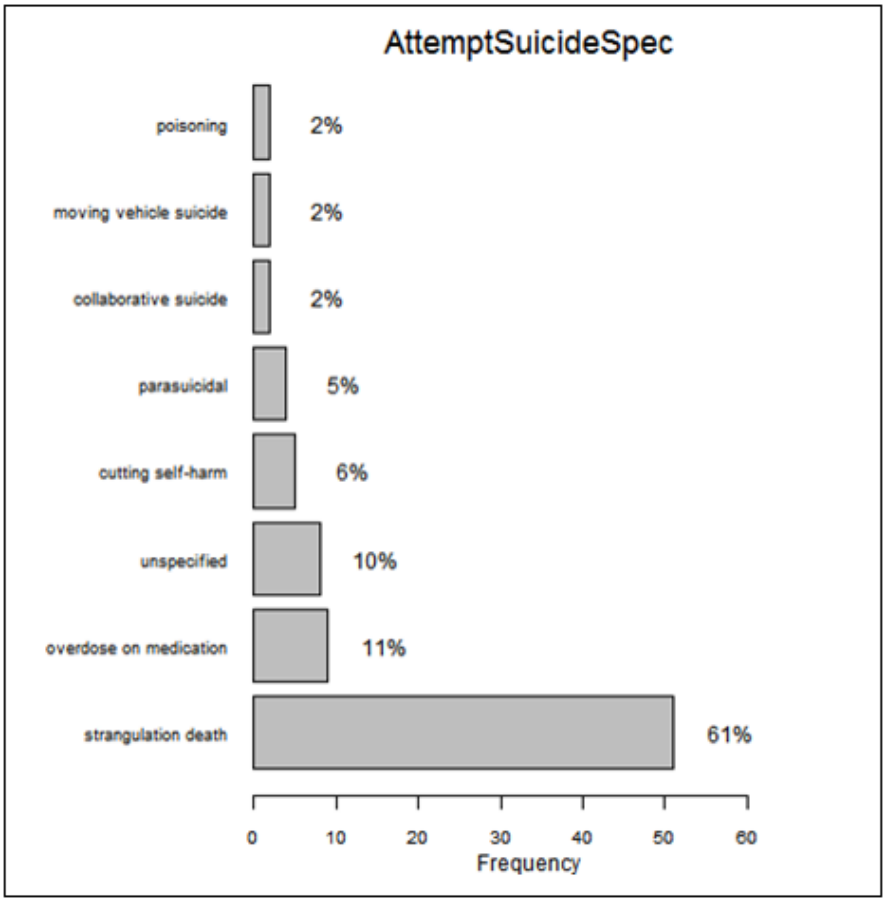
Frequency Table 5: Attempted Suicide

Category	Frequency	Relative Frequency
No	2893	97.2
Yes	83	2.8

There are different mechanisms for 'Attempted Suicide'. The Communications Centre usually details the specifics of the type of attempted suicide as provided by the person who reported the problem. The mechanisms of attempted suicide were grouped in to broader category names for proper statistical analysis: '*strangulation death*'[89], *'overdose on medication*'[90], *'unspecified*'[91], *'cutting self-harm*'[92], *'parasuicidal*'[93], *'collaborative suicide*'[94], *'moving vehicle suicide*'[95] and *'poisoning*'[96].

[89] Strangulation death refers to death by asphyxiation of airway. This usually implies to a person who hung themselves. Rope, wire or ties are most commonly used.
[90] Overdose on medication refers to any medication. Usually type of medication isn't specified. This is different to category overdose, as this was specified as an attempted suicide or suicide in the incident management record.
[91] Unspecified refers to attempted suicide where no details are provided about what happened.
[92] Cutting self-harm is usually neck cuts and wrist cuts.
[93] Parasuicidal is the many attempts at suicide without real meaning to die. Fatality isn't usually reached, unless the person poor mental health has suffered severely. Describe as reaching out for help.
[94] Collaborative suicide refers to attempted or suicide using multi mechanisms to bring about death. These mechanisms usually are overdose and hanging (strangulation death) or overdose and drowning.
[95] Moving vehicle suicide pertains to jumping out a moving vehicle.
[96] Poisoning here is referring to actual ingestion of poison in an attempt to die. The difference with this poisoning and poisoning in behavioural problem, is this poisoning was referenced to as an attempted suicide or suicide in the incident management records.

Graph 4: Frequency of specific Attempted Suicide types



4.1.2.5.1. Strangulation Death

'Strangulation death' presented 51 (n) times from 83 attempted suicide incidents from the census over the 3-year period. This provided a proportion of 61.4% of the IMR who were regarded to have 'attempted suicide', attempted with the mechanism of 'strangulation death'.

4.1.2.5.2. Overdose on medication

'Overdose on medication' presented 9 (n) times from 83 attempted suicide incidents from the census over the 3-year period. This provided a proportion of 10.8% of the IMR who were regarded to have 'attempted suicide', attempted with the mechanism of 'overdose'.

4.1.2.5.3. Unspecified

‘Unspecified’ presented 8 (n) times from 83 attempted suicide incidents from the census over the 3-year period. This provided a proportion of 9.6% of the IMR who were regarded to have ‘attempted suicide’. This mechanism was unspecified.

4.1.2.5.4. Cutting self-harm

‘Cutting self-harm’ presented 5 (n) times from 83 attempted suicide IMR from the census over the 3-year period. This provided a proportion of 6% of the IMR who were regarded to have ‘attempted suicide’, attempted with the mechanism of ‘cutting self-harm’.

4.1.2.5.5. Parasuicidal

‘Parasuicidal’ presented 4 (n) times from 83 attempted suicide incidents from the census over the 3-year period. This provided a proportion of 4.8% of the IMR who were regarded to have ‘attempted suicide’, attempted more than once in a short period of time (parasuicidal).

4.1.2.5.6. Collaborative Suicide

‘Collaborative suicide’ presented 2 (n) times from 83 attempted suicide incidents from the census over the 3-year period. This provided a proportion of 2.4% of the IMR who were regarded to have ‘attempted suicide’, attempted through multi mechanisms of death.

4.1.2.5.7. Moving vehicle suicide

‘Moving vehicle suicide’ presented 2 (n) times from 83 attempted suicide incidents from the census over the 3-year period. This provided a proportion of 2.4% of the IMR who were regarded to have ‘attempted suicide’, attempted by jumping out a moving vehicle.

4.1.2.5.8. Poisoning

‘Poisoning’ presented 2 (n) times from 83 attempted suicide incidents from the census over the 3-year period. This provided a proportion of 2.4% of the IMR who were regarded to have ‘attempted suicide’, attempted with self-poisoning.

4.1.2.6. Commit Suicide

'Commit Suicide' presented 102 (n) times from 2976 (n) IMR. This provided proportion of 3.4% of the IMR from the census over the 3-year period. Suicide is the most fatal of DSH, poor mental health and mental illness. Suicide presenting 102 (n) times in a 3-year period suggests that there was on average 34 suicides a year, meaning there was about 2.8 suicides a month within the 3-year period in the GRD.

Frequency Table 6: Commit Suicide

Category	Frequency	Relative Frequency
No	2874	96.6
Yes	102	3.4

The committing of suicide usually takes place through different mechanisms of death and is usually recorded in the IMR. These mechanisms were given a broader category name to allow for proper statistical analysis: '*strangulation death', 'overdose on medication', 'jump from height*'[97], *'cutting self-harm', 'gunshot*'[98] *and 'poisoning'*.

4.1.2.6.1. Strangulation Death

'Strangulation death' (Hanging) presented 82 (n) times from 102 commit suicide incidents from the census over the 3-year period. This provided a proportion of 82% of the IMR who were regarded to have 'commit suicide' using the mechanism of strangulation (death).

4.1.2.6.2. Overdose on medication

'Overdose on medication' presented 10 (n) times from 102 commit suicide incidents from the census over the 3-year period. This provided a proportion of 10% of the IMR who were regarded to have 'commit suicide' using the mechanism of 'overdose'.

[97] Jump from height refers to committing suicide usually by jumping off a bridge. This is a recurring event along the N2 highway bridges after Plettenburg Bay in the Garden Route District. Bloukrans bridge is world famous for its bungee operations.

[98] Gunshot refers to committing suicide by shooting oneself. There is no specific target but usual places are head and mouth.

4.1.2.6.3. Jump from height

‘Jump from height’ presented 4 (n) times from 102 commit suicide incidents from the census over the 3-year period. This provided a proportion of 4% of the IMR who were regarded to have ‘commit suicide’ using the mechanism of ‘jump from height’.

4.1.2.6.4. Cutting self-harm

‘Cutting self-harm’ presented 1 (n) time from 102 commit suicide incidents from the census over the 3-year period. This provided a proportion of 1% of the IMR who were regarded to have ‘commit suicide’ using the mechanism of ‘cutting self-harm’.

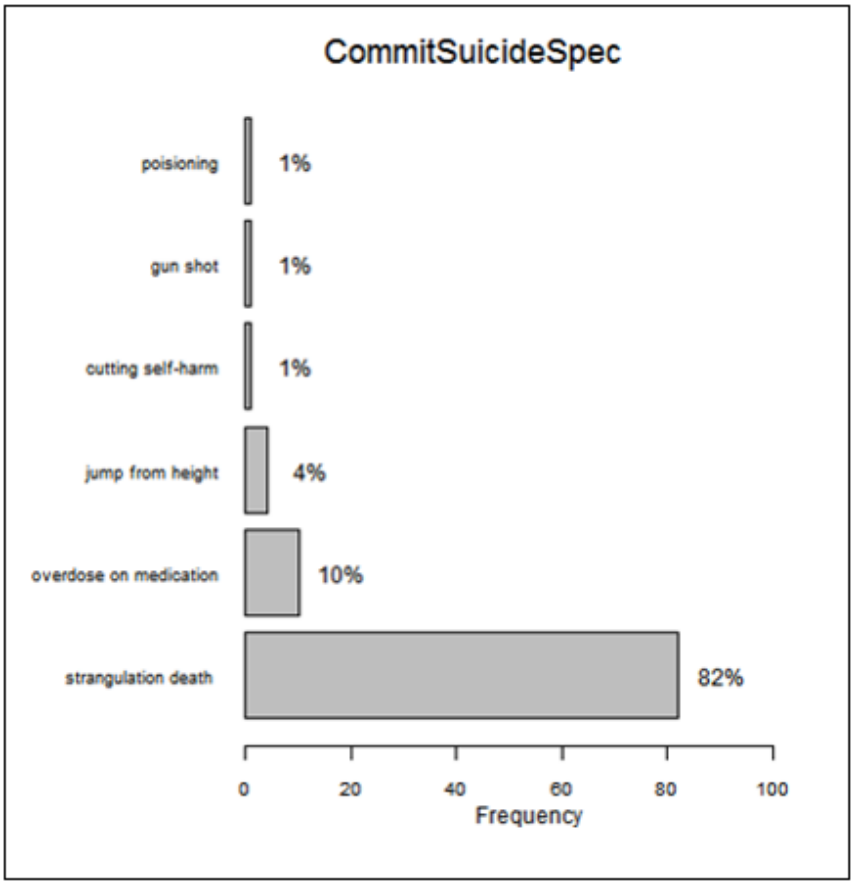
4.1.2.6.5. Gunshot

‘Gunshot’ presented 1 (n) time from 102 ‘commit suicide’ incidents from the census over the 3-year period. This provided a proportion of 1% of the IMR who were regarded to have ‘commit suicide’ using the mechanism of ‘gunshot’.

4.1.2.6.6. Poisoning

‘Poisoning’ presented 1 (n) time from 102 commit suicide incidents from the census over the 3-year period. This provided a proportion of 1% of the IMR who were regarded to have ‘commit suicide’ using the mechanism of self-poisoning (DSP).

Graph 5: Frequency of specific Commit Suicide types



4.1.2.7. Presenting problem - Other

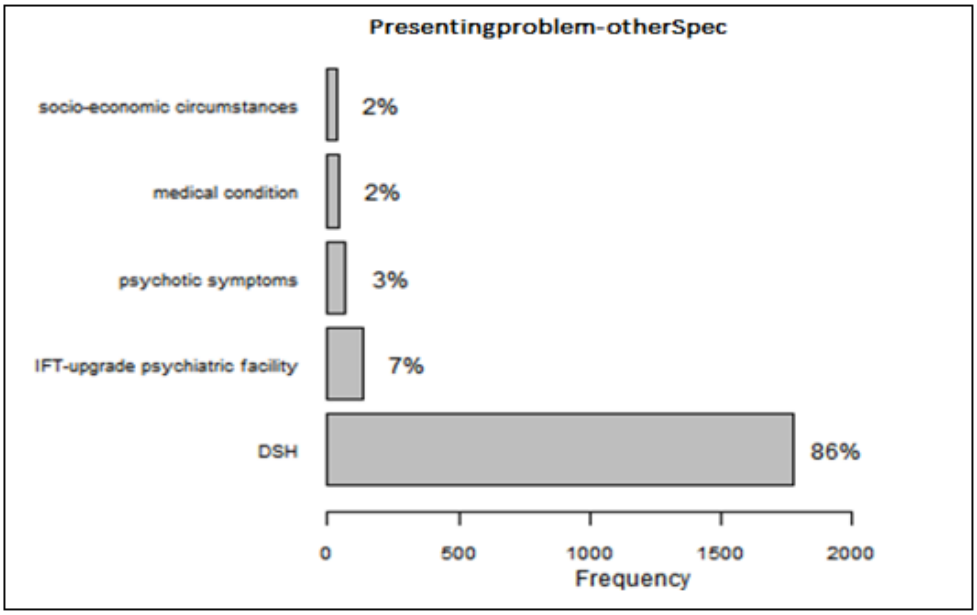
Presenting problem-Other presented 2059 (n) times from 2976 (N) IMR. This provided a proportion of 69.2% of the IMR from the census over the 3-year study. Presenting problem-Other was an option to record any other mental health or mental illness issue that may have presented. Presenting problem-Other provided an arena to take all health care consumers into account, preventing exclusions that may have fallen prey to the setup of the data collection instrument.

Frequency Table 7: Presenting problem – Other

Category	Frequency	Relative Frequency
Yes	2059	69.2
No	917	30.8

Presenting problem-Other provided five new categories. These categories were '*DSH*[99]*', 'IFT-upgrade psychiatric facility*[100]*', 'symptoms of psychosis', 'medical condition' and 'socio-economic circumstances*[101]*'*. These are broader category names that provides a general classification of problems that arose from the IMR.

Graph 6: Frequency of specific Presenting problem – Other



4.1.2.7.1. DSH

'DSH' presented 1776 (n) times from 2059 presenting problem-other incidents from the census over the 3-year period. This provided a proportion of 86% of the IMR who were regarded to have a 'presenting problem-other', presented to have done 'DSH'. DSH provides the percentage of health care consumers who technically suffered with poor mental health; suicide a final outcome. This DSH was the grouping of overdose, DSH, attempted suicide and suicide particularly for this research.

[99] DSH (Deliberate Self-Harm) in this aspect refers to the collective of self-harm, overdose, attempted suicide and suicide. This was put in a collective to provide evidence of the burden of DSH.
[100] IFT-upgrade psychiatric facility refers to inter facility transfers (IFT) from clinic or hospital to a dedicated psychiatric ward (hospital).
[101] Socio-economic circumstances refer here to stress of life, emotional problems, dealing with family death and grieving and poverty.

4.1.2.7.2. Interfacility Transfer (IFT) – Upgrade psychiatric facility

'IFT-upgrade psychiatric facility' presented 135 (n) times from 2059 presenting problem-other incidents from the census over the 3-year period. This provided a proportion of 7% of the IMR who were regarded to have a 'presenting problem-other', required an IFT to a psychiatric facility. This provided the frequency and need for transport of psychiatric patients to psychiatric facilities.

4.1.2.7.3. Symptoms of psychosis

'Symptoms of psychosis' presented 70 (n) times from 2059 presenting problem-other incidents from the census over the 3-year period. This provided a proportion of 3.4% of the IMR who were regarded to have a 'presenting problem-other', had 'symptoms of psychosis'.

4.1.2.7.4. Medical Condition

'Medical condition' presented 40 (n) times from 2059 presenting problem-other incidents from the census over the 3-year period. This provided a proportion of 2% of the IMR who were regarded to have a 'presenting problem-other', presented with a 'medical condition'.

4.1.2.7.5. Socio-economic circumstances

'Socio-economic circumstances' presented 33 (n) times from 2059 presenting problem-other incidents from the census over the 3-year period. This provided a proportion of 1.6% of the IMR who were regarded to have a 'presenting problem-other', presented to have a 'socio-economic circumstance' problem; mainly experienced stress of life, a death in the family or emotional shock.

4.1.3. Medical History of IMR

The medical history of the health care consumer aimed to see if people with mental illness and mental health needs had comorbidities with chronic illness. This was only available if disclosed. This is divided up into the Chronic Illnesses and Medical Condition–Other.

4.1.3.1. Chronic Illnesses

This section focuses on the frequencies at which a chronic illness presented as a comorbidity to mental illness. This evaluand was designed to see if there were any relationships with comorbidity, mental illness and poor mental health. This relied on disclosure from health care consumers and where they were not able to talk, family members. This section focused on the more "common" chronic conditions. These are '*Diabetes', 'Cardiac problems', 'Asthma', 'Epilepsy', 'Hypertension', 'Human Immune Virus' (HIV), 'Tuberculosis' (TB)* and *'Cerebral Vascular Accident' (CVA)*. These have been grouped together as the research provided low frequencies.

Frequency Table 8: Chronic Illnesses

Category	Frequency	Relative Frequency
Diabetes	15	0.5
Cardiac problems	7	0.2
Asthma	7	0.2
Epilepsy	21	0.7
Hypertension	55	1.8
HIV	15	0.5
Tuberculosis	10	0.3
CVA	6	0.2

*From 2976 (N) IMR from the census over 3-years: '*Diabetes' presented 15 (n) times at a proportion of 0.5%. 'Cardiac problems' (any cardiac related sequela) presented 7 (n) times at a proportion of 0.2%. 'Asthma' presented 7 (n) times at a proportion of 0.2%. 'Epilepsy' presented 21 (n) times at a proportion of 0.7%. 'Hypertension' presented 55 (n) times at a proportion of 1.8%. 'HIV' presented 15 (n) times at a proportion of 0.5%. 'TB' presented 10 (n) times at a proportion of 0.3%. 'CVA' presented 6 (n) times at a proportion of 0.2%.

4.1.3.2. Medical condition - other

'Other Medical condition' was an evaluand to cover all bases and allow for all medical conditions to be considered. The option of other medical condition presented 126 (n) times from 2976 (N) IMR. This produced a proportion of 4%. This suggests that 4% of health care consumers disclosed another not so common medical condition.

Frequency Table 9: Medical condition – other

Category	Frequency	Relative Frequency
No	2850	95.8
Yes	126	4.2

Medical condition-other had the option to specify and provided five broader categories for statistical analysis: '*mental disorder*[102]*',* *'pregnant*[103]*',* *'medical condition*[104]*',* *'socio-economic circumstances*[105]*'* and '*institutionalised*[106]*'.*

4.1.3.2.1. Mental disorder

'Mental Disorder' presented 72 (n) times from 128 medical condition-other incidents from the census over the 3-year period. This provided a proportion of 57% of the IMR who were regarded to have a 'medical condition-other', had a 'mental disorder'. This mental disorder represents diagnosed depression.

4.1.3.2.2. Pregnant

'Pregnant' presented 35 (n) times from 128 medical condition-other incidents from the census over the 3-year period. This provided a proportion of 28% of the IMR who were regarded to have a 'medical condition-other', was 'pregnant'. Pregnant represents all time periods of pregnancy.

4.1.3.2.3. Medical condition

'Medical condition' presented 13 (n) times from 128 medical condition-other incidents from the census over the 3-year period. This provided a proportion of 10% of the IMR

[102] Mental Disorder here refers to Depression. This is where health care consumers had been previously diagnosed with depression as chronic illness. This was different from the option of depression as people present to the WCEMS feeling depressed, but hadn't been diagnosed with depression. This option noted diagnosed depression health care consumers.
[103] Pregnant is for health care consumers that were pregnant at the time of presenting to the WCEMS with a mental health issue.
[104] Medical condition here referred to cancers, Parkinson's, cholesterol, COPD and meningitis.
[105] Socio-economic circumstances referred to health care consumers who were post rape victims and defaulters of medication
[106] Institutionalised refers to a health care consumer who regularly attends a psychiatric institution. Usually, Valkenburg in Cape Town

who were regarded to have a ‘medical condition-other’, presented with a medical condition like cancer, Parkinson’s, cholesterol, COPD or meningitis as a chronic sequela.

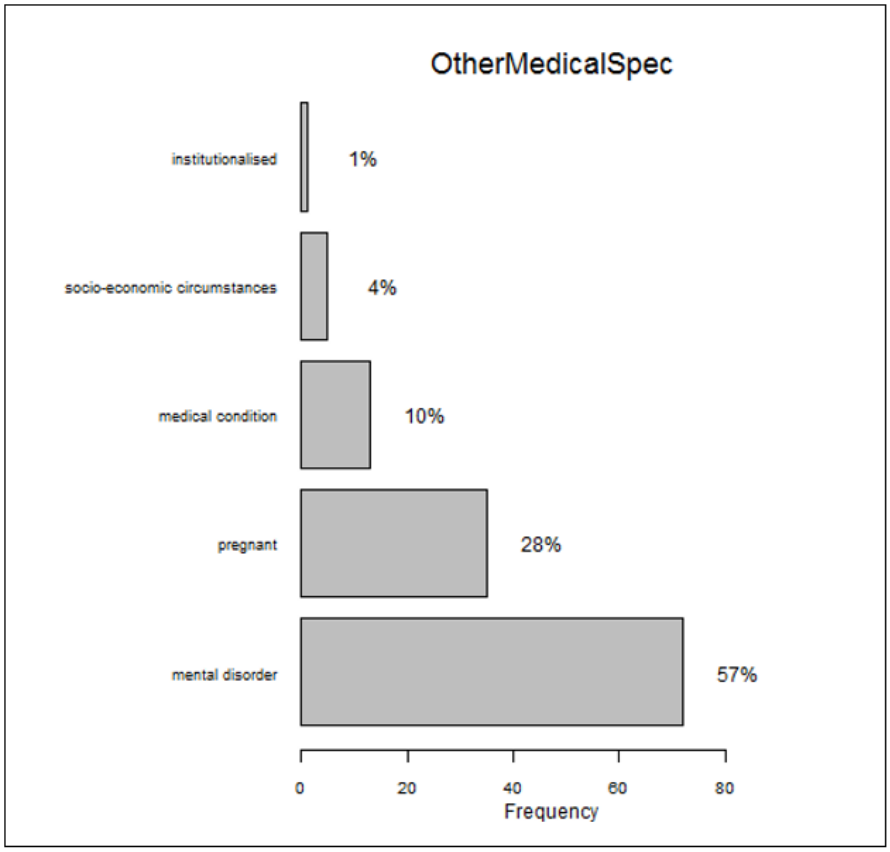
4.1.3.2.4. Socio-economic circumstances

‘Socio-economic circumstances’ presented 5 (n) times from 128 medical condition-other incidents from the census over the 3-year period. This provided a proportion of 4% of the IMR who were regarded to have a ‘medical condition-other’, had experienced a socio-economic circumstance, disclosing to being a victim to rape.

4.1.3.2.5. Institutionalised

‘Institutionalised’ presented 1 (n) time from 128 medical condition-other incidents from the census over the 3-year period. This provided a proportion of 1% of the IMR who were regarded to have a ‘medical condition-other’, need to be institutionalised at Valkenburg Psychiatric Hospital in Cape Town.

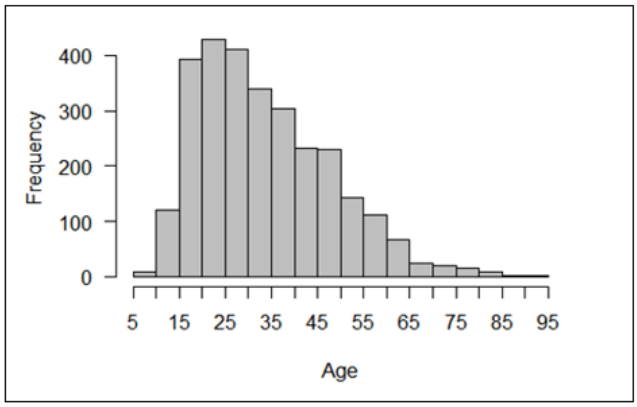
Graph 7: Frequency of specific Medical conditions – other



4.1.4. Age and Gender

Age was the only nominal variable and produced a variety of age variances. A frequency of over 300 (n) IMR peaked from the ages 15 to 40 years old, peaking past a frequency of 400 (n) IMR between the ages of 20 to 30 years old. From 5 to 15 years old produces a low frequency variance and climbs to just over a frequency of 100 (n) IMR. From 40 years old and up the frequency starts to taper down from a frequency of 250 (n) IMR to a frequency below 100 (n) IMR by the age of 60 years old. From 60 years on the frequency of IMR declines well below the 50 (n) frequency mark. The Mean[107] Age for the IMR census within the 3-year period from 2976 (N) IMR was 34.2. This made the Standard Deviation[108] 14.3; The Median[109] Age was 32, with the Interquartile Range[110] 21.

Histogram 2: Frequency of Age

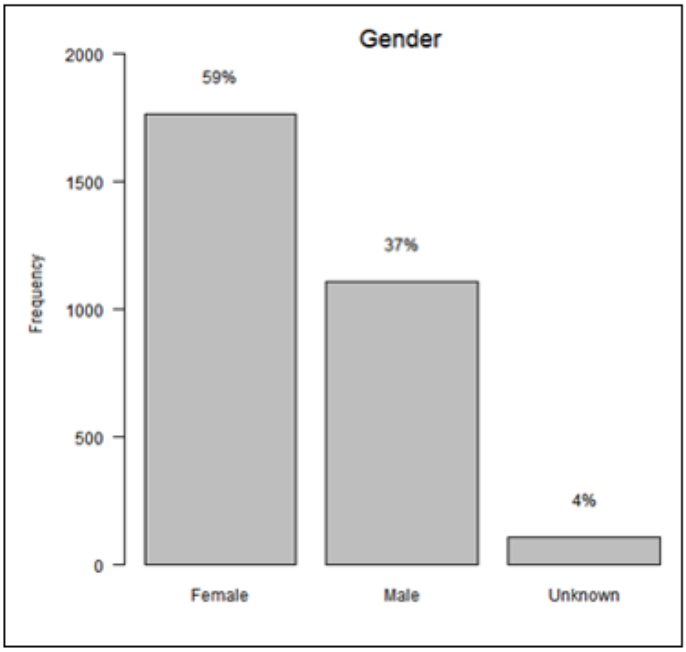


Gender provided larger frequencies and was produced in a bar graph. From the 2976 (N) IMR, females presented to the WCEMS more than males as pertaining to the census. Females presented 1763 (n) times at a proportion of 59% of the IMR. Males presented 1107 (n) times at a proportion 37% of the IMR. The option of unknown was provided and

[107] Mean is the average you get when add up all the numbers and then divide by the number of numbers you added (Manikandan, 2011).
[108] Standard Deviation is a quantity that shows by how much member of a group from the mean value for the group (Manikandan, 2011)
[109] Median is the middle value in the list of numbers. To work out the median, numbers have to be in numerical order from smallest to largest (Manikandan, 2011).
[110] Interquartile range describes the middle 50% of values when ordered from lowest to highest (Bolboacă *et al.*, 2011)

presented 106 (n) times at a proportion of 4% of the IMR. Gender and Age is used to provide relationships between the data.

Graph 8: Frequency of Gender



4.1.5. Dispatch of Emergency Service

Dispatch of Emergency Service covered the area on which emergency service dispatched to an incident. There were only four options of *WCEMS*[111]*, Private EMS, South African Police Service (SAPS)* and *Air Mercy Services (AMS)-Helicopter*[112]*.* This section provided the option of stating if two services were sent to the same scene. From the research data it can be concluded that the WCEMS was dispatched majority of the time with the aid of the SAPS. Incidents for the private ambulance is not reflected in the data, except were stipulated on the IMR that private service had to be used.

Frequency Table 10: First Emergency Service dispatched

Category	Frequency	Relative Frequency
WC Gov.EMS	2960	99.5
SAPS	13	0.4
Private EMS	3	0.1

[111] WC Gov.EMS in the graph as to make sure of the difference from private service and the public service WCEMS. Hence Gov.

[112] AMS-Helicopter mainly used for body retrieval of suicides

From 2976 (N) IMR from the census over 3-years: WCEMS was dispatched 2960 (n) times as a first response service. This provided a proportion of 99.5% of the IMR. SAPS was dispatched 13 (n) times as a first response service. This provided a proportion of 0.4% of the IMR. Private EMS was dispatched 3 (n) times as a first response service by the WCEMS due to no available WCEMS ambulances at the time. This provided a proportion of 0.1% of the IMR. The secondary option of Emergency Service dispatched showed that the SAPS was requested majority of the time as a second option or back up to the WCEMS as pertaining to the IMR. This section provided the research data that states whether SAPS are being sent to assist EC providers on scenes. It is noted that the WCEMS and the SAPS as pertaining to the IMR reported to the same scenes. The secondary option dispatch presented 58 (n) from 2976 (N) IMR from the census over the 3-year period.

Frequency Table 11: Secondary Emergency Service dispatched

Category	Frequency	Relative Frequency
SAPS	52	89.7
Private EMS	4	6.9
AMS-Helicopter	2	3.4

From 58 (n) Secondary Emergency Dispatch IMR from the census over 3-years: SAPS was dispatched 52 (n) times as a secondary emergency service dispatch. This was a proportion of 89.7% of the secondary dispatched emergency services. Private EMS was dispatched 4 (n) times as a secondary emergency service. This was a proportion of 7% of the secondary dispatched emergency services. AMS-Helicopter was dispatched 2 (n) times as a secondary emergency service. This provided a proportion of 3% of the secondary dispatched emergency services; mainly to retrieve bodies from suicides by jump from height (off bridges).

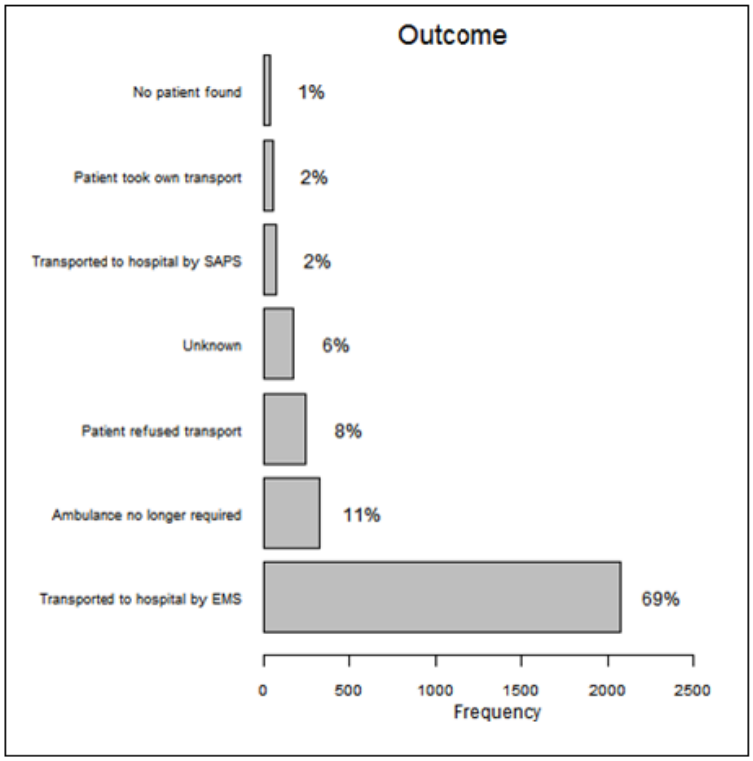
4.1.6. Outcome of the IMR

Outcome of the IMR focused on “what became of the health care consumer” after the Emergency Service arrived to their aid. These types of outcome possibilities are how a health care consumers outcome status would be recorded on the IMR. Unknown is the only category where no reference to outcome of the IMR was made. These outcome status possibilities are: ‘*Transport to hospital by EMS’; ‘Ambulance no longer required’;*

'Patient refused transport'; 'Unknown'; 'Transported to hospital by SAPS'; 'Patient took own transport'; 'No patient found'.

From 2976 (N) IMR from the census over 3-years: 'Transported to hospital by the EMS' presented 2068 (n) times at a proportion of 69.5% of the IMR. *'Ambulance no longer required'* presented 328 (n) times at a proportion of 11% of the IMR. *'Patient refused transport'* presented 248 (n) times at a proportion of 8.3% of the IMR. *'Unknown'* presented 177 (n) times at a proportion of 5.9% of the IMR. *'Transported to hospital by the SAPS'* presented 72 (n) times at a proportion of 2.4% of the IMR. *'Patient took own transport'* presented 54 (n) times at a proportion of 1.8% of the IMR. *'No patient found'* presented 29 (n) at a proportion of 1% of the IMR.

Graph 9: Frequency of specific health care consumer outcomes



4.1.7. Demographic of the IMR

The demographic of the IMR provides the location of the health care consumer within the GRD. This was used to provide a needs assessment for the sub-districts of the GRD. This analysis is to provide an idea of how and where the EMS could focus their attempts to help improve service for health care consumers with mental health needs. If one refers

back to Figure 12 in Chapter 3, 3.1.1 provides a map of the GRD and the seven sub-districts. These sub-district names are *George, Oudtshoorn, Mossel Bay, Knysna, Bitou, Hessequa* and *Kannaland*. Further analysis of providing the number of health care consumers per sub-district allows for easier logistical analysis for the Western Cape province.

From 2976 (N) IMR from the census over 3-years: George sub-district consisted of George and Uniondale locales, presenting 922 (n) times at a proportion of 31% of the IMR. Oudtshoorn sub-district consisted of Oudtshoorn and Dysselsdorp locales, presenting 523 (n) times at a proportion of 17.6% of the IMR. Mossel Bay sub-district consisted of Mossel Bay and Groot Brak locales, presenting 462 (n) times at a proportion of 15.5% of the IMR. Knysna sub-district consisted of Knysna and Sedgefield locales, presenting 400 (n) times at a proportion of 13.5% of the IMR. Bitou sub-district consisted of Plettenberg Bay and Kranshoek locales, presenting 288 (n) times at a proportion of 9.6% of the IMR. Hessequa sub-district consisted of Heidelberg and Riversdale locales, presenting 208 (n) times at a proportion of 7% of the IMR. Kannaland sub-district consisted of Ladismith, Carlitzdorp and Zoar locales, presentin173 (n) times at a proportion of 5.8% of the IMR.

Frequency Table 12: IMR per sub-district

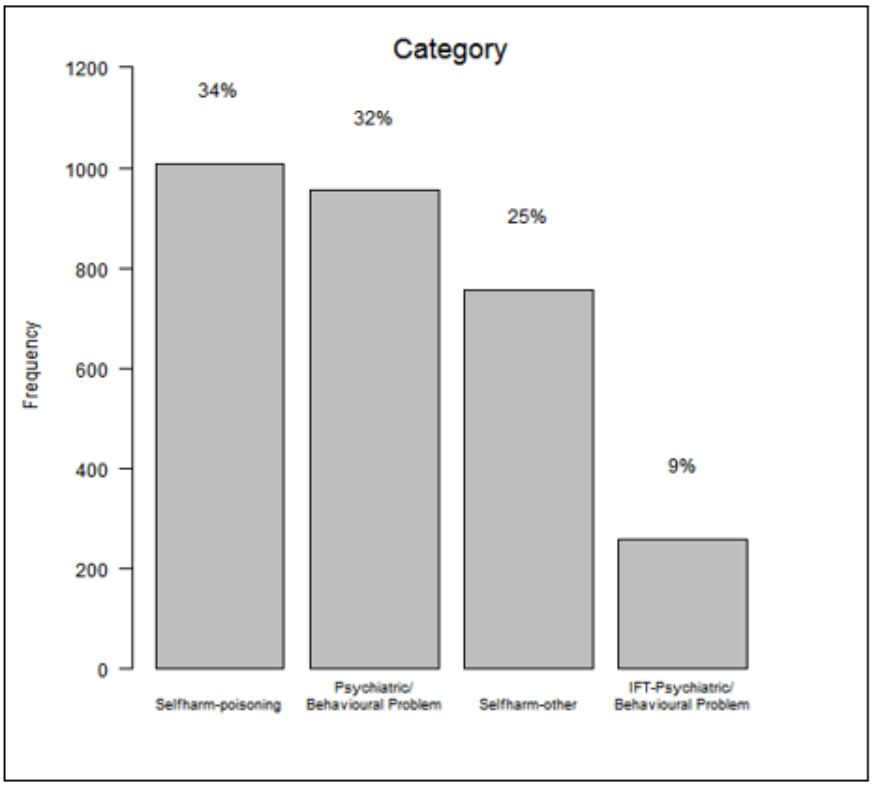
Category	Frequency	Relative Frequency
George sub-district	922	31
Oudtshoorn sub-district	523	17.6
Mossel Bay sub district	462	15.5
Knysna sub-district	400	13.5
Bitou sub-district	288	9.6
Hessequa sub-district	208	7
Kannaland sub-district	173	5.8

4.1.8. Percentage of IMR per Census categories

This section provides the frequency of the IMR per category of the census sample. These categories are *Self-harm-poisoning, Psychiatric/Behavioural Problem, Self-harm-other* and *IFT-Psychiatric/Behavioural Problem.*

From 2976 (N) IMR over 3-years: Self-harm-poisoning category housed 1008 (n) IMR at a proportion of 34% of all the IMR over the 3-year period. *Psychiatric / Behavioural problem* category housed 954 (n) IMR at a proportion of 32% of all the IMR over the 3-year period. *Self-harm-other* category housed 755 (n) IMR at a proportion of 25% of all the IMR over the 3-year period. *IFT - Psychiatric / Behavioural problem* category housed 259 (n) IMR at a proportion of 8.7% of all the IMR over the 3-year period.

Graph 10: Frequency of IMR per census category



4.2. Association of interest – Age Relationships

Association of interest provided a precise analysis of age relationships with attempted suicide, suicide, DSH status and overdose status. The concept was to analyse if age presented any significant factors in patterns or relationships to the presenting problems. In this analysis a logistic regression model was used to produce coefficients and p-values to form a significance value. If the p-value is greater than the significance level predictor

of 0.05[113], then that variable will not be significant in the model. This would render that variable as a poor predictor to the relationships at hand.

4.2.1. Age distribution for Attempted Suicide

Looking at attempted suicides, a logistic regression model was run with age as the independent variable. The coefficients table presented a negative which suggests that there is a negative relationship with age and attempted suicides, meaning that with age chances of attempted suicide will decrease. The *p*-value for the test of significance of the age coefficient in the model is 0.31. Thus, we cannot conclude at a 5% significance level that the odds of attempted suicide are related to age. This makes age not statistically significant in the model, meaning age is not a valid predictor of attempted suicide. The median age of attempting suicide was 30. Therefore, it can be stated after statistical analysis, according to the data researched (IMR) over the 3-year period that:

∴ *Since the significance p-vale > 0.05 (3.094603e-01), we have insufficient evidence to claim that the likelihood of attempting suicide is related to age.*

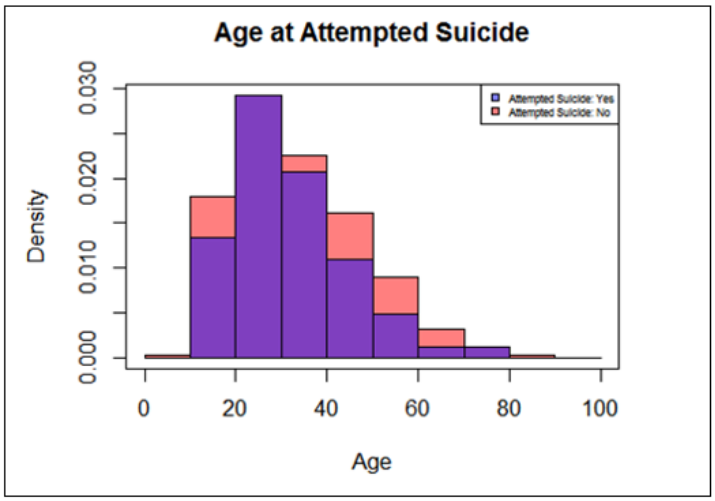
Coefficients Table 1: Logistic regression model - Age distribution for Attempted Suicide

Explanatory Variable	Estimate	Std. Error	z value	Pr(>|z|)
(Intercept)	-3.42196165	0.31975586	-10.701795	9.982549e-27
Age	-0.00923382	0.00908523	-1.016355	3.094603e-01

A histogram was created to show the relationship between age and attempted suicide. The overlaps produced a purple colour which is the blue and red overlapping. Blue represented yes for attempted suicide and red represented no for attempted suicide. Therefore, in this histogram we can acknowledge that the purple would now represent those that did attempt suicide and red would be those that didn't attempt suicide. This presents no obvious pattern between the age distribution between those that attempted suicide and those that didn't.

[113] The symbol used to define greater than is > … Therefore p-value > 0.05
The symbol used to define less than is < … Therefore p-value < 0.05.

Histogram 3: Age distribution for Attempted Suicide



4.2.2. Age distribution for Suicide

Looking at suicides, a logistic regression model was run with a quadratic term included as a way of checking for non-monotonic relationships. Interestingly, this method only produced results for age distribution for suicide.

Where $\widehat{p_i}$ is estimated probability of committing suicide and x_i is age. With the fitted regression equation:

$$\widehat{p_i} = \left(1 + e^{8.241 - 0.2281x_i + 0.002805x_i^2}\right)^{-1}$$

Using calculus to maximise the estimated odds of suicide with respect to age, we obtain 40.7. This suggests that the risk of suicide among mental health patients increases with age until a peak around age 41 and decreases thereafter. The median age for committing suicide was 36. Therefore, it can be stated after statistical analysis, according to the data researched (IMR) over the 3-year period that:

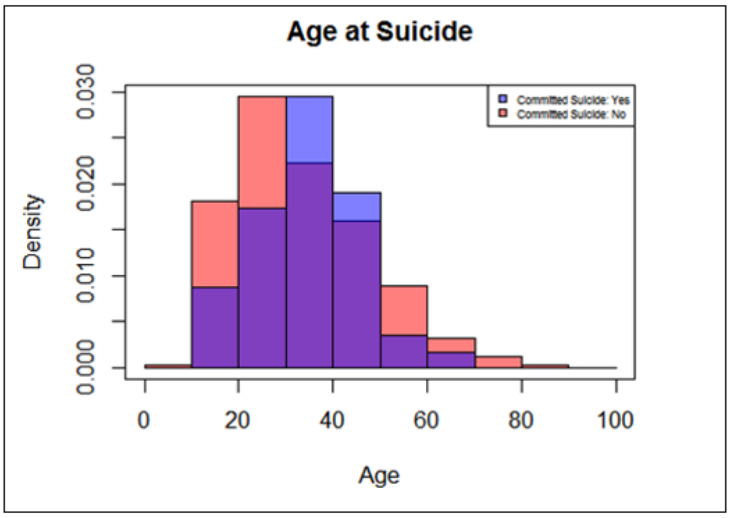
∴ *The risk of suicide among mental health patients increases with age until a peak around age 41 and decreases thereafter.*

Coefficients Table 2: Logistic regression model - Age distribution for Suicide

Explanatory Variable	Estimate	Std. Error	z value	Pr(>|z|)
(Intercept)	-8.241401	1.437155	-5.735	9.78e-09
Age	0.228082	0.078989	2.888	0.00388
I(Age^2)	-0.02805	0.001037	-2.706	0.00681

A histogram was created to show the relationship between age and committing suicide. The blue represents yes for committing suicide and red represents no for committing suicide. The purple is where the two overlap. The data from the graph suggests that people who commit suicide are in-between 30 and 40 years old, while the younger or older you are, you are less likely to commit suicide.

Histogram 4: Age distribution for Suicide



4.2.3. Age distribution by DSH status

Looking at DSH status, a logistic regression model was run with age as the independent variable. The p-value is 1.042737e-31 (<2e-16), this is less than $2x10^{-16}$ in scientific notation. This is much smaller than the significance level predictor of 0.05. This suggests that age is a significant predictor of DSH, as it is statistically significant in the model. In the coefficients table the estimate by age is -0.03. The position of negative presents that with the increase in age, the chances of DSH is smaller. The median age to DSH was 29. Therefore, it can be stated after statistical analysis, according to the data researched (IMR) over the 3-year period that:

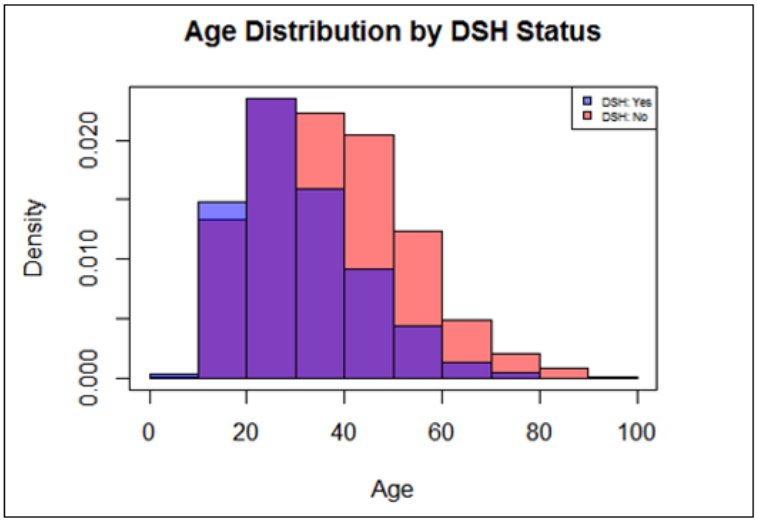
∴ *Since the significance p-value < 0.05 (<2e-16), we have sufficient evidence to claim that the likelihood of DSH decreases with age.*

Coefficients Table 3: Logistic regression model - Age distribution by DSH status

Explanatory Variable	Estimate	Std. Error	z value	Pr(>|z|)
(Intercept)	1.47107663	0.104771179	14.04085	8.765224e-45
Age	-0.03281135	0.002800315	-11.71702	1.042737e-31

A histogram was created to provide a relationship between age and DSH. Blue represents yes for DSH and Red represents no for DSH. The histogram presents red to the right and clearly shows that the older group of health care consumers tend to not DSH while the blue section is left, suggesting that the younger group of health care consumers tend to DSH.

Histogram 5: Age distribution by DSH status



4.2.4. Age distribution by Overdose status

Looking at Overdose status, a logistic regression model was run with age as the independent variable and overdose as the dependent variable. The p-value is 3.117086e-24 (<2e-16), this is less than $2x10^{-16}$ in scientific notation. This is much smaller than the significance level predictor of 0.05. This suggests that age is a significant predictor of overdose, as it is statistically significant in the model. In the coefficients table the estimate by age is -0.028. The position of negative presents that with the increase in age, the chances of people overdosing is smaller. The median age to DSH was 29. Therefore, it

can be stated after statistical analysis, according to the data researched (IMR) over the 3-year period that:

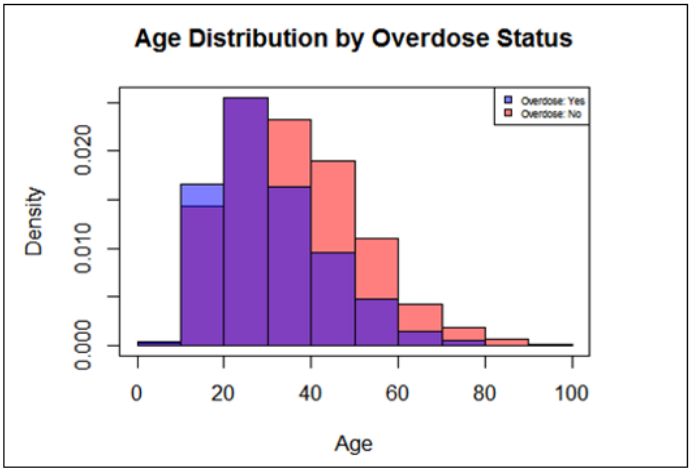
- ∴ *Since the significance p-value < 0.05 (<2e-16), we have sufficient evidence to claim that the likelihood of overdose decreases with age.*

Coefficients Table 4: Logistic regression model - Age distribution by Overdose status

Explanatory Variable	Estimate	Std. Error	z value	Pr(>|z|)
(Intercept)	0.79940787	0.101592170	7.868794	3.580758e-15
Age	-0.02867294	0.002823261	-10.155966	3.117086e-24

The histogram provided a relationship between age and Overdose. The red represents no for overdosing and is positioned more to the right as age increases. The Blue represents yes for overdose and is positioned to the left where the age is younger. As noted, this suggests that the younger group of health care consumers are more likely to overdose than the older group.

Histogram 6: Age distribution by Overdose Status



4.3. Association of interest – Gender Relationships

Association of interest provided a precise analysis of gender relationships with attempted suicide, suicide, DSH and overdose. The concept was to provide any relationships with gender, in a non-derogatory or sexist way. This could provide indicators for early protection towards mental health. For gender relationships both variables are categorical, male and female. Pearson's Chi-squared test and a logistic regression model were conducted to analyse gender relationships. Coefficients and p-value form a significance

value. If the p-value is greater than the significance level predictor of 0.05, then that variable will not be significant in the model. This would render that variable as a poor predictor to the relationships at hand.

4.3.1. Gender relationship to Attempted Suicide

Looking at attempted suicides, a gender relationship was drafted by looking at the frequency of no and yes to attempted suicides. This comparison presented males to be more frequent in the yes column and females to be more frequent in the no column. This already provided a suspicion of likelihood. The Pearson's Chi-squared test of association was conducted and provided a p-value = 0.004484. This is significantly smaller than the 0.05 significance predictor level. This is suggestive that gender and attempted suicide share an association. Therefore, it can be stated after statistical analysis, according to the data researched (IMR) over the 3-year period that:

∴ *Pearson Chi-square test for association has p-value < 0.05, so we conclude that an association exists between gender and attempted suicide. Specifically, males are more likely than females to attempt suicide.*

Frequency Table 13: Pearson's Chi-squared test - Gender association to Attempted Suicide

Attempted Suicide	Female	Male
No	1733	1069
Yes	30	38

To get a further quantification of the Pearson's Chi-square a logistic regression model was run. The coefficients table produced a p-value of 3.617881e-03. This is lower than the 0.05 significance predictor value. Male is the independent variable and the estimate is positive which confirms that a male is more likely than a female to attempt suicide. The constant of e[114] was put to the power of the male variable estimate of 0.7195 which produced an estimated odds ratio of 2.053445. This suggested that the odds of a male

[114] The constant of e, the natural number, Euler's number. This is an important mathematical constant. It is equal to 2.71828

attempting suicide are 2.05 more times than a female attempting suicide. Thus, with statistical analysis of the data from the 3-year period it can be suggested:

∴ *The expected odds of a male attempting suicide are more than twice as high as expected odds of a female attempting suicide.*

Coefficients Table 5: Logistic regression model - Gender relationship to Attempted Suicide

Explanatory Variable	Estimate	Std. Error	z value	Pr(>|z|)
(Intercept)	-4.0564118	0.1841143	-22.032034	1.420510e-107
GenderMale	0.7195191	0.2472838	2.909689	3.617881e-03

4.3.2. Gender relationship to Suicide

Looking at suicides, a gender relationship was drafted by looking at the frequency of no and yes to suicides. Males presented more frequently in the yes column and females presented more frequently in the no column. After conducting the Pearson's Chi-squared test of association a p-value = `1.716e-08` ($1.716x10^{-08}$). This p-value is smaller than the significant predictor value of 0.05. This suggests there is a significant relationship between gender and suicide. Therefore, it can be stated after statistical analysis, according to the data researched (IMR) over the 3-year period that:

∴ *Pearson Chi-square test for association has p-value < 0.05, so we conclude that an association exists between gender and committing suicide. Specifically, males are more likely than females to commit suicide.*

Frequency Table 14: Pearson's Chi-squared test - Gender association to Suicide

Committed Suicide	Female	Male
No	1749	1064
Yes	14	43

Further quantification was run on the Pearson's Chi-squared test, with a logistic regression model. The coefficient table produced a p-value of 1.78e-07. This is lower than the significant predictor value. Male is the independent variable with the estimate positive, which confirms that a male is more likely to commit suicide than a female. The constant of *e* was put to the power of the male variable estimate of 1.6192 which produced an estimated odds ratio of 5.048805. This suggests that the odds of a male committing

suicide are 5.04 times more than the odds of a female committing suicide. Thus, with statistical analysis of the data from the 3-year period one can be suggested:

∴ *The expected odds of a male committing suicide are more than five times as high as the expected odds of a female committing suicide.*

Coefficients Table 6: Logistic regression model - Gender relationship to Suicide

Explanatory Variable	Estimate	Std. Error	z value	Pr(>|z|)
(Intercept)	-4.827742	0.2683159	-17.99276	2.220393e-72
GenderMale	1.619152	0.3101436	5.22065	1.782958e-07

4.3.3. Gender relationship to DSH

Looking at DSH, a gender relationship was drafted by looking at the frequency of no and yes to DSH. Females presented more frequently in the yes column and males presented more frequently in the no column. The Pearson's Chi-squared test of association was conducted and produced a p-value of $<2.2e\text{-}16$ $(2.2x10^{-16})$. This p-value is smaller than the significant predictor value of 0.05. This suggests there is a significant relationship between gender and DSH. Therefore, it can be stated after statistical analysis, according to the data researched (IMR) over the 3-year period that:

∴ *Pearson Chi-square test for association has p-value < 0.05, so we conclude that an association exists between gender and DSH. Specifically, females are more likely than males to DSH.*

Frequency Table 15: Pearson's Chi-squared test - Gender association to DSH

Deliberate Self-Harm	Female	Male
No	586	605
Yes	1177	502

Using further quantification of the logistic regression model the p-value was 3.029079e-29 [$(<2.2e\text{-}16)$ $(2.2x10^{-16})$]. This is lower than the significant predictor value. Male is the independent variable with the estimate negative, which confirms that a female is more likely to DSH than a male. The constant of *e* was put to the power of the male variable estimate which produced an estimated odds ratio of 2.420642. This suggests that the odds of a female doing DSH are 2.4 times more than a male doing DSH. Thus, with statistical analysis of the data from the 3-year period one can be suggested:

∴ *The expected odds of a female doing DSH are more than 2.4 times as high as expected odds of a male doing DSH.*

Coefficients Table 7: Logistic regression model - Gender relationship to DSH

Explanatory Variable	Estimate	Std. Error	z value	Pr(>|z|)
(Intercept)	0.6974043	0.05055790	13.79417	2.763119e-43
GenderMale	-0.8840327	0.07874659	-11.22630	3.029079e-29

4.3.4. Gender relationship to Overdose

Looking at Overdose, a gender relationship was drafted by looking at the frequency of no and yes to overdose. Females presented more frequently in the yes column and males presented more frequently in the no column. The Pearson's Chi-squared test of association was conducted and produced a p-value of <2.2e-16 ($2.2x10^{-16}$). This p-value is smaller than the significant predictor value of 0.05. This suggests there is a significant relationship between gender and overdose. Therefore, it can be stated after statistical analysis, according to the data researched (IMR) over the 3-year period that:

∴ *Pearson Chi-square test for association has p-value < 0.05, so we conclude that an association exists between gender and Overdose. Specifically, females are more likely than males to Overdose.*

Frequency Table 16: Pearson's Chi-squared test - Gender association to Overdose

Overdose	Female	Male
No	790	776
Yes	973	331

Using further quantification of the logistic regression model the p-value was 6.429918e-39 [(<2.2e-16) ($2.2x10^{-16}$)]. This is lower than the significant predictor value. Male is the independent variable with the estimate negative, which confirms that a female is more likely to Overdose than a male. The constant of *e* was put to the power of the male variable estimate which produced an estimated odds ratio of 2.887483. This suggests that the odds of a female overdosing are 2.8 times more than a male overdosing. Thus, with statistical analysis of the data from the 3-year period one can be suggested:

∴ *The expected odds of a female overdosing are more than 2.8 times as high as expected odds of a male overdosing.*

Coefficients Table 8: Logistic regression model - Gender relationship to Overdose

Explanatory Variable	Estimate	Std. Error	z value	Pr(>|z|)
(Intercept)	0.2083511	0.04789125	4.350505	1.358243e-05
GenderMale	-1.0603853	0.08126116	-13.049104	6.429918e-39

4.4. Association of interest – Gender and Age relationship with type of Suicide

Association of interest for gender and age relationship with suicide first needed combining of suicide and attempted suicide together to increase the frequencies, thus having a better chance of finding an effect between age or gender and method of suicide/attempted suicide. Overdose and poisoning were combined, also combining all methods other than strangulation, overdose and poisoning into other/unspecified category. To try to identify a combined age-gender effect, a multinomial regression model was fitted with method of suicide/attempted suicide as a response variable and age and gender as independent variables with an interaction of age and gender as well. Unfortunately, there were no statistically significant coefficients, so no interactive effect could be identified. Looking at the method of suicide/attempted suicide vs. gender using Fisher's Exact Test, there was a statistically significant relationship (small p-value). Looking more specifically at the two-way frequency table, it appears that males are more likely to use strangulation and females are more likely to use overdose or poisoning. Then looking at method of suicide/attempted suicide vs. age using an ANOVA and got a statistically significant relationship. Looking more specifically using Tukey's post hoc method, it appears that the mean age of strangulation victims is less than the mean age of those using other/unspecified methods. Therefore, using a multinomial logistic regression model to predict attempted/suicide method by age and gender provided no statistically significant predictors found in the model at 5% level.

Coefficients Table 9: Logistic regression model layout - Gender and Age relationship to type of Suicide (multinomial regression model)

```
## We first combine the attempted suicides and suicides to get larger
frequencies

##
##  Other or unspecified overdose or poisoning   strangulation death
##                    28                    22                   133

## # weights:  15 (8 variable)
## initial  value 119.748739
## iter  10 value 84.233088
## final  value 84.220176
## converged

## Multinomial logistic regression to predict attempted/suicide method by age
and gender

## Call:
## nnet::multinom(formula = AttorComSpec ~ Age * Gender2, data = dat)
##
## Coefficients:
##                       (Intercept)         Age Gender2Male Age:Gender2Male
## Other or unspecified   -1.278676  0.02476155   0.9989150      0.01170249
## strangulation death     1.704831 -0.03863174   0.5557824      0.04890228
##
## Std. Errors:
##                       (Intercept)        Age Gender2Male Age:Gender2Male
## Other or unspecified   1.2664027 0.02880904    2.380916      0.06678731
## strangulation death    0.9889576 0.02636292    2.006309      0.05978044
##
## Residual Deviance: 168.4404
## AIC: 184.4404

##                       (Intercept)       Age Gender2Male Age:Gender2Male
## Other or unspecified   0.3126430 0.3900612   0.6748137       0.8609066
## strangulation death    0.0847319 0.1428169   0.7817668       0.4133392
```

Using the Fishers Exact Test for count data and two-way table it can be stated that looking at gender in isolation, we do find statistically significant relationship with method of suicide/attempted suicide using the Fisher's Exact test. The p-value is 0.0005098. Specifically, it appears that males are more likely to use strangulation while females are more likely to use poisoning or overdose.

Coefficients Table 10: Fisher's Exact Test - Gender association to type of Suicide

```
## Fisher's Exact Test for Count Data
##
## data:  tabt
## p-value = 0.0005098
## alternative hypothesis: two.sided

##
##           overdose or poisoning Other or unspecified strangulation death
##   Female               59.09091              35.71429             15.78947
##   Male                 22.72727              35.71429             48.12030
##   Unknown              18.18182              28.57143             36.09023
```

Considering age in isolation, it was found that a statistically significant relationship with method of suicide/attempted suicide occurred using ANOVA. This presented the mean age of victims to not be the same across all three methods of suicide/attempted suicide.

Coefficients Table 11: ANOVA - Age relationship with method of Suicide[115]

Term	Df	Sum Sq	Mean Sq	F value	Pr(>F)
AttorComSpec	2	1017.113	508.5565	3.509373	0.0333395
Residuals	109	15795.601	144.9138	NA	NA

Finally, Tukey multiple comparisons of means suggested that using Tukey's honest Significant Difference method for post hoc comparisons, it is found that the mean age of strangulation victims is less than the mean age of "Other or unspecified" victims, p-value being 0.0414684.

Coefficients Table 12: Tukey's post-hoc method - Comparisons of age with methods of Suicide

Comparison	Diff in Means	Lower CL	Upper CL	Adj p-value
Other or unspecified-overdose or poisoning	2.750000	-6.543301	12.0433011	0.76215151
strangulation death-overdose or poisoning	-4.689189	-12.206652	2.8282732	0.30343063
strangulation death-Other or unspecified	-7.439189	-14.647982	-0.2303966	0.04146837

SUMMARY

Chapter Four provides the results from the statistical analysis of data where 2976 (N) IMR provided a large amount of evidence and data. Summary of the results provides all the results from the analysis as per the data collection instrument. Relative frequencies and frequencies provided the researchers with quantified evidence. This evidence provided minimal feedback in frequencies to the more common mental illness, however provided large frequencies for health care consumers (IMR) who present to the WCEMS as a known psychiatric, behavioural problem, overdose or DSH. These categories will be further unpacked in Chapter Five. 'Commit Suicide' and 'Attempted Suicide' provide knowledge on the more fatal of mental health and mental illness problems. Suicide presenting almost 2.8 times a month for 3-years. The history of the IMR hope to provide if mental illness and poor mental health care users suffered from comorbidities. This too presented with low frequencies. Age and gender provided a platform to analyse deeper giving the researcher the equipment to look at relationships with mental illness and mental

[115] since the age variable seems not to be normally distributed (as suggested by the histogram and further confirmed by a Shapiro-Wilk normality test, with p-value less than 10^{-16}), you tried running the ANOVA with log(Age) as the dependent variable rather than Age. However, this made almost no difference in the results.

health conditions. This provided associations of interest from a gender and an age perspective. Age and Gender were analysed with attempted suicide, suicide, DSH, overdose and type of suicide. It needs to be noted that majority of the IMR were treated and transported by the WCEMS. It was noted that police attended incident scenes. It was alarming to note that 5.9% of health care consumers received the status of unknown, providing no outcome. It is also provided that George sub-district is the locale for majority of health care consumers with mental illness and mental health needs. The results have been entered into the data collection instrument (See table 11 and 12).

The categories for the census (100% sample) provide a large database, providing evidence and information to extract evaluands that would provide frequencies to paint a holistic picture. Chapter Five unpacks the meaning of the data analysis with the discussion polishing the results to provide a fuller understanding of the research at hand.

Table 11: Associations of interest results

Association of interest – Age Relationships
Age distribution for Attempted Suicide: Since the significance p-vale > 0.05 (3.094603e-01), we have insufficient evidence to claim that the likelihood of attempting suicide is related to age. Mean age – 30yrs old **Age distribution for Suicide:** The risk of suicide among mental health patients increases with age until a peak around age 41 and decreases thereafter. Mean age – 36yrs old **Age distribution for DSH Status:** Since the significance p-value < 0.05 (<2e-16), we have sufficient evidence to claim that the likelihood of DSH decreases with age. Mean age – 29yrs old **Age distribution for Overdose Status:** Since the significance p-value < 0.05 (<2e-16), we have sufficient evidence to claim that the likelihood of overdose decreases with age. Mean age – 29yrs old
Association of interest – Gender Relationships
Gender relationship to Attempted Suicide: Pearson Chi-square test for association has p-value < 0.05, so we conclude that an association exists between gender and attempted suicide. Specifically, males are more likely than females to attempt suicide. Therefore, the expected odds of a male attempting suicide are more than twice (2.0) as high as expected odds of a female attempting suicide. **Gender relationship to Suicide:** Pearson Chi-square test for association has p-value < 0.05, so we conclude that an association exists between gender and committing suicide. Specifically, males are more likely than females to commit suicide. Therefore, the expected odds of a male committing suicide are more than five (5.0) times as high as expected odds of a female committing suicide. **Gender relationship to DSH:** Pearson Chi-square test for association has p-value < 0.05, so we conclude that an association exists between gender and DSH. Specifically, females are more likely than males to DSH. Therefore, the expected odds of a female doing DSH are more than 2.4 times as high as expected odds of a male doing DSH. **Gender relationship to Overdose:** Pearson Chi-square test for association has p-value < 0.05, so we conclude that an association exists between gender and Overdose. Specifically, females are more likely than males to Overdose. Therefore, the expected odds of a female overdosing are more than 2.8 times as high as expected odds of a male overdosing.
Association of interest – Gender and Age Relationship with type of Suicide
Logistic regression model: Using a multinomial logistic regression model to predict attempted/suicide method by age and gender provided no statistically significant predictors found in the model at 5% level. **Fisher's Exact Test:** Looking at gender in isolation, we do find statistically significant relationship with method of suicide/attempted suicide using the Fisher's Exact test. The p-value is 0.0005098. Specifically, it appears that males are more likely to use strangulation while females are more likely to use poisoning or overdose **Analysis of Variance (ANOVA):** Looking at age in isolation, it was found that a statistically significant relationship with method of suicide/attempted suicide occurred using ANOVA. This presented the mean age of victims to not be the same across all three methods of suicide/attempted suicide **Tukey's post-hoc method:** It is found that the mean age of strangulation victims is less than the mean age of "Other or unspecified" victims, p-value being 0.0414684.

Table 12: Results captured on the Data Collection Instrument

Results from 2976 incident management records over the 3-year time frame of 2017/2018/2019	**Coherence between the Data Collection Instrument and the results after Data Analysis. R Statistical software analysis, logistic regression models, Pearson's Chi-square tests, Fisher's Exact Test, ANOVA and Tukey's post-hoc test.**	**Triage Relative Frequency** 3% 3% 10% 38% 45%

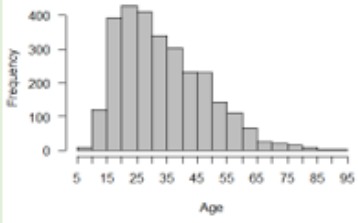
Relative Frequency results of presenting problem and history of patient

Known Psychiatric: 15%	**Substance Abuse:** 2.6%
Schizophrenia: 0.6%	**Anxiety:** 2%
Bipolar disorder: 0.7%	**PTSD:** 0.1%
Autism: 0%	**Delirium:** 0.2%
Depression: 3%	**Alzheimer's:** 0.2%
Suicidal: 7.6%	**Dementia:** 0.1%
Behavioural Problem: 37%, psychotic symptoms most frequent at 67%	
Overdose: 44.9%, unspecified medication overdose most frequent at 76%	
Commit Suicide: 2.8%, strangulation death most frequent at 82%	
Attempted Suicide: 3%, strangulation death most frequent at 61.4%	
Other: 69.2%, DSH the most frequent at 86%	

Relative Frequency for patients with a chronic illness?	
Diabetes: 0.5%	**Hypertension:**1.8%
Cardiac problems: 0.2%	**HIV:** 0.5%
Asthma: 0.2%	**TB:** 0.3%
Epilepsy: 0.7%	**CVA:** 0.2%
Other: 42%, mental disorder most frequent at 57% (Diagnosed Depression)	

Relative Frequency results of Age and Gender

AGE	Mean: 34.2 yrs. old; Median: 32 yrs. old	
GENDER		
Male: 37%	**Female:** 59%	**Unknown:** 4%



Relative Frequency results of Emergency Service dispatch

Private EMS: dispatched to 0.1% of patients	**WC Gov. EMS:** dispatched to 99% of patients	**SAPS:** dispatched 90% of time to patients as a back up	**AMS-Helicopter:** dispatched to 3% of patients: body retrieval

Relative Frequency results for Outcome and Demographic location of patients

Transported to hospital by EMS: 69.5% of patients	**Transported by SAPS:** 2.4% of patients	**Patient refused transport:** 8.3% of patients	**George sub-district:** 31%	**Oudtshoorn sub-district:** 17.6%
Patient took own transport: 1.8% of patients	**Ambulance no longer required:** 11% of patients	**Unknown:** 5.9% of patients	**Knysna sub-district:** 13.5%	**Bitou sub-district:** 9.6%
		No patient found: 1% of patients	**Mosselbay sub-district:** 15.5%	**Hessequa sub-district:** 7%
			Kannaland sub-district: 5.8%	

CHAPTER FIVE: DISCUSSION AND INTERPRETATION

INTRODUCTION

Chapter Five illuminates the results from Chapter Four. Mental illness, poor mental health and the sequelae they present, incite an increase in burden towards society and economies (World Health Organization, 2005; Keyes, 2014). A need arose to quantify this burden of mental illness and poor mental health from the perspective of the EMS in the Garden Route District (GRD); the aim being to appraise access to health care for health care consumers who present to a public EMS with mental health needs. This appraisal of retrospective data also sought to determine how the EMS may be predisposed to ameliorate human rights and attenuate any stigma associated with mental illness. The research approach chosen for this study was a quantitative non-experimental descriptive retrospective study viewed through the paradigm of Critical Theory. The data for the study was obtained by undertaking a census (100% sample) of EMS cases from 2017-2019. The inclusion categories (EMS incident types) were Psychiatric/Behavioural Problems, Self-Harm-other, Self-Harm-poisoning and Inter-facility transfer (IFT)-psychiatric/behavioural problem. These categories pertained to health care consumers with mental illness and mental health needs. The retrospective data contained in the WCEMS Communications Centre database included 2976 Incident Management Records (IMR)[116], 'retrospective patient' (health care consumer) records.

The data was analysed with R statistical software to provide categorical variable results. These results were further analysed using logistic regression models, Pearson's Chi-square test of association, Fisher's Exact test, ANOVA and Tukey's post-hoc test. This presented associations of interest using age and gender as independent variables. Notably, a non-experimental descriptive study can be used to develop theory and identify

[116] Incident Management Record (IMR) is a case record created when a health care consumer request the ambulance/WCEMS. This record houses information like personal details, presenting problem, ambulance crew sent and outcome of health care consumer. The IMR is the Communications Centre's term for each health care consumers (patient) record that is created. These records pertain to what is said by the people who call for the WCEMS. No details of health care consumer management or final diagnosis is included in the IMR. The term IMR refers to the entire incident of the health care consumer's case.

problems of current practice and phenomena (Drummond and Murphey-Reyes, 2017).The questions this research answered was: “What did we find?” and “What did it say?”. Mental illness and poor mental health from a S.A EMS perspective presented a theoretical lacuna. The literature review provided a narrative review of secondary literature that best located the emergency care practice (in relation to mental illness) in the EMS. Chapter Four findings assist in bridging knowledge gaps evident in Chapter Two through primary data, albeit retrospective. One IMR pertains to one health care consumers case, and that no health care consumer was seen or managed. The IMR houses all the incident information about the health care consumer, except treatment and management done by the EC providers. This would be the ‘Patient Care Record’ and pertains to health care consumer diagnosis, management and treatment done by EC providers. These records were not completed for all 2976 (N) IMR and thus could not be included in the study.

5.1. Categorical Variable Results interpretation

The Categorical Variable Results looks at the results from the categories from the data collection instrument.

5.1.1. Triage and time frame

Of 2976 (N) IMR 45.5% (n=1352) triaged green, 38% (n=1131) triaged yellow, 10% (n=302) triaged orange, 3% (n=87) triaged red and 3.5% (n=104) triaged blue. Triage is a concept that has been used for many years. This system allows the best chance to help survivors in huge incidents or it can be used to colour-code severity of health care consumers being transported to hospital by ambulance personnel (Aljazairi, 2019). Historically, triage has been used through war-time usually as a first-come-first-help approach (Aljazairi, 2019). Triage is most commonly used as the system to grade patients (health care consumers) in a colour code format as to prioritise service for the severe (red) and very urgent (orange). Referral for urgent (yellow) and not urgent (green) are usually not prioritised for care (South African Triage Group, 2012; Figure 26).

Figure 26: Western Cape hospital Triage scale (South African Triage Group, 2012, pp. 7)

Priority COLOUR	Target time	Management
RED	IMMEDIATE	Take to the resuscitation room for **emergency** management
ORANGE	< 10 mins	Refer to majors for **very urgent** management
YELLOW	< 1 hour	Refer to majors for **urgent** management
GREEN	< 4 hours	Refer to designated area for non-urgent cases
BLUE	< 2 hours	Refer to doctor for certification

The South African Triage Score (SATS) works on a scale. This could be applied inconsistently, as people vary who do the scoring. Each doctor or EC provider has their own subjective judgement (although limited by the triage scale) of grading severe, urgent and non-urgent cases. The triage score is an estimate of acute injury rather than estimate for chronic illness. A study done in an Emergency Department (ED) in rural Kwa-Zulu Natal (KZN), assessed the effectiveness of triage in an ED. Their finding suggests SATS to be effective in triaging medical and trauma patients in the rural ED, however had difficulties with the adherence to the system. This adherence required a senior official to help with downgrade of priority levels in chronic disease (Rosedale *et al.*, 2011). The reflection on the finding further suggested health care consumers in the rural area had progressed in the severity of the illness due to the distance to a hospital or clinic (Rosedale *et al.*, 2011). The medical problems referred to more of the life threating (TB, HIV) problems and suggested the patient's severity of illness provided accuracy for the SATS to be effective. This suggests triage relies on severity. What of a health care consumer who presents to the ambulance with depression, doesn't talk, is calm, vital signs are normal and the only severity is minor cuts on the person's arms? SATS would present as yellow (due to presence of blood on the persons arm) depression wouldn't be seen as severe. How far is the health care consumer from suicidal ideation? The SATS seems to have an implementation bias for severe trauma and does not adequately protect mentally ill health care consumers.

Majority of the IMR are triaged green. The triage scale doesn't take into account feeling and emotion. People who suffer from mental illness and poor mental health can present

green to the clinician doing the assessment, but in their mind, they could be red. Unless a health care consumer is a severe emergency like an attempted hanging or near fatal overdose that triages red, then triage places no real humanity towards a health care consumer who is having a mental emergency. To champion human rights and to push the boundaries of poor mental health and mental illness awareness the triage scale for this research is not considered a significant analytic tool. It will be used as a presentation tool, of how a rising burden like mental illness and poor mental health can be acknowledged as not severe by simply using the standard instruments provided.

Time Frame - The timeframe covered 3-years of retrospective data of IMR filed from the period of 1st January 2017 to 31st December 2019 pertaining to the census categories. This consisted of 993 (N) IMR for 2017, 1026 (N) for 2018 and 957 (N) for 2019; 2976 (N) IMR. The number of IMR per year was fairly constant, suggesting a constant burden.

5.1.2. Presenting problem

This is the presenting complaints from the IMR, sub-divided into: '*Minority frequency cases', 'Known Psychiatric', 'Behavioural Problem', 'Overdose', 'Attempted Suicide', 'Commit Suicide'* and *'Presenting problem – other'*.

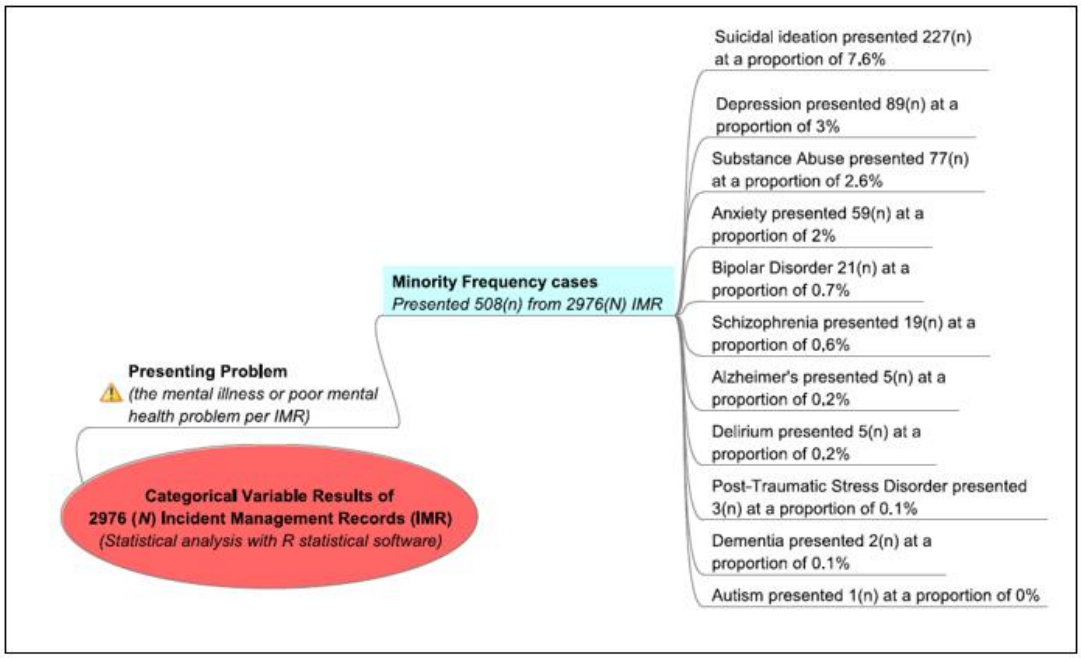
5.1.2.1. Minority frequency cases

'Minority frequency cases' was the grouping of the more common mental disorders: 'Suicidal ideation', 'Depression', 'Substance Abuse', 'Anxiety', 'Bipolar Disorder', 'Schizophrenia', 'Alzheimer's', 'Delirium', 'Post-traumatic Stress Disorder' (PTSD), 'Dementia'[117] and 'Autism'. 'Suicidal ideation' presented 227 (n) of 2976 (N) IMR, 'Depression' 89 (n), 'Substance Abuse' 77 (n), 'Anxiety' 59 (n), 'Bipolar Disorder' 21 (n) and 'Schizophrenia' 19 (n) (Figure 27). This represents a low frequency of mental illnesses usually considered to be most common in society. The frequency of suicidal cases, depression, substance abuse and anxiety are of interest. These four burdens all work intersectionally. According to Ritchie and Roser (2018) suicidal ideation, anxiety,

[117] Dementia is not a mental illness, but does affect mental health. This can lead to a mental illness like Alzheimer's due to death of brain cells.

depression and substance abuse usually coincide. This vicious cycle usually pushes each symptom into the next (Ritchie and Roser, 2018b). These results are positive as they illuminate that mental illness is present in the GRD.

Figure 27: Minority frequency case findings



An audit done in 2017 established that 264 million people (3.76%) of the global population suffered from depression while anxiety disorders presented in 284 million people (3.76%). Globally Schizophrenia presented in 20 million people (0.25%), Substance abuse (accounting for alcohol and drugs) in 178 million people (1.98%) and Bipolar disorder in 46 million people (0.6%) (Ritchie and Roser, 2018). In S.A it was estimated in 2017 that 6.82 million people suffered from mental and substance abuse disorder, 1.96 million (3.75%) people suffer from depression, 2.15 million (3.99%) people suffer from anxiety, 99 023 (0.18%) people suffer from schizophrenia, 345 326 (0.68%) people suffer from bipolar disorder and 2.47% of the population have a alcohol or drug disorder (Ritchie and Roser, 2018; See Annexure 9, Graph 11). These figures present mental illness in S.A to be rife, suggesting that a higher frequency should have been present for the more common mental illness in the GRD.

From a health care consumer perspective, this data allows the WCEMS to associated EC providers with mental illnesses, through training, treatment and management options.

This would renderer an improved service. From a WCEMS perspective one needs to consider why the frequencies presented for these mental illnesses were low and how communication centre agents made the diagnosis of mental illness from a phone call? The low frequency of these mental illnesses suggested to the researcher that the health care consumer or their next of kin were unaware of the persons mental status; Or the dispatcher who created the IMR was unsure of what the caller was saying. Thus, health care consumers have been referred to as: “being regarded as having ‘x’ mental illness”; Regarded being based on the assumption of the dispatcher and the health care consumer (this will be discussed further in 5.1.2.2.). Simply, acute mental illness cases will be recognised and dispatches can’t be expected to make a diagnosis over a telephone call. This suggests that from an EMS perspective, the same common mental illness issues based from a hospital perspective has to be navigated by the EMS. Although the frequencies are low, the numbers provide evidence of health care consumers with these medical problems. It must also be noted that dementia is a leading cause of death amongst 70-year-olds and has ability to cause severe mental outcome like Alzheimer’s (Ritchie and Roser, 2018b; World Health Organization, 2018). Dementia and Alzheimer’s both presented as a presenting problem in this research.

5.1.2.2. Known Psychiatric

‘Known Psychiatric’ is a general term used in the Communications Centre to classify a health care consumer that had a mental illness. No remark is made to why ‘known psychiatric’ is used, however provides a presenting problem for 14.5% (n=432) of the IMR with no specification. Historical disadvantage in S.A has been a huge perpetrator for unequal literacy rates. The older generation of 65+ were recorded at being the more of the global illiterate population, making up majority of illiteracy in the African countries. (Roser and Ortiz-Ospina, 2016). According to Leighton and Dogra (2009) and WHO (2017), literacy levels for people with mental illness have reported to be significantly low, aiding in stigmatism (Leighton and Dogra, 2009; World Health Organization, 2017). However, the literacy rates in Africa (See Annexure 10, Figure 47) have been improving with 70% of adults 65+ being literate (Roser and Ortiz-Ospina, 2016). Thus, illiteracy seems insufficient to answer the ‘known psychiatric’ conundrum.

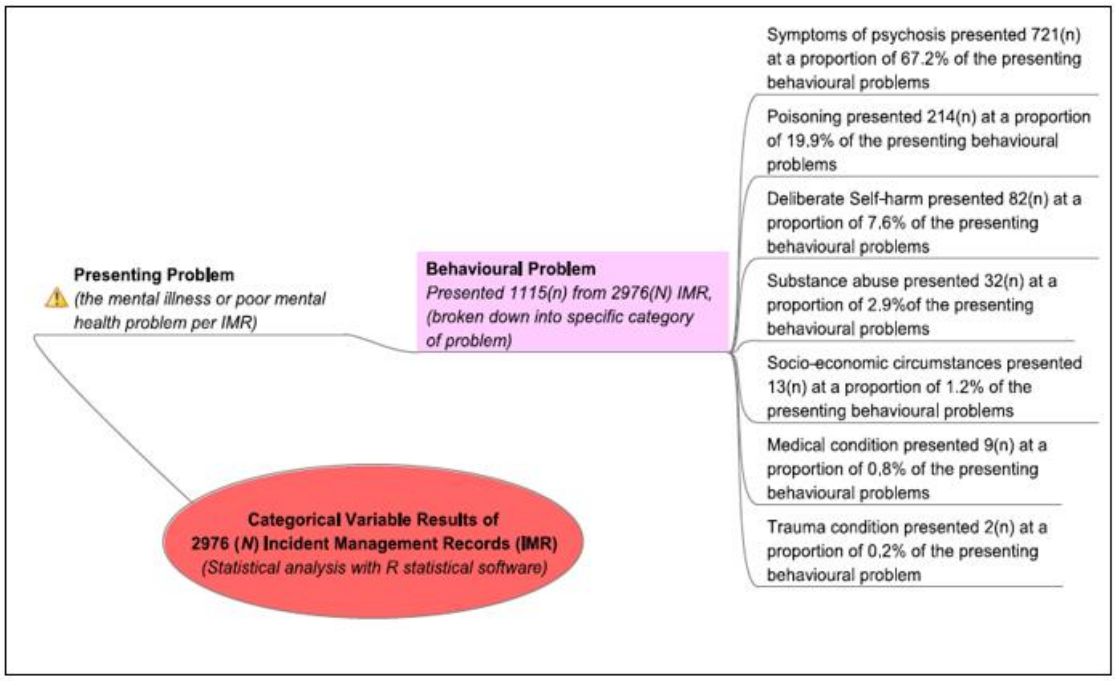
The other comprehensible option is language. S.A is a land with 11 official languages gazetted into the Constitution (Brenzinger, 2017). In the Western Cape and more especially the GRD, isiXhosa and Afrikaans are the predominant home languages as well as English (Western Cape Government, 2019). The complexity of using English medical words when English is a second language or even a third language enables lay terms. The premise of knowing 'psychiatric' and not the actual mental illness still provides the EMS with a basic medical condition. This history is enough for the mental health care user or next of kin to explain relatively what is wrong, to bridge the language gap. This option of the term 'known psychiatric' might seem impractical for retrospective data analysis, however it does illuminate that the categories for the census were appropriate. From a dispatcher's point of view, the term 'known psychiatric' suggests that more training is required for dispatchers. Medical doctors and nurses use diagnostic manuals like the DSM 5 to make a diagnosis. The dispatchers and EC providers do not have the equivalent training and are required to make a provisional diagnosis from the limited information provided by the health care consumer or next of kin. Knowing what mental illnesses, the mental health care users in the GRD have, will help alleviate stigma and improve EMS management, treatment, care and transport.

5.1.2.3. Behavioural Problem

The category of 'Behavioural problem' is the term used in the Communications Centre for a person that is displaying "different" or "weird" behaviour, inconsistent with his past conduct or the conduct of the society. This coding option is usually given to health care consumers with no known medical condition or an unknown medical condition. The term Behavioural problem presented in 1115 (n) from 2976 (N) IMR. This suggested that a large frequency of health care consumers had a behavioural problem that represented psychiatric type idioms, as regarded by the dispatcher and the person who phoned for help. The IMR provided a description of what the health care consumers behavioural problem entailed. There was no evidence to whether these health care consumers had been diagnosed with a mental illness or just expressed mental illness type idioms. This also opened the question to whether or not this could be the beginning of mental illness manifestation. These categories were '*symptoms of psychosis', 'poisoning', 'deliberate*

self-harm', 'substance abuse', 'socio-economic circumstances', 'medical condition' and *'trauma condition'* (Figure 28).

Figure 28: Behavioural Problem findings



5.1.2.3.1. Symptoms of psychosis

The term 'Symptoms of psychosis' presented 721 (n) times from 1115 'Behavioural problem' incidents. The symptoms of psychosis descriptions that were grouped in this broader category name were: *aggression, hallucinations, auditory hallucinations, aggressive and needing sedation, confused, combative, disorientated, psychosis, feeling possessed, stripping, hypersexual activity, psychotic disorder and mentally disturbed.* These descriptions of the health care consumer do not automatically suggest that they have a mental illness, but presents with symptoms of such. Symptoms of psychosis provide an understanding of the types of behaviour presenting to the WCEMS. The understanding of such symptoms is unknown. Are these psychotic symptoms the consequence from poor social economic standards, substance abuse, poverty and inequality (Commission on Social Determinants of Health, 2008; World Health Organisation and Calouste Gulbenkian Foundation, 2014) or could it be the true symptoms of health care consumers who have an underlying mental illness? There are

no answers to this question with this data set, however there is the presumption that 721 (n) IMR presented with a behavioural problem and that 'behavioural problem' resembled a symptom of psychosis. Importantly a psychotic symptom can be psychosis, where by delusions and hallucinations can be displayed as well as aggression and combativeness (Högberg *et al.*, 2012). Psychotic symptom behavioural problems provide some understanding as to an emerging evident problem.

5.1.2.3.2. Poisoning

'Poisoning' (self-poisoning) presented 214 (n) times from 1115 'Behavioural problem' incidents. Usually, the self-poisoning is recorded as an overdose by the communications centre; for this research, it was separated. This was to provide the significance of how much and different types of self-poisoning (with actual poison) is taking place. The prevalence of self-poisoning suggests that it's a rising burden. No reference was made in the IMR to self-poisoning being an attempted suicide and thus inferences couldn't be made. In Canada it has been recently reported that self-poisoning is a deliberate self-harm (DSH) and one of the leading and preferred methods for attempted suicide and suicide (Centre for Suicide Prevention, 2017). The self-poisoning that presented in this research was put into sub categories: Chemical poisoning, cleaning detergent poisoning, insecticide poisoning, herbicide poisoning and rodenticide poisoning. Chemical poisoning included chemicals such as battery acid, thinners, dog flea dip, petrol, diesel, paraffin, perfume and oil. Cleaning detergent poisoning included bleach detergents (Jik, Jeys Fluid, Handy-Handy), washing powder and Pine Gel (strong floor-cleaning detergent). Insecticide poisoning included poisons such as blue death (highly dangerous ant poison), spider poisons, cockroach poison, insect spray and mosquito repellent. Herbicide poisoning included grass and plant poisons. Rodenticide poisoning included 'Rattex' and other rodent killing poisons. Rattex[118] as a choice for self-poison appeared unreassuringly, many times.

These poisons are highly dangerous; with enough of it consumed, it can be fatal. Benedict, van Loggerenberg and Steinberg (2019) synthesised data from health care

[118] 'Rattex' is a popular rat or mouse poison that can be bought at any retail outlet.

consumers who presented to a regional hospital in Bloemfontein, Free State, who had deliberately self-poisoned (DSP). Their findings stated that DSP was often used as a method for suicide, while most patients faced relationship, marital, psycho-socioeconomic and employment problems (Benedict, van Loggerenberg and Steinberg, 2019). These patients had a poor background, located in a poor socio-economic environment (Benedict, van Loggerenberg and Steinberg, 2019). Poverty can be a determinant of poor mental health, embedded in the social determinants of mental health (Bitanihirwe, 2015; Compton and Shim, 2017). Being retrospective data, no further analysis can be put into finding out the socioeconomic status of the health care consumers who have DSP. Notably, one-third of global suicides accounts for pesticide DSP (Gunnell *et al.*, 2007; Ritchie, Roser and Ortiz-Ospina, 2015; Karunarathne *et al.*, 2019). Pesticide self-poisoning has been related to over 14 million deaths over the last 50 years, suggesting that 1 in 7 global suicides is due to pesticide self-poisoning (Gunnell *et al.*, 2007; Ritchie, Roser and Ortiz-Ospina, 2015; Karunarathne *et al.*, 2019). Studies done in Uganda, Zimbabwe, Sri Lanka, Kenya, Nigeria and Ethiopia suggested pesticide to be most used of DSP toxic agents (Gunnell *et al.*, 2007; Malangu, 2008; Senarathna *et al.*, 2008; Karunarathne *et al.*, 2019); (See Annexure 9, Graph 12). The development and easy access of pesticide has been the sole enabler (Gunnell *et al.*, 2007; Karunarathne *et al.*, 2019). Notably suicide rates by pesticide self-poising had dropped in over the past 10 years (Karunarathne *et al.*, 2019). Africa represented 3.5% of pesticide self-poisoning suicides in 2014, lower than developing countries of Asia and the Western Pacific (Ritchie, Roser and Ortiz-Ospina, 2015).

5.1.2.3.3. Deliberate Self-Harm (DSH)

'DSH' presented 82 (n) times from 1115 'Behavioural problem' incidents. The DSH that presented from the IMR was 'eating glass', 'cutting wrists and neck' and 'stabbing oneself in the neck'. Severity of a health care consumer is encoded in the triage; however, it would be noted on the IMR if the outcome of the health care consumer was fatal on the scene or in the ambulance. DSH is intentional. It is the act of creating physical injury to oneself. Usually there is no intention to die (Lauw, How and Loh, 2015). DSH has been believed to be caused by personal distress, where by an individual would inflict bodily harm to

themselves, deliberately to cause injury (Arkins *et al.*, 2013). This is usually done with cutting (knife/blade), scratching or hitting oneself and overdose (usually drugs). Risk factors (distal) play a part in DSH origins. Current mental illness and chronic disease, physical and sexual abuse and a history of being bullied all presented to be distal risk factors before DSH has occurred (Arkins *et al.*, 2013). It has been stated that having a history of DSH, has proven to be a main indicator for suicide. Suicide is among the leading causes of death among 15-24-year-olds with researchers classifying all DSH on a suicidal continuum (Arkins *et al.*, 2013; Centre for Suicide Prevention, 2017). This research of DSH covers mainly the cutting and stabbing self-harm suggesting poor mental health. Overdose, attempted suicide and poisoning are all considered in the DSH milieu and will be looked at later in this chapter.

5.1.2.3.4. Substance Abuse

'Substance abuse' presented 31 (n) times from 1115 'Behavioural problem' incidents. The main substance abuse recorded here was alcohol and drug (methamphetamine) intoxication. Substance abuse is a co-morbidity of mental illness. It has been recorded by the National Institute on Drug Abuse (2020) that many individuals who develop a substance abuse disorder, usually diagnose with a mental disorder (National Institute on Drug Abuse, 2020). This suggested that from those who experience a mental illness in their lives, usually experience a substance abuse disorder (National Institute on Drug Abuse, 2020). Substance abuse in adolescents has reported high rates of a co-occurring mental illness. Substance abuse disorders have been found co-occurring with anxiety disorders, panic disorder, PTSD, depression, bipolar disorder, ADHD and borderline personality disorders (Baldacchino *et al.*, 2015). People suffering from schizophrenia have a higher substance abuse rate than any normal person in a general population (Galvani and Livingston, 2012; Baldacchino *et al.*, 2015; National Institute on Drug Abuse, 2020).

In section 5.2.2.1, substance abuse presented as a minority frequency case. Substance abuse presented 77 (n) times. This was added to the 32 (n) that presented in this section, suggesting substance abuse to present 101 (n) (3.7%) times from the census over the 3-

year period. Substance abuse in the Western Cape is a rising burden and has contributed to many non-natural deaths in the province (Jacob and Coetzee, 2018). The increased usage of methamphetamine[119] amongst adolescents has been noted in admissions and re-admissions due to this drug abuse (Stein and Bateman, 2007; Jacob and Coetzee, 2018). It was recorded that 9 075 people in the GRD[120] had been arrested for substance related offences in 2018/19. Of these offences 1 745 people were arrested for driving under the influence of alcohol, and the other 7 330 were arrested for possession and sale of drugs (Western Cape Government, 2019). Thus, substance abuse needs to be considered in the context of mental illness and poor mental health.

5.1.2.3.5. Socio-economic circumstances

'Socio-economic circumstances' (socio-economic affected behaviour) presented 13 (n) times of 1115 'Behavioural problem' incidents. The socio-economic circumstances that were present in the data were: *hitting windows, being assaulted and emotional shock from witnessing trauma, death and accidents*. Socio-economic factors (as social determinants of health) have been known to affect mental health, and in turn could promote mental illness (Commission on Social Determinants of Health, 2008; Solar and Irwin, 2014). Considering the social determinants of mental health, mental health problems can be a result of social factors like unemployment and poverty or increase the prevalence of these social factors (World Health Organisation and Calouste Gulbenkian Foundation, 2014); contributing to mental health and mental health inequalities (Mental Health Foundation, 2016). These mental health inequalities or social determinants of mental health is the term used to explain that social factors affect the risk for mental illness and substance use disorders (Compton and Shim, 2017). Being cognizant that the aetiologies of mental illness and substance abuse disorders are due to social risk factors, Compton and Shim stress that the social determinants of health and the social determinants of mental health exert their effects greatly at a societal level (Compton and Shim, 2017). This concept recognises certain population subgroups and are subjected to increased risk of mental illness with prolific exposure to tainted social, economic and environmental factors.

[119] Common names used in the Western Cape are 'tik', 'ice', 'glass', 'meth', 'crystal meth'
[120] Garden Route District

Marginalised groups are the most exposed as gender, ethnicity and disability are factors that intersect social determinants of mental health (Mental Health Foundation, 2016).Considering that social factors of education, unemployment, substance abuse, poverty and inequality play a role in cause and effect (Commission on Social Determinants of Health, 2008), there seems to be a need to document 'deprivation data' for health care consumers presenting to the EMS.

5.1.2.3.6. Medical Condition

'Medical condition' (underlying medical condition) presented 9 (n) times of 1115 'Behavioural problem' incidents. The medical conditions that presented was: *emesis (vomiting), convulsions (seizures) and unresponsive*. Convulsions or seizures are a sign of epilepsy, however they could occur in an overdose of drugs (National Institute on Drug Abuse, 2020). Very little insight is given into further analysis of this section, suggesting the communication centre agents need to acquire more information pertaining to a health care consumer's presenting problem.

5.1.2.3.7. Trauma Condition

'Trauma condition' presented 2 (n) times of 1115 'Behavioural problem' incidents. This was mainly from blood loss as presented in the IMR. The trauma condition here was mainly profuse bleeding. No illumination is given in regard as to why. Being a behavioural problem provides confusion as to what happened, however not much elucidation is provided. It is noted that substance abuse has led to traumatic incidents, with trauma often becoming the leading cause for depression, anxiety and post-traumatic stress disorders (Jacob and Coetzee, 2018).

5.1.2.3.8. Behavioural Problem Summary

The category of "behavioural problem" provided data on 1115 (n) IMR. Valuable analysis is provided from this data, with each category offering insights into the presentation of health care consumers to the WCEMS, presumably for related mental health needs. However, more information needs to be presented to display a full picture to the responders. With retrospective data the ability to change these challenges is nuanced.

Respectively some of the data could display more information about health care consumers, to preserve an archive to better manage, dispatch and treat health care consumers presenting with a behavioural problem. Notably, self-poisoning seemed the more severe of the behavioural problems presumed to present to the WCEMS. Value proposition could be enhanced from a WCEMS perspective on better noting of the behavioural patterns of these people. The theory of planned behaviour is a human social behaviour predictor which helps to explain why individuals behave in certain ways (Ajzen, 2011). This concept could illuminate the behavioural problems of the health care consumers in this study. This would prove helpful for better service delivery, knowing health care consumers' behavioural habits. Theory of planned behaviour suggests behavioural decisions is a thought out process influenced by attitudes, norms and behaviour control (Ajzen, 2011; Sommer, 2011).

5.1.2.4. Overdose

'Overdose' is the broad category for a health care consumer who ingested a lot of medication, poison or drugs intentionally; seen as a mental health burden. Overdose is universally known as deliberate self-poisoning (DSP) (Benedict, van Loggerenberg and Steinberg, 2019). The statistical analysis from the data provides a large frequency of health care consumers with DSP. It was recorded that 44.9% (n=1336) of the 2976 (N) IMR from the census over the 3-year period, were regarded to have overdosed. There was a necessity to separate self-poisoning and overdose due to the large frequency of both and technically, one cannot "overdose" on a poison if there is no "normal" dose for human consumption. If one should look at the poisons being ingested compared to the medications that were ingested, it does suggest ingesting petrol or poison to be a more deliberate attempt at suicide. It must be noted that all people who overdosed, were considered as DSH or DSP and no assumption was made of attempted suicide or suicide unless stated in the IMR. This presented the researcher with the reality that DSH is not typified as such and may be underestimated in official records.

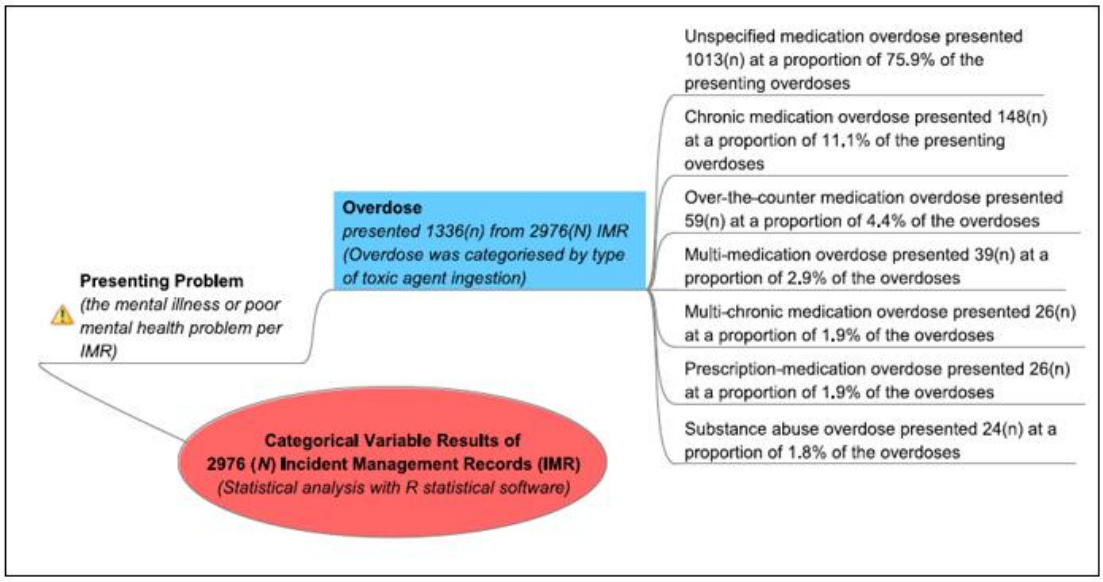
WHO defines DSP (overdose) as "an act with a nonfatal outcome in which an individual deliberately ingests a substance in excess of the prescribed or generally recognized

therapeutic dosage" (World Health Organisation, 2014; Benedict, van Loggerenberg and Steinberg, 2019). In developing countries pesticides, herbicides, detergents, chemicals and medication have been the options chosen for DSP (Naga, 2007; Benedict, van Loggerenberg and Steinberg, 2019). In developed countries prescription medication, over-the-counter medication and drugs are methods for DSP (Rasimas, Smolcic and Sinclair, 2017). One must understand there is no therapeutic[121] dose for pesticides and unintended overdose may occur where the user may have been mistaken about the potency/concentration of the substance or the usual dose amount. DSP has been recorded as the leading method of attempted suicide in developed countries, namely USA and Canada. Surviving DSP is not uncommon, however after a first episode the risk of long-term suicide could be high (Finkelstein *et al.*, 2015). It was elucidated that DSP has been used to gain attention or express distress, with the main purpose not always suicide (Benedict, van Loggerenberg and Steinberg, 2019). DSP reflects on the morbidity and mortality of a country, especially in the developed world where DSP is the more common choice of suicide attempt (Finkelstein *et al.*, 2015; Benedict, van Loggerenberg and Steinberg, 2019). DSP is the most common method of attempted suicide, being accountable for 85% to 95% of suicide-related hospital admissions in North America. This makes DSP accountable for 1 in 300 patients in North America visiting the ED. Notably these patients made repeated attempts at DSP/suicide, using more aggressive means each time (Finkelstein *et al.*, 2015).

The IMR specified the type of overdose. These overdose types were: '*unspecified medication overdose'; 'chronic medication overdose'; 'over-the-counter medication overdose'; 'multi-chronic medication overdose'; 'prescription-medication overdose'; 'substance abuse overdose'* (See Figure 29).

[121] Therapeutic dose could suggest toxicity to become a useful semantic

Figure 29: Overdose findings



5.1.2.4.1. Unspecified medication overdose

'Unspecified medication overdose' presented 1013 (n) times of 1336 'Overdose' incidents. This provided more questions than answers. Assumptions cannot be made and this evidence on what type of substance/medication was ingested would be valuable to learn more about DSP in the GRD, especially due to the high frequency level.

5.1.2.4.2. Chronic medication overdose

'Chronic medication overdose' presented 148 (n) times from 1336 'Overdose' incidents. The medications that represented this broader category name were all the chronic medication for chronic illness, usually recorded as: *cardiac or hypertension medication*; *diabetic medication-metformin or insulin; Asthma medication; Epilepsy-Epilim; depression medication-antidepressants and tricyclic-antidepressants; TB and HIV medication.*

5.1.2.4.3. Over-the-counter medication overdose

'Over-the-counter medication overdose' presented 59 (n) times from 1336 'Overdose' incidents. Over-the-counter medications are medicines that require no prescription and can usually be bought hassle free at a pharmacy. These were paracetamol, adcodol,

antihistamine (allergex), sleeping tablets, iron tablets and ibrufin anti-inflammatory medication. The severity of paracetamol overdose or even Ibuprofen overdose includes renal failure (Rasimas, Smolcic and Sinclair, 2017).

5.1.2.4.4. Multi-medication overdose

'Multi-medication overdose' presented 39 (n) times from 1336 'Overdose' incidents. Multi-medication is the broader category name grouping for an overdose where a person has taken more than one medication to DSP. In this case these medications were combinations like paracetamol and antibiotics or sleeping tablets and pain medication. Majority of the multi-medication combinations presented as over-the-counter medication. No reference was made to quantity, only combinations.

5.1.2.4.5. Multi-chronic medication overdose

'Multi-chronic medication overdose' presented 26 (n) times from 1336 'Overdose' incidents. Multi-chronic medication was the grouping of chronic medications taken in combinations. The combination that presented the most was diabetic with hypertension medication overdose and diabetic with depression medication overdose.

5.1.2.4.6. Prescription-medication overdose

'Prescription-medication overdose' presented 26 (n) times from 1336 'Overdose' incidents. Prescription-medication refers to the medication that requires a doctor's prescription to acquire from the pharmacy. The main medication here was Tramadol (a Schedule 5 pain medication) and antibiotics. Scheduled medication is a burden in North America with DSP (Finkelstein *et al.*, 2015).

5.1.2.4.7. Substance abuse overdose

'Substance abuse overdose' presented 24 (n) times from 1336 'Overdose' incidents. This overdose was mainly with alcohol, cannabis and cocaine. Substance abuse is a recorded burden and also presents as a creator for DSP and a push towards DSP (Benedict, van

Loggerenberg and Steinberg, 2019), notwithstanding that some intoxication may exclude the intention to poison in recreational and coercive contexts.

5.1.2.4.8. Overdose Summary

It has been recorded that developing countries have battled with the rise in DSP (Benedict, van Loggerenberg and Steinberg, 2019). This public health issue was recorded as a leading cause of in-hospital deaths in rural Sri Lanka. A study in Sri Lanka looked at personal and professional challenges in management of DSP, suggesting that developed countries context for treating DSP was established for a developed world, elucidating more research was required from a rural perspective (Senarathna *et al.*, 2008). The GRD satisfies a rural description. Rural areas have provided high frequencies for health care consumers who DSP (Gunnell *et al.*, 2007; Malangu, 2008; Senarathna *et al.*, 2008; World Health Organization, 2014). In Uganda a study was done to characterise acute poisoning cases. It was found that from 276 patients 71% were male. Toxic agents that were used for DSP were household chemicals, agrochemicals and carbon monoxide (Malangu, 2008). These patients had 2.1 days mean length of stay at hospital, ranging from 1 to 26 days. Of these patients 1.4% were fatal, 75% being males, with carbon monoxide, organophosphate and alcohol poisoning being the main causes (Malangu, 2008). In a study on the global distribution of fatal pesticide self-poisoning, African countries like Uganda, Nigeria, Zimbabwe, Kenya and Ethiopia all presented high frequency of DSP (Gunnell *et al.*, 2007). Asian countries have produced the highest prevalence of pesticide self-poisoning leading to suicide. India (20%), China (66%) and Sri Lanka (70%) produce some of the highest frequencies of pesticide DSP suicide (Gunnell *et al.*, 2007; Karunarathne *et al.*, 2019). These studies have similar reference to this research as pesticide poisoning, household chemicals and agrochemicals were all found to be an agent for DSP in the GRD.

Three articles make reference to DSP in S.A from a hospital perspective. A study on DSP was done at a hospital in Paarl in the Western Cape that found the frequency of overdose to be 1.13 cases per day over the study period (Laubscher and Van Rooyen, 2007). Females with an average age of 27 presented most frequent for DSP, with paracetamol

and tricyclic-antidepressants the most common. Patients who used multi-medication to DSP presented as 42.3%, with 8.5% needing high-care (Laubscher and Van Rooyen, 2007). At a hospital in northern KZN a study on DSH suggested younger woman to be more affected. Relational issues contributed to 50% of all DSH cases, with poor socio-economic circumstances present in most (Ani, Ross and Campbell, 2017). Majority of admissions were for parasuicide, noting DSP (mainly medication and organophosphates/pesticides) as the leading causes for parasuicides and attempted suicides from all cases in the study period (Ani, Ross and Campbell, 2017). Elucidation from a study done in Bloemfontein, Free State suggested 66% of the study population were female residing in low socio-economic conditions (Benedict, van Loggerenberg and Steinberg, 2019). Paracetamol (21.4%), household chemicals (19.3%) and antiretrovirals[122] (9.9%) were the most frequently presented substance of choice to DSP. (Benedict, van Loggerenberg and Steinberg, 2019). Similarly, the data analysis from the researcher's study found 11% of health care consumers regarded to have overdose, had used chronic medicine to overdose, which included antiretrovirals while 4% had been regarded to have used over-the-counter medicine; this included paracetamol. The researcher also noted females were more likely to overdose than males, with a mean age of 29.

An alignment was noted with the three S.A based[123] studies mentioned above and with the researcher's own findings. The toxic agents used to DSP were all similar. Laubscher and Van Rooyen (2007) made reference to chronic medications, antibiotics, household detergents, paracetamols, antidepressants (tricyclic) and pesticides. These medications also presented for Benedict van Loggerenberg and Steinberg (Laubscher and Van Rooyen, 2007; Benedict, van Loggerenberg and Steinberg, 2019). As mentioned in the findings, these types of toxic agents presented as mechanisms for DSP in the GRD. The choice of toxic agent is different from country to country. Depending the development of that country, socio-economic circumstances and availability of a substance/toxic agent, overdosing effect is related to lethality of mechanism (Fathelrahman, Ab Rahman and

[122] Antiretrovirals is medication for HIV/AIDS

[123] South African based represents the three studies from Western Cape, Free State and Kwa-Zulu Natal. It is important to note these studies as they represent statistics on South African soil.

Mohd Zain, 2008; Benedict, van Loggerenberg and Steinberg, 2019). Based on percentages of parasuicides, not all self-poisonings are intended for death, with suicidal tendencies always having conflict of decisions (Rasimas, Smolcic and Sinclair, 2017).

This data analysis allows for improved value proposition located in overdose patterns between local areas with in S.A. Knowing overdose patterns could provide a platform to develop improved care for health care consumers, pertaining to how medication is distributed through Government hospitals. From a WCEMS communication centres perspective more emphasis could be put into distinguishing unspecified medication. The proportion of unspecified medication overdose consisted of 76% of the overdose IMR. By noting the type of overdose, the communications centre could create an archive of types of overdose mechanisms used. Training could be done around this; equipping EC providers to treat specific overdose. The frequency that was presented for overdose in this research was 1336 (n) health care consumers over 3-years. If one was to include the self-poisoning (n=214) from behavioural problem in section 5.2.2.3.2 then one could conclude that 1550 (n) IMR were regarded as health care consumers with DSP. Thus, one could state that:

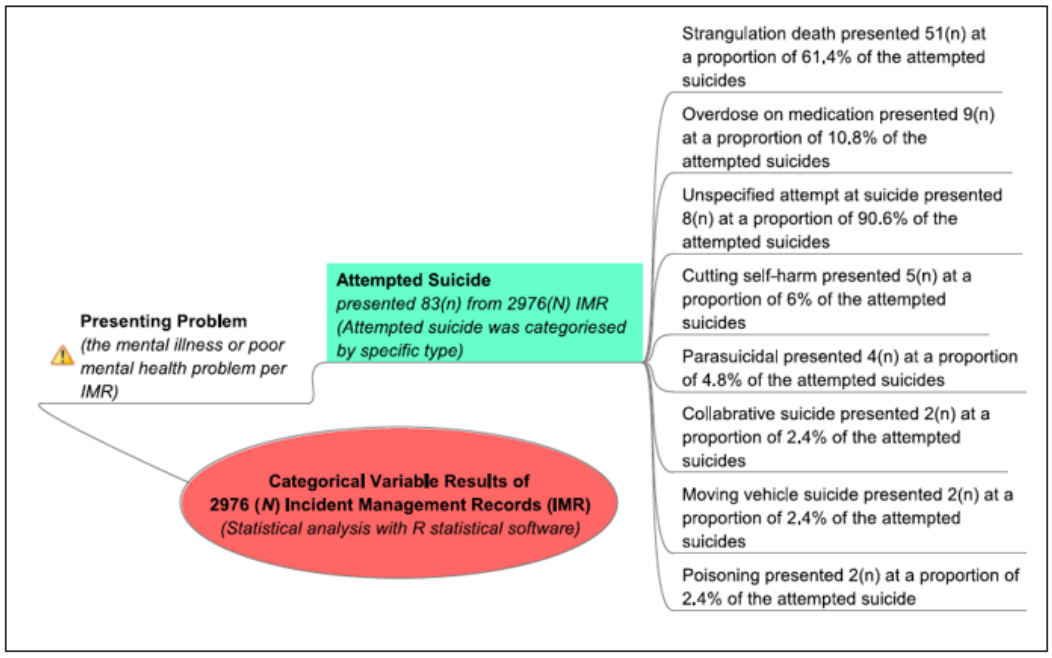
> *As per the data analysis, the finding regards people who overdose or DSP as present in the Garden Route District (GRD). DSP would account for 1550(n) cases. This suggests that up to 52% of health care consumers over the 3-year study period could have presented with DSP. Females were more likely to overdose, with the mean age being 29 years old. Household detergents, pesticides, chemicals, medication and alcohol were all part of the toxic agents used to DSP in the GRD.*

5.1.2.5. Attempted Suicide

'Attempted Suicide' presented 83 (n) times from 2976 (N) IMR, providing a proportion of 2.8% of the IMR from the census within the 3-year period. The case for attempted suicide is usually how a bystander or family member would perceive the situation when they call for help. Globally attempted suicide accounts for 20 people for every actual suicide, equating to an attempted suicide every 1 to 3 seconds (Ani, Ross and Campbell, 2017).

The Communications Centre usually details the specifics of the type of attempted suicide as provided by the person who reported the problem. These categories (types) are '*strangulation death', 'overdose on medication', 'unspecified', 'cutting self-harm', 'parasuicidal', 'collaborative suicide', 'moving vehicle suicide'* and *'poisoning'* (Figure 30).

Figure 30: Attempted Suicide findings



5.1.2.5.1. Strangulation Death

'Strangulation death' presented 51 (n) times from 83 'Attempted Suicide' incidents. 'Strangulation death' was the broader category name given to death by causing asphyxiation to one's airway. The colloquial term is often referred to as 'hanging'. From experience as an EC provider, one cannot speculate that strangulation death is usually just hanging. Hanging refers to knotting a ligature around one's neck like a noose and then suspending or partial suspension to create unconsciousness, asphyxiation and then death (Rahman *et al.*, 2017). It has been noted that rope, wire, ties and string have all been used, and often not truly suspended as the term 'hanging' would imply (Rahman *et al.*, 2017). The IMR[124] recorded attempted suicide with method of 'hanging', making references to occurrences such as "rope snapping" or "family members intervening". It

[124] IMR – Incident Management Record

was found in Northern KZN that DSP was the more common method of attempted suicide, with only 5 patients presenting to the ED with attempted hanging (Ani, Ross and Campbell, 2017).

5.1.2.5.2. Overdose on medication

'Overdose on medication' presented 9 (n) times from 83 'Attempted Suicide' incidents. For the people who overdosed as an attempted suicide there was no specification as to what medication or substance was used. DSP is a leading cause of attempted suicides in many countries, with developed worlds using drugs and pharmaceutical scheduled medication (Finkelstein *et al.*, 2015). Usually the first episode of an attempted suicide leads to a second attempt, often with increase in fatality (Ani, Ross and Campbell, 2017). Notably, in Bloemfontein (Free State) regional hospital, 90.7% of attempted suicide cases sent for psychological evaluation, presented to have DSP (Benedict, van Loggerenberg and Steinberg, 2019). Overdose attempted suicide IMR presented a low frequency, however overdose (n=1336) presented with very high frequencies in this study. Without assumption, only 9 (n) were referenced as attempted suicide. The notation on mechanism of overdose is relevant, to create an archive on attempted suicide logistics. If patterns present themselves in the archived data, systems can be created in risk reduction of attempted suicide by overdose. This would add value proposition towards health care consumers care, treatment and outcome.

5.1.2.5.3. Unspecified

'Unspecified' presented 8 (n) times from 83 'Attempted Suicide' incidents. This category was left as unspecified as no reference was made to type of mechanism for attempting suicide. It must be stated that it is unclear if the family was not sure or if it was an error in documentation. This needs to be addressed from a communications centre perspective.

5.1.2.5.4. Cutting self-harm

'Cutting self-harm' presented 5 (n) times from 83 'Attempted Suicide' incidents. Cutting self-harm was mainly recorded as cutting to the wrists and neck. Cutting self-harm or DSH is a huge indicator towards attempted suicide and suicide and has created a large

burden towards DALY's, mortality and morbidity (Arkins *et al.*, 2013; Ani, Ross and Campbell, 2017). Cutting as a form of self-harm has been stigmatised as attention seeking behaviour, however with each attempt of cutting self-harm, the severity increases, eventually leading to suicide (Arkins *et al.*, 2013; World Health Organization, 2014; Centre for Suicide Prevention, 2017). It becomes attempted suicide, once the persons need for relief of stress and urge for relief outweighs the severity of cutting self-harm required to relieve (Arkins *et al.*, 2013). Evidence about DSH has proven that without prevention, a crisis could loom. Five % of the adult population to have inflicted DSH and 15% of the youth (Centre for Suicide Prevention, 2017). DSH usually begins between 12-15 years of age (Centre for Suicide Prevention, 2017). Hospitalisation of DSH occurs four times more often for girls 14-17 years of age than boys (Centre for Suicide Prevention, 2017). Females are more likely to cut, while males usually adopt burning and hitting themselves (Centre for Suicide Prevention, 2017). DSH may not be considered a mental illness, but is an indication of someone experiencing poor mental health. This poor mental health could lead to mental illness and further erosion of the self-concept and suicide.

5.1.2.5.5. Parasuicidal

'Parasuicidal[125]' presented 4 (n) times from 83 'Attempted Suicide' incidents. Globally parasuicide is a term grouped with DSH, usually labelled under attempted suicide (De Leo *et al.*, 2006; Centre for Suicide Prevention, 2017). Suicide is fatal, but not all attempts at suicide are failed suicide. Parasuicide has been seen as manipulative or as an attempt to seek attention (De Leo *et al.*, 2006). Parasuicide is defined as:

> "…an act with a non-fatal outcome in which an individual deliberately initiates a non-habitual behaviour that, without intervention from others, will cause self-harm, or deliberately ingests a substance in excess of the prescribed or generally recognized therapeutic dosage, and which is aimed at realizing changes which the subject desired, via the actual or expected physical consequences…" (De Leo *et al.*, 2006, pp. 8).

[125] Parasuicidal here means attempted suicide more than one time

‘Parasuicide’ in this research accounted for the attempts at suicide at multiple times with multiple mechanisms. No indication was made in this research findings as to whether the attempts were of an attention seeking nature or real attempts.

5.1.2.5.6. Collaborative Suicide

‘Collaborative suicide’ presented 2 (n) times from 83 ‘Attempted Suicide’ incidents. ‘Collaborative suicide’ was the use of multi-mechanisms of death, namely overdose and drowning and overdose and hanging. As previously stated, DSP is usually the most common type of attempted suicide (Finkelstein *et al.*, 2015). There was no reference to whether this was parasuicide, being the first time or not.

5.1.2.5.7. Moving vehicle suicide

‘Moving vehicle suicide’ presented 2 (n) times from 83 ‘Attempted Suicide’ incidents. These two incidents were directly related to a health care consumer stepping in front of a car on a busy road, and another trying to jump out of an ambulance while in transit.

5.1.2.5.8. Poisoning

‘Poisoning’ presented 2 (n) times from 83 ‘Attempted Suicide’ incidents. No reference was made here to type of poison. DSP is a leading cause of attempted suicide and suicide, with pesticide self-poisoning accountable for 14 million deaths in the last 50 years (Ritchie, Roser and Ortiz-Ospina, 2015; Karunarathne *et al.*, 2019). It is interesting that only 2 (n) IMR presented as attempting suicide with poison.

5.1.2.5.9. Attempted Suicide summary

From the attempts of suicide, it is clear to see that DSH holds most of the accountability. Subsequently parasuicide, attempted suicide, DSH and DSP could be grouped under the category of ‘non-fatal suicidal behaviour, with or without injuries’ (De Leo *et al.*, 2006). De Leo *et al*. (2006) defines this new category as:

> “…a nonhabitual act with nonfatal outcome that the individual, expecting to, or taking the risk to die or to inflict bodily harm, initiated and carried out with the purpose of bringing about wanted changes…” (De Leo *et al.*, 2006, pp. 14).

Being interrelated, once DSH has become unreleasing it can lead to attempts at suicide and these attempts can be fatal (Arkins *et al.*, 2013). As noted in other studies (Finkelstein *et al.*, 2015; Ani, Ross and Campbell, 2017), DSP was not the leading cause for attempted suicides in this study. Strangulation death, and more commonly hanging seemed to be the leading cause of attempted suicide in the GRD over the 3-year period. Attempted suicides are a perfect indicator for suicide. Individuals who have made prior attempts at suicide have a higher likelihood of death by suicide, compared to individuals who have not attempted suicide (World Health Organization, 2014). Usually, DSP has proven to be the fatal blow with multiple attempts (World Health Organization, 2014; Jamison and Bol, 2016).

Factors like depression, poor socio-economic circumstances, substance abuse, poverty, poor educational background and the pressures of society all play a part in an individuals need to attempt suicide (Laubscher and Van Rooyen, 2007; World Health Organization, 2014; Finkelstein *et al.*, 2015; Ani, Ross and Campbell, 2017; Benedict, van Loggerenberg and Steinberg, 2019). These factors are also known as the social determinants of mental health (World Health Organisation and Calouste Gulbenkian Foundation, 2014; Compton and Shim, 2017). Suicidal thoughts (ideation) and attempted suicides are a huge burden to society and the economy. The global lifetime prevalence of suicide ideation is 9.2% and 2.7% for attempted suicides (Klonsky, May and Saffer, 2016). Suicidal ideation and attempts are a strong predictor of suicide, hospitalising many people each year. This adds to the financial burden of a country (Klonsky, May and Saffer, 2016). No assumption can be made to the causation of attempted suicide.

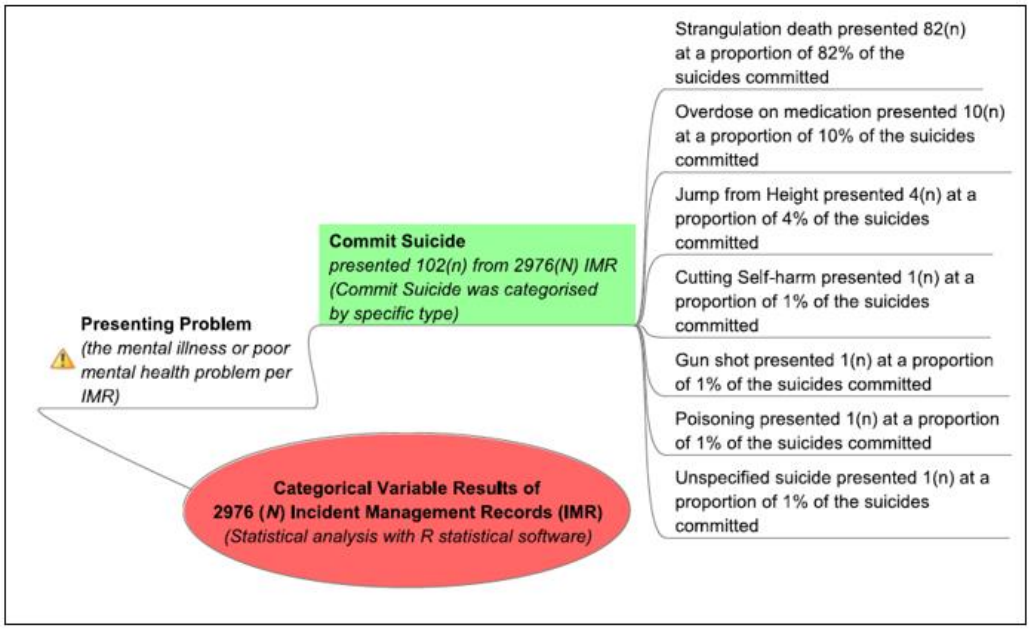
5.1.2.6. Commit Suicide

'Commit Suicide' presented 102 (n) times from 2976 (N) IMR, providing a proportion of 3.4% of IMR from the census over the 3-year period. Suicide presenting 102 (n) times in a 3-year period suggests that there was (on average) 34 (n) suicides a year, meaning there was about 2.8 (n) suicides a month within the 3-year period in the GRD. Globally, 800 000 people commit suicide yearly, averaging one person every 40 seconds. Suicide rates are higher in developed countries than in developing countries (Klonsky, May and

Saffer, 2016). Developing countries account for over 75% of all global suicides (Klonsky, May and Saffer, 2016). There has been a 16% increase of suicide in the USA, making suicide the tenth leading cause of death. Approximately 38 000 people in the USA commit suicide annually, providing an approximation of 1.5 million years of life lost annually (Finkelstein *et al.*, 2015). Globally suicide has been recorded as a leading cause of death in young people, however more frequent among older people (Ritchie, Roser and Ortiz-Ospina, 2015). Suicide accounted for 1.4% of global deaths in 2017, raising to 5% in various countries; men committing suicide twice as often as woman (Ritchie, Roser and Ortiz-Ospina, 2015). In the USA, 60% of suicides have taken place with a firearm, while the global firearm suicide rate is 6%. Developing countries tend to report DSP with pesticide as the main mechanism for suicide (Ritchie, Roser and Ortiz-Ospina, 2015; Karunarathne *et al.*, 2019).

S.A recorded almost 8 000 people committing suicide annually. This is 10% of all unnatural adult deaths and 9.5% of unnatural youth deaths (Benedict, van Loggerenberg and Steinberg, 2019). According to the South African Depression and Anxiety Group (SADAG), in 2014, 23 suicides had been committed and 230 suicides attempted, with two-thirds of the victims between 20-39 years old (SADAG, 2013; Benedict, van Loggerenberg and Steinberg, 2019). Considering the global statistics and the researchers data analysis and statistical findings, presumption suggests that people who had commit suicide, could have in fact attempted suicide previously. No direct reference was made in this regard. Specification of types of 'suicide committed' were recorded as per the IMR, namely: 'S*trangulation death', 'overdose on medication', 'jump from height', 'cutting self-harm', 'gunshot', 'poisoning'* and '*unspecified*' (Figure 31).

Figure 31: Commit Suicide findings



5.1.2.6.1. Strangulation Death

'Strangulation death' (Hanging) presented 82 (n) times from 102 'Commit Suicide' incidents. As mentioned, strangulation death refers to "hanging". Notably, from experience as an EC provider, the choice for using strangulation death was due to the myth of hanging. People commit suicide by hanging, but not all hangings are fully suspended. A complete hanging is the full suspension of the body from the ground with the bodies weight being the constricting force (Rahman *et al.*, 2017). A partial or incomplete hanging is when a victim's body is partially suspended, usually with feet of the victim found touching the floor. Victims have been recorded to have been found in kneeling and sitting positions (Rahman *et al.*, 2017). 'Suicide hanging' (n=82) presented the highest frequency for a mechanism of suicide in the GRD. Suicidal hanging is elucidated to be one of the most common causes for suicide globally due to the lethality with 70% of suicidal hanging attempts ending in fatality (Klonsky, May and Saffer, 2016; Rahman *et al.*, 2017). Suicidal hanging has been suggested to be painless, once the process has started, the victim usually loses consciousness within 15 seconds from asphyxiation. This is assumed to make it more common (Mars *et al.*, 2014). Countries in Asia and Europe elucidate higher frequencies for hanging as a type of suicide (Värnik *et*

al., 2008; Mars *et al.*, 2014; Rahman *et al.*, 2017). An article published by Kootbodien *et al* (2020) trends in suicide mortality in S.A from 1997-2016 are examined. Hanging was the leading mechanism for suicide in men at 60.6% and the second leading mechanism for suicide in woman at 36.1%. There were 8 573 suicides over the 20-year study (Kootbodien *et al.*, 2020).

5.1.2.6.2. Overdose on medication

'Overdose on medication' presented 10 (n) times from 102 'Commit Suicide' incidents. 'Overdose on medication' represented pharmaceutical medication. DSP (overdose) is a leading cause of attempted suicide and often leads to severe fatalities. DSP is usually the second leading method for suicide victims (Finkelstein *et al.*, 2015; Ani, Ross and Campbell, 2017). Reference to the type of medication used was not displayed. In suicide mortality trends in S.A, overdose was recorded as the second leading mechanism for suicide by men at 14.4%, 5.3% directly related to medication overdose (Kootbodien *et al.*, 2020). Females tended to overdose as a leading mechanism for suicide at 39.8%, 21.9% directly related to medication overdose (Kootbodien *et al.*, 2020). Notably, in Bloemfontein, 16.2% of the suicide cases presented with DSP as a mechanism for suicide (Benedict, van Loggerenberg and Steinberg, 2019).

5.1.2.6.3. Jump from height

'Jump from height' presented 4 (n) times from 102 'Commit Suicide' incidents. In the GRD, the route from Plettenburg Bay towards Jeffery's Bay in the Eastern Cape has many bridges which bridge the gap between really high ravens and gorges. These bridges have become synonymous over time for suicide victims. As per the statistical findings, only 4 (n) suicides had occurred with jumping from height. Usually this requires the speciality of Air-Mercy-Services Helicopter to retrieve the body using an aerial winch. Suicide mortality trends in S.A elucidate 'jump from height' as a mechanism for suicide, however not as significant as hanging, overdose and gunshot (Kootbodien *et al.*, 2020). Jumping from height as a mechanism for suicide has presented more commonly in places like Hong Kong and China (Ajdacic-Gross *et al.*, 2008; Reisch, Schuster and Michel, 2008).

5.1.2.6.4. Cutting self-harm

'Cutting self-harm' presented 1 (n) time from 102 'Commit Suicide' incidents. This 'cutting self-harm' took place with a cut to the neck[126]. These types of suicides have not been recorded often, as suggested by the study on suicide trends in S.A, were self-harm[127] is presented as a low frequency for suicide (Mars *et al.*, 2014; Kootbodien *et al.*, 2020). DSH is a significant indicator for early suicide prevention (Centre for Suicide Prevention, 2017). This DSH simply means that the need for relief outweighed the need for life.

5.1.2.6.5. Gunshot

'Gunshot' presented 1 (n) time from 102 'Commit Suicide' incidents. 'Gunshot', or suicide with a firearm is usually a gunshot to the cranium; messy and not always accurate, from researcher's experience. People have been known to commit suicide by firearm, only to survive for a few hours after the incident (Värnik *et al.*, 2008; Klonsky, May and Saffer, 2016). Suicide by firearm usually presents to be male, with many occurring in the USA (Ritchie, Roser and Ortiz-Ospina, 2015). In S.A from 1997-2016, only 8.6% of suicides were by firearm (Kootbodien *et al.*, 2020).

5.1.2.6.6. Poisoning

'Poisoning' presented 1 (n) time from 102 'Commit Suicide' incidents. This was specifically stated as carbon monoxide poisoning. Carbon monoxide poisoning was found to be a common method for suicide in Uganda (Malangu, 2008). Self-poisoning, especially pesticides are a leading cause of death in many African countries. Often self-poisoning presents numerously as attempted suicide at the ED. Rural areas often being a significant denominator in pesticide poisoning (Gunnell *et al.*, 2007; Ani, Ross and Campbell, 2017; Rasimas, Smolcic and Sinclair, 2017; Benedict, van Loggerenberg and Steinberg, 2019; Karunarathne *et al.*, 2019). The GRD is considered a rural area (Western Cape Government, 2019). Trends in suicide mortality in S.A suggest from all

[126] The researcher had the traumatic experience of attending this suicide. Although low in frequency, self-inflicted injury may invoke vicarious traumatisation for the caregiver as the paramedic attempts to assist a person who may resist care.

[127] This self-harm refers specifically to cutting or injury and not to self-poisoning (DSP/overdose)

overdose/DSP suicides, 8.7% had occurred with pesticide (Kootbodien *et al.*, 2020). Notably there has been a gradual decline in pesticide poisoning in the recent years (Karunarathne *et al.*, 2019), however no associations can be made from these results.

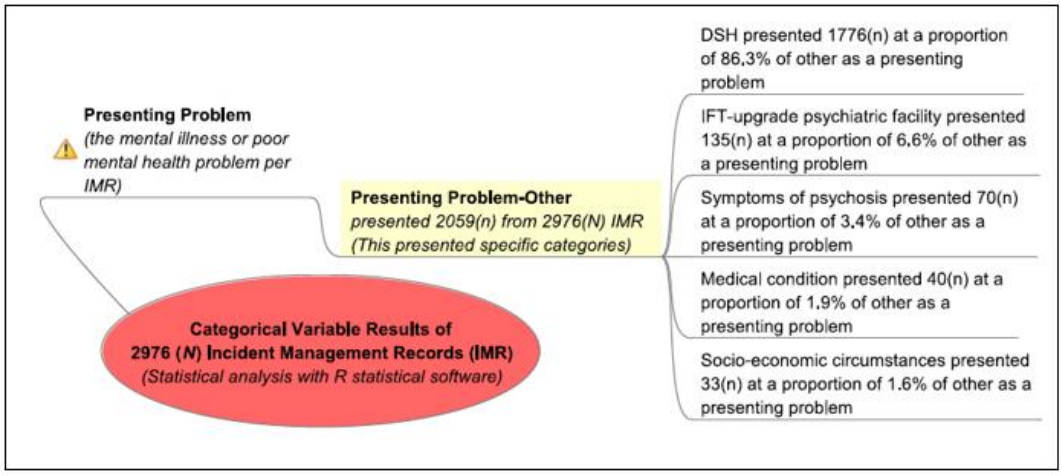
5.1.2.6.7. 'Commit Suicide' summary

Statistics from developed countries and developing countries all state the effect suicide has on an economy, health systems and communities. Research in developing countries on suicide stated poor socio-economic circumstances, depression, family issues, substance abuse and poverty to be the social pushers towards suicide (Malangu, 2008; Ani, Ross and Campbell, 2017; Benedict, van Loggerenberg and Steinberg, 2019; Kootbodien *et al.*, 2020). The GRD has presented an alarming total of suicide victims over the 3-year period. It was mentioned that from 1997-2016, 8 573 suicides had occurred in S.A, averaging 35.7 suicides a month for 20 years (Kootbodien *et al.*, 2020). There has been on average 2.8 suicides a month in the GRD over the 3-year period. If one considers the attempted suicides had been fatal, the suicide frequency would have been 185 (n) victims. This suggests there could have been on average 5 suicides a month in the GRD over the 3-year period. The more conventional methods of suicide like hanging and jump from height has started to be replaced with pesticides and firearms in certain countries (Ajdacic-Gross *et al.*, 2008; Värnik *et al.*, 2008; Klonsky, May and Saffer, 2016). Although hanging is still the most common (due to availability), pesticides have presented very common in Asian and Latin American countries while the USA remains the highest for firearm suicide (Ajdacic-Gross *et al.*, 2008). Jump from heights still presents in the bigger cities of China, while Eastern Europe still presents with hanging as a mechanism for suicide (Ajdacic-Gross *et al.*, 2008). In S.A, hanging, overdose/DSP and firearm suicide are the main mechanism for suicide (Kootbodien *et al.*, 2020). It can now be said that hanging, overdose on medication and jump from height were the three highest frequencies for suicide in the GRD over the 3-year period. This provides the WCEMS with knowledge on suicide burden and exposure in the GRD. This suggests more prevention is needed from the WCEMS and other stakeholders to help decrease the burden of suicide.

5.1.2.7. Presenting Problem – Other

'Presenting Problem-Other' presented 2059 (n) times from 2976 (N) IMR, providing a proportion of 69.2% of the IMR from the census over the 3-year period. Presenting problem-Other was an option to record any other mental health or mental illness issue that may have presented. Presenting problem-Other was divided into categories: 'DSH', 'Inter-Facility-Transfer (IFT)-upgrade psychiatric facility', 'symptoms of psychosis', 'medical condition' and 'socio-economic-circumstances'. These category names provide a general classification of problems that arose from the IMR (Figure 32).

Figure 32: Presenting Problem-other findings



5.1.2.7.1. DSH

'DSH' presented 1776 (n) times from 2059 'presenting problem-other' incidents. This DSH provides the percentage of health care consumers who technically suffered with poor mental health. Suicide was the most fatal. This presenting problem of DSH is the incorporation of all the DSH, overdose, DSP, attempted suicides and suicides. The researcher used this platform to present the case for DSH. In essence, 1776 (n) health care consumers presented with a DSH type problem. This is theoretically 60% of all the IMR from the census over the 3-year period. DSH has become a growing phenomenon, usually being a predictor towards suicide (Arkins *et al.*, 2013); DSP accounting for majority of attempted suicides and eventual suicide in Africa (Benedict, van Loggerenberg and Steinberg, 2019). Attempted suicide and suicide are the eventual outcome of DSH

(Arkins *et al.*, 2013; Ani, Ross and Campbell, 2017). The grouping of these concepts was not to provide unjustifiable notice to the severity of suicide, but to present the severity of the problem at hand. The emerging summary suggests:

> *Knowing that DSH*[128] *is an indicator and predictor towards attempted suicide and suicide (Arkins et al., 2013), it has been recorded that 60% of the IMR in the GRD from the census, over the 3-year period had self-harmed, self-poisoned (overdosed), attempted suicide or commit suicide. Some of the health care consumers may even be accountable for all of the above. This suggests a high prevalence of DSH and poor mental health. Poor mental health has proven to be a catalyst for mental illness (Keyes, Dhingra and Simoes, 2010).*

5.1.2.7.2. Interfacility Transfer (IFT) – Upgrade psychiatric facility

'IFT-upgrade psychiatric facility' presented 135 (n) times from 2059 'presenting problem-other' incidents. This was the transport of psychiatric patients to psychiatric facilities. These health care consumers are usually referenced as requiring evaluation or admission to a psychiatric facility. In the GRD, George Provincial Hospital has a psychiatric department. Usually, patients are referred from clinics in George-to-George Provincial Hospital for evaluation or admission to a psychiatric facility. Surrounding town hospitals also refer patients with psychiatric like symptoms or diagnosed psychiatric patients to George Provincial Hospital Psychiatric Facility. If patients require further attention, they are usually referred to Cape Town in the Western Cape. There are two big government-run psychiatric hospitals in Cape Town: Valkenburg and Stikland Psychiatric Hospitals. Valkenburg is usually the more common destination for transfer from George Provincial Hospital. This type of transfer requires a 470km drive from the GRD to Cape Town. Patients are usually transported by an EC provider unless the patient is combative and requires sedative medication; which will then be transported by an Emergency Care Practitioner or Advanced Life Support in an ambulance. This analysis tells the researcher that 135 (n) health care consumers required evaluation or admission into a psychiatric facility. From a health care consumer perspective, transport and access to health care is

[128] DSH is the broad term for any self-harm and self-poisoning (DSP)

being enacted. From a communications centre, IFT provides a true reflection on people with mental illness.

5.1.2.7.3. Symptoms of psychosis

‘Symptoms of psychosis’ presented 70 (n) times from 2059 ‘presenting problem-other’ incidents. The ‘symptoms of psychosis’ that presented the most often were panic attacks, anxiety attack, insomnia and stiff person syndrome. The panic attacks and anxiety attacks had no reference whether these were frequent, the first episode or if the health care consumer was diagnosed with such. Anxiety disorders are a leading cause of disorders in the mental illness arena (Ritchie and Roser, 2018b). Notably stiff person syndrome appeared; a rare neurological disease (auto immune disease) where a person’s body pulls in to a spasm. This usually happens due to heightened sensitivity to stimuli like touch, emotional distress and noise. These stimuli cause the person to go into muscle spasms (Pretorius and Struwig, 2013).

5.1.2.7.4. Medical Condition

‘Medical condition’ presented 40 (n) times of 2059 ‘presenting problems-other’ incidents. These medical conditions were: *headaches, not feeling well, chest pains, short of breath and dizzy*. These medical problems represented actual primary health care problems. There was no reference as to whether the health care consumers were known with a mental illness.

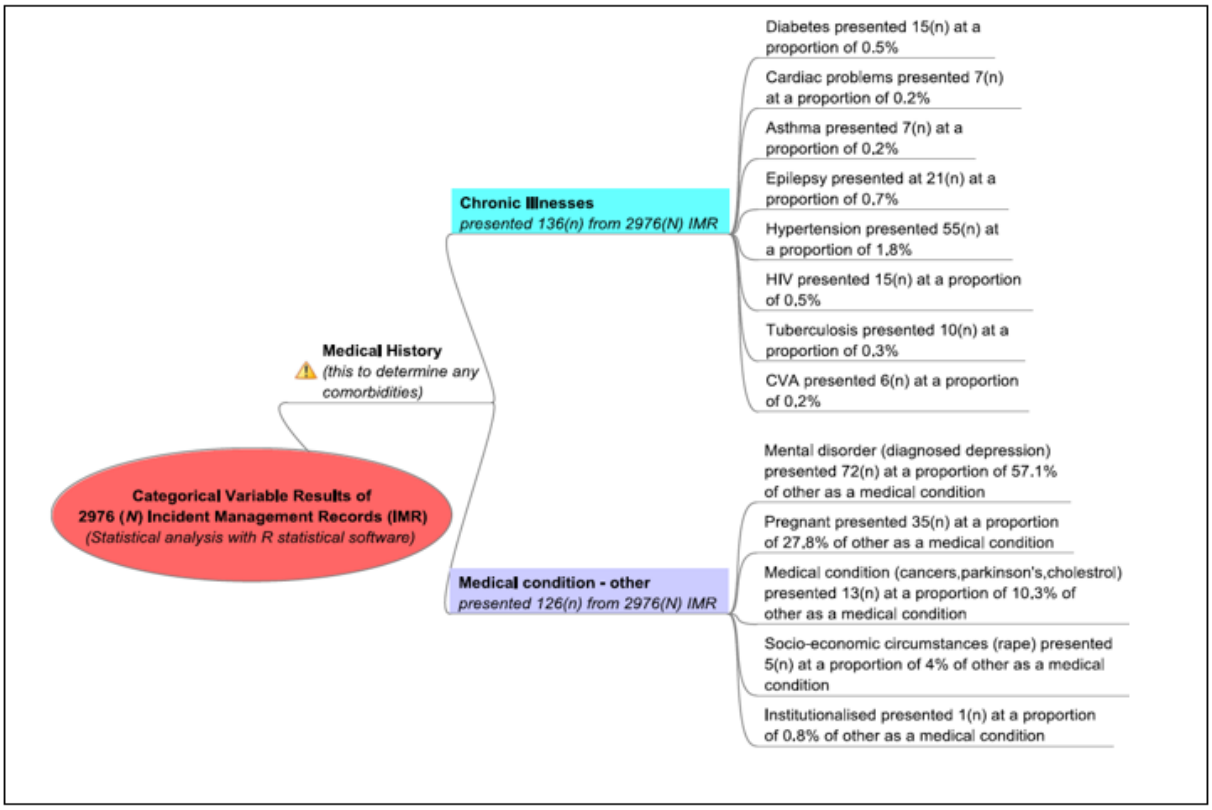
5.1.2.7.5. Socio-economic circumstances

‘Socio-economic circumstances’ presented 33 (n) times of 2059 ‘presenting problem-other’ incidents. This category noted IMR where health care consumers had experienced stress of life, a death in the family or were in emotional shock. The stand out problem in this category was Gender Based Violence (GBV). GBV is a creator for poor mental health (Kleintjes *et al.*, 2006; Commission on Social Determinants of Health, 2008; World Health Organization, 2014; Folb *et al.*, 2015). Stress, emotional shock to a hanging and a family death could all trigger poor mental health (Folb *et al.*, 2015).

5.1.3. Medical History

The medical history aimed to see if health care consumers with mental illness and mental health needs had comorbidities. This was only available if disclosed by the person.

Figure 33: Medical history findings



5.1.3.1. Chronic Illnesses

This section disclosed comorbidities. The evaluand was designed to see if there were any comorbidities with mental illness. The chronic illnesses focused on '*Diabetes', 'Cardiac problems', 'Asthma', 'Epilepsy', 'Hypertension', 'Human Immune Virus' (HIV), 'Tuberculosis' (TB)* and *'Cerebral Vascular Accident' (CVA)* (Figure 33).

'Hypertension' (n=55), 'Epilepsy' (n=21) and 'Diabetes' (n=15) presented with higher frequencies amongst the non-communicable disease whilst 'Asthma' (n=7), 'Cardiac problems' (n=7) and 'CVA' (n=6) presented in less IMR. This could suggest health care consumers didn't disclose details of chronic illness, or details were not recorded correctly.

These chronic illnesses are universal. Non-communicable diseases are diseases that are not transferable between humans. They can be hereditary, but not transferable. The non-communicable diseases that usually share a comorbidity with mental illness is cardiovascular disease and diabetes (Prince *et al.*, 2007; Bitanihirwe, 2015; World Health Organization, 2017). Systematic reviews prove that there is a strong correlation between depression, anxiety and coronary heart disease. Prince *et al*. (2007) suggests a 15%-30% increase in chance of depression after a myocardial infarction (Prince *et al.*, 2007), normally within the first month of the event. This makes comorbid depression a symptom of coronary syndromes as well as for a person who experiences a stroke (Prince *et al.*, 2007). Schizophrenia and diabetes present as a comorbidity(World Health Organization, 2020). A notable abnormality of glucose was seen before the use of antipsychotic medication as well as noted metabolic changes to the effects of typical and atypical antipsychotic medication (Prince *et al.*, 2007). Diabetes Mellitus has been the most notable comorbidity to a mental disorder. However, noncompliance of medication regime, depression and schizophrenia can exacerbate diabetes and *vice versa* (Prince *et al.*, 2007; World Health Organization, 2020).

The communicable diseases of HIV (n=15) and TB (n=10) presented in few IMR. A communicable disease is a disease that can be transferred between humans. Prince *et al.* (2007) suggest that people with mental disorders have a proven risk for HIV/AIDS as their behavioural risk factors eludes to lack of precaution through unprotected sex or communicable substance abuse needle sharing, heightening the prevalence of HIV (Prince *et al.*, 2007). The HIV/AIDS infection has direct effects on the central nervous system, causing neuropsychiatric complications like depression, mania, cognitive disorder and frank dementia (Prince *et al.*, 2007; Druss and Walker, 2011). However, with highly active anti-retroviral (HAART) HIV dementia has halved, but can create side effects including depression, psychosis and hallucinations putting people at risk of a mental disorder (Prince *et al.*, 2007). TB is a communicable disease often linked with HIV/AIDS infection causing a high prevalence of comorbidity (World Health Organization, 2006a). TB has been found to be a comorbidity to mental illness as it is exacerbated through

commune[129], while mental health users' behavioural factors presume incomplete treatment regimens (Druss and Walker, 2011). Depression has been found to be the most significant comorbidity with TB, however the lack of education towards people with mental illness is the greatest cause of comorbidity of communicable diseases and mental illness (Prince *et al.*, 2007). In this study only 25 (n) IMR disclosed a communicable disease and 111 (n) IMR disclosed a non-communicable disease. It should be noted that it is the persons' right to not disclose information they feel is impeding on their livelihood, integrity or creed (HPCSA, 2007, 2008). Archiving comorbidities with mental illness could help to alleviate comorbidity through improved treatment regimes, management and service delivery.

5.1.3.2. Medical condition - other

The option of 'Medical condition-other' presented 126 (n) times from 2976 (N) IMR. The evaluand allowed for all medical conditions to be considered. The categories are '*mental disorder', 'pregnant', 'medical condition', 'socio-economic circumstances'* and '*institutionalised'* (Figure 34).

5.1.3.2.1. Mental disorder

This 'mental disorder' represents diagnosed depression and presented in 72 (n) 'Medical condition-other' IMR. Diagnosed depression was disclosed as a chronic condition. The concept of separating depression was due to what was reflected in the IMR. The depression recorded in Minority Frequency Cases only reflected that the health care consumers were feeling depressed. By grouping the two categories then there would be 161 (n) IMR that presented with depression. This is 5% of all the IMR from the census over the 3-year period. This is a relatively large frequency of IMR (health care consumers), knowingly that depression is a huge burden on society (Folb *et al.*, 2015; Ritchie and Roser, 2018b; World Health Organization, 2018). Depression is a leading cause for DALY's lost aiding in morbidity and presenting as a leading burden of mental illness. It is estimated that 264 million people suffer from depression every day (Ritchie

[129] Commune refers to patients (people) that are institutionalised

and Roser, 2018b). Depression in S.A amongst males have totalled about 822 thousand while females have totalled 1.14 million (Ritchie and Roser, 2018b); (See Annexure 10, Graph13). DALY's provides a measurement of total burden of disease, both from years of life lost and lived with a disability (See Annexure 10, Figure 48). A lost DALY is equal to one year of healthy life lost. S.A equates to about 508 DALYs lost due to depression (Ritchie and Roser, 2018b). Knowing the burden of depression, the WCEMS has the ability to provide an archived data base of health care consumers with depression, as a rubric for raising the standards of service delivery, management and empathy.

5.1.3.2.2. Pregnant

'Pregnant' (n=35) presented as a category under medical condition other. Pregnant represented all semesters, with majority of the IMR who presented as pregnant, presented to have overdosed or substance abused. Research in KZN noted pregnant woman would DSP, suggesting a stress to life while pregnant (Ani, Ross and Campbell, 2017). This is significantly bad as the WHO recognise a countries health through maternal deaths and number of infant deaths under the age of 5 (World Health Organization, 2019). A concept that arises with pregnancies is Postpartum depression (PPD), a mood disorder that affects 10%-15% of new mothers. PPD is defined by DSM-5 not as a discrete disorder, but a sub-category of major depressive disorder (Patel *et al.*, 2012). If left untreated, a negative effect is created for child development, mother-infant bonding and eventually depressive symptoms for the child (Patel *et al.*, 2012).

5.1.3.2.3. Medical condition

'Medical condition' (n=13) presented with conditions like cancer, Parkinson's, cholesterol, COPD or meningitis as a chronic sequela. Cancer sequela can lead a person to depression (Prince *et al.*, 2007).

5.1.3.2.4. Socio-economic circumstances

'Socio-economic circumstances' (n=5) represented where Rape was disclosed in the IMR. This category was created for rape victims, that presented with DSP. S.A ranks highest in Rape statistics, averaging 1.2 per 100 000 population (Burns, 2011). Rape is

associated with poor mental health, mental illness and suicide (Prince *et al.*, 2007; Bitanihirwe, 2015; World Health Organization, 2017).

5.1.3.2.5. Institutionalised

'Institutionalised' (n=1) represented one patient (IMR) who required transport to Valkenburg Psychiatric Hospital in Cape Town. It must be noted that the Mental Health Care Act 17 of 2002 provided for deinstitutionalisation (Mental Health Care Act 17 of 2002, 2002). Case follow up would provide more answers.

5.1.4. Age and Gender

Age was produced with a histogram. Age was the only nominal variable and produced a variety of age variances. The Mean[130] Age from 2976 (N) IMR, from the census within the 3-year period was 34.2 years old. The Median[131] Age was 32 years old. Age was used as an independent variable to look at associations of interest. Age will be discussed further in the associations of interest section. From the 2976 (N) IMR, 59%(n=1763) were females and 37% (n=1107) were male. Gender and Age was used to provide relationships between the data. Gender was also used as an association of interest. The GRD has a population of 622 664, with a gender ratio of 94.1 males to every 100 females (Western Cape Government, 2019). GRD age cohorts for 2019 predict that there are 168 884 people between the ages of 0-14 years old, 402 784 people between the ages of 16-65 years old and 50 997 people 65 years and above; suggesting the dependency ratio[132] to be 54.6% (Western Cape Government, 2019). A high dependence ratio puts pressure on social systems and delivery of basic services (Western Cape Government, 2019). Social justice needs to be considered with age and gender. Nancy Fraser suggests participatory

[130] Mean is the average you get when add up all the numbers and then divide by the number of numbers you added (Manikandan, 2011).
[131] Median is the middle value in the list of numbers. To work out the median, numbers have to be in numerical order from smallest to largest. (Manikandan, 2011)
[132] Dependency ratio is the ratio as a percentage of people who are the workforce and have people dependent on them. Usually children, seniors and disabled people. (Western Cape Government, 2019)

parity[133] is required for social justice. Recognition[134], misrecognition[135] and social belonging[136] are important concepts of social justice (Fraser and Bourdieu, 2007). Participatory parity can champion a marginalised group.

5.1.5. Dispatch of Emergency Service

Dispatch of Emergency Service covered what service was utilised. There were only four options of WCEMS, Private EMS[137], South African Police Service (SAPS) and Air Mercy Services (AMS)-Helicopter. This section provided the option of stating if two services were sent to the same scene. The WCEMS was dispatched to 2960 (n) of 2976 (N) IMR from the census over the 3-year period. At 99.5% the WCEMS was always the first option. On 13 (n) occasions the SAPS was used as first dispatched emergency service, suggesting 13 (n) health care consumers (IMR) were aggressive and unmanageable. On 52 (n) occasions the SAPS was dispatched as a secondary service. This suggests that 52 (n) health care consumers (IMR) were unmanageable and the WCEMS required dual service at the persons residence. This suggests that the WCEMS and SAPS do provide a dual service with regards to unmanageable health care consumers, however does not provide whether it has been effective or not. The AMS-Helicopter presented as a secondary service 2 (n) times. When a person commits suicide by jumping from height (usually a bridge), AMS is used to retrieve the victim's body. The Private EMS was needed for 7 (n) IMR in the 3-year period, when requested for help by the WCEMS. Thus, one can state that:

> *From the research data it can be concluded that the WCEMS was dispatched majority of the time, suggesting that the WCEMS is sent to every call first and provided with a secondary service if needed, usually the police. Therefore, data analysis suggests that*

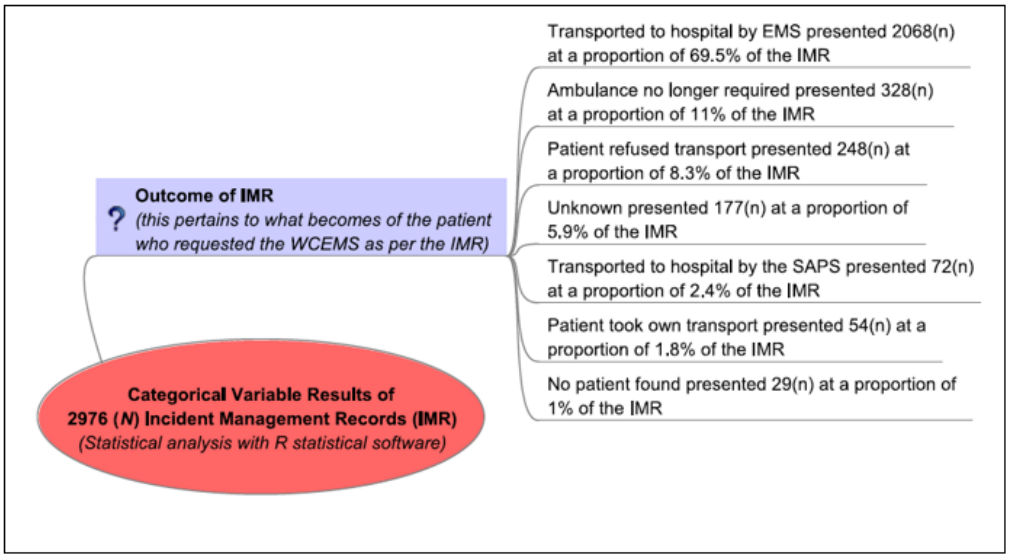
[133] Participatory parity is the equality and equity of taking part as full members of society, while interacting with others. Redistribution of resources, recognition of status, misrecognition and social belonging and presentation are the dimensions that make up participatory parity. Participatory parity is needed for social justice in society (Fraser and Bourdieu, 2007).
[134] Recognition is how people are regarded in relation to social markers (age, gender); (Fraser and Bourdieu, 2007).
[135] Misrecognition is not recognizing status in society (Fraser and Bourdieu, 2007).
[136] Social belonging is who is excluded and who is included in society (Fraser and Bourdieu, 2007).
[137] Private sector only used and requested by WCEMS if there are no available ambulances at time.

dual service is required and used on scene as per Section 40 of the Mental Health Care Act (Mental Health Care Act 17 of 2002, 2002).

5.1.6. Outcome of the IMR

The outcome status possibilities of each IMR were*: Transport to hospital by EMS; Ambulance no longer required; Patient refused transport; Unknown; Transported to hospital by SAPS; Patient took own transport; No patient found* (Figure 35). It is important to note that no ambulance EC provider 'patient care reports' were considered in the research due to incomplete documentation being done for every IMR. Usually if a health care consumer (IMR) is combative, EC providers need to ask for police assistance. Only an EC provider with advanced training can sedate a person with police assistance. This creates limitations for intermediate and basic life support EC providers.

Figure 34: Outcome of the IMR findings



From 2976 (N) IMR, 2068 (n) IMR (69.5%) were recorded as *'Transported to hospital by the EMS'* from census over the 3-year period. Significantly, only 69.5% of the IMR from the study received right 27 from the S.A Bill of Rights (Constitution of South Africa, 2005). *'Ambulance no longer required'* presented 328 (n) (11%) times from the census. No specification is provided as to why the ambulance was no longer required. One could consider stigma as a barrier to refusing transport, however no assumption can be made. Notably if a health care consumer is violent, then the ambulance status could be made

"ambulance no longer required". *'Patient refused transport'* presented 248 (n) (8.3%) times from the census. No reference is made as to why refusal of transport was made. From experience, health care consumers may not need the ambulance anymore, or may have fear. All people are different. These statistics reveal that 248 health care consumers (IMR) refused help. No reflection is made on severity of health care consumer upon refusing transport.

'Unknown' was a category created from the IMR where no reference is made to outcome status. Notably 177 (n) IMR (5.9%) from the census were *'unknown'*. This was a worrying aspect of the research. According to the constitution of S.A, this suggests that 177 (n) health care consumers (IMR) had not received their right to "access to health care" (Constitution of South Africa, 2005). No reference is made to how or why 177 (n) IMR are unaccounted for. Poor 'access to health care' induces increase in global burden of mental illness, inciting poor access to medication (Lund *et al.*, 2011, 2012). *'Transported to hospital by the SAPS'* presented in 72 (n) IMR (2.4%). SAPS usually transport combative mental illness health care consumers. This suggested 72 (n) health care consumers were too violent for EC providers, acquiring SAPS transport for combative health care consumers in reference to section 40 of the Mental Health Care Act 17 of 2002 (Mental Health Care Act 17 of 2002, 2002). Notably the 7 (n) IMR attended to by private EMS, were transported by the SAPS. *'Taken own transport'* presented in 54 (n) IMR (1.8%). This option of health care consumer taking own transport provides two questions. How severe was the person? Or, how long was the emergency service taking? *'No patient found'* presented for 29 (n) IMR. This represents health care consumers absconding from locale and is unknown if delays in ambulance arrival may have contributed to this.

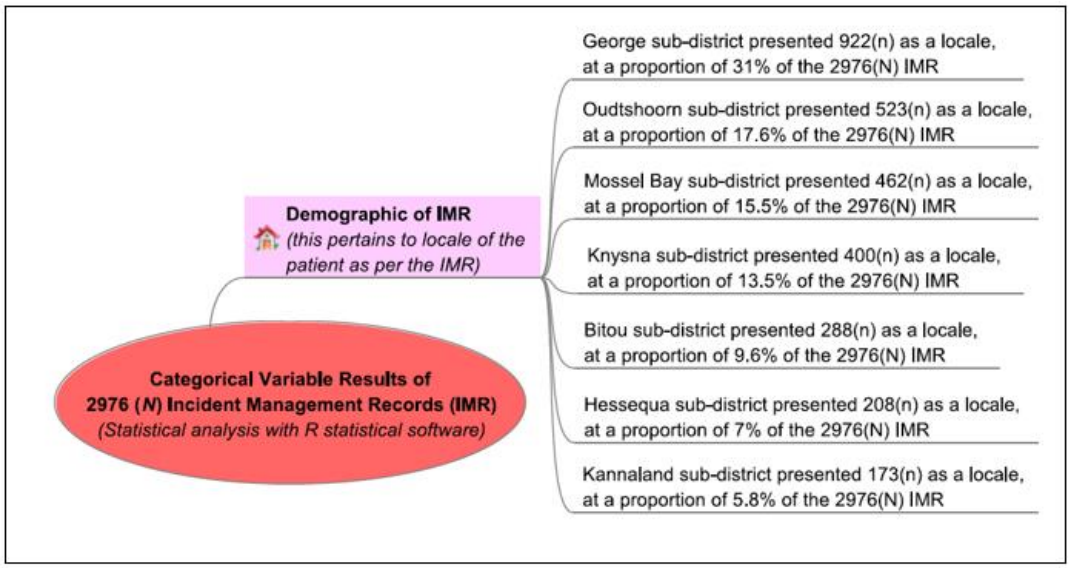
The outcome of the IMR was a significant analytic tool for this study. The concept of determining whether a health care consumer (IMR) received access to health care was the premise of this research. From the statistical analysis from the 3-year period, 69.5% of the health care consumers received access to health care from the WCEMS. A further 2.4% of health care consumers (IMR) received access to health care from the SAPS, suggesting 72 health care consumers (IMR) to be unmanageable by EC providers. This should be considered a failed option. Surely transporting a health care consumer in a

police vehicle suggests stigma, and thus doesn't provide best practice as posed by the Mental Health Care Act 17 of 2002. The statistic that presented alarming was the amount of unknown and ambulance not required frequencies. These two categories suggest 350 (n) IMR (health care consumer) had an inconclusive outcome. Alarming, almost 12% of the IMR from the census over the 3-year study were unaccounted for. Retrospective data doesn't answer these questions, but provides a description about this phenomenon. It has been suggested that people who have mental illness refuse hospital help due to liberty and stigma (Bateman, 2015), while mental health users who refuse hospital care and medicine cost the economy millions towards the burden of mental illness (Bateman, 2015). Thus, as a champion for a marginalised group, how can the outcome of these health care consumers improve, making sure those patients that want help from the EMS receive full access to health care as stated in the Constitution of S.A in the Bill of Rights (27) (Constitution of South Africa, 2005; Hassim, Heywood and Berger, 2007)

5.1.7. Demographic of the IMR

The demographic of the IMR provides the location of the health care consumer (IMR) within the GRD. The sub-district names are *George, Oudtshoorn, Mossel Bay, Knysna, Bitou, Hessequa* and *Kannaland* (Figure 35).

Figure 35: Demographic of the IMR findings

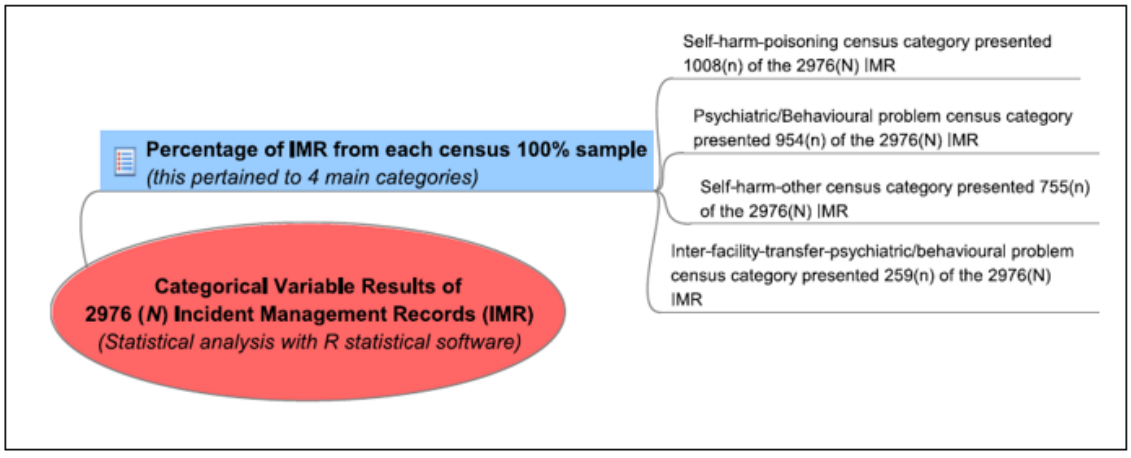


From 2976 (N) IMR, George sub-district presented in 922 (n) IMR, Oudsthoorn sub-district presented in 523 (n) IMR, Mossel Bay sub-district presented in 462 (n) IMR, Knysna sub-district presented in 400 (n) IMR, Bitou sub-district presented in 288 (n) IMR, Hessequa sub-district presented in 208 (n) IMR and Kannaland sub-district presented in 172 (n) IMR. Knowing the locale/demographic of people with mental illnesses and mental health needs allows for specialised services to be deployed at the point of need. The percentage of IMR from each sub-district provides a needs assessment to improved quality assurance and care for people already feeling stigmatised, vulnerable and misrepresented.

5.1.8. Percentage of IMR per Census category

The categories of *Self-harm-poisoning, Psychiatric/Behavioural Problem, Self-harm-other* and *IFT-Psychiatric/Behavioural Problem* were ideal categories for the census. These categories provided evidence of health care consumers with mental health needs. Notably self-harm-poisoning housed 1008 (n) IMR in the data base, while overdoses recorded in 1336 (n) IMR. A discrepancy of 328 (n) IMR (regarded as overdose) were filed in the self-harm-other category; this complicated data synthesis. Communications Centre Agents should be filing IMR correctly to improve quality governance on data-outlay and future improvement on dispatching (Figure 36).

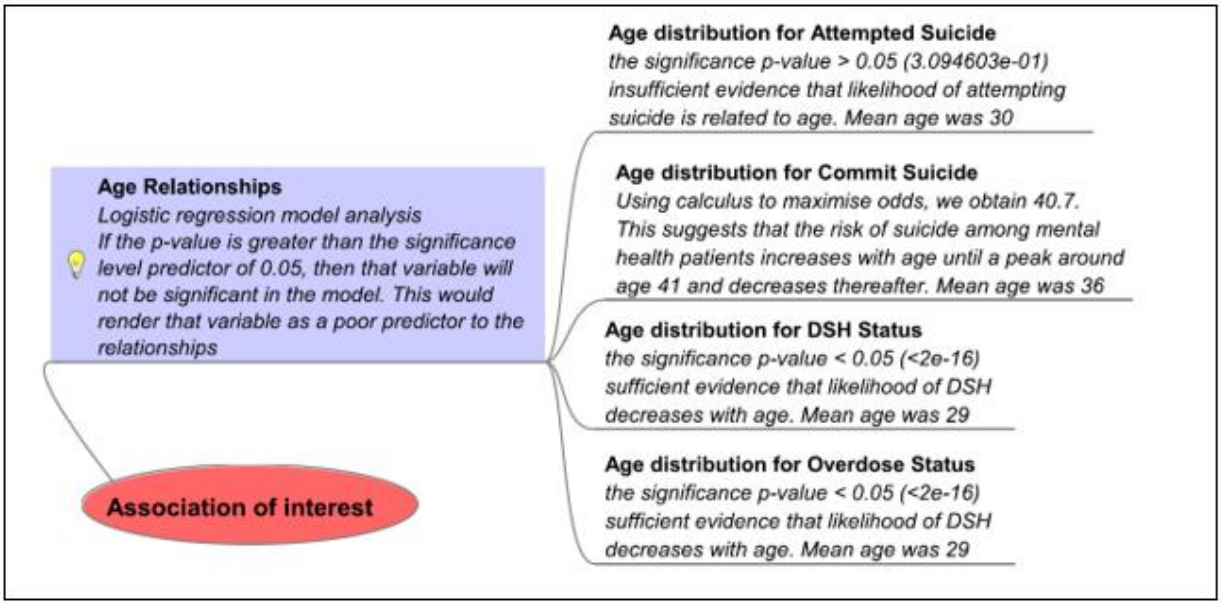
Figure 36: Percentage of IMR per Census findings



5.2. Association of interest interpretation – Age Relationships

Association of interest provided analysis of age relationships with attempted suicide, suicide, DSH status and overdose status. The concept was to analyse if age presented any significant factors or relationships to presenting problems. A logistic regression model was used to produce coefficients and p-values to form a significance value. If a p-value is greater than the significance level predictor of 0.05[138], then that variable will not be significant in the model; rendering that variable as a poor predictor to the relationships at hand. Statistical analysis on age relationships, suggested that the likelihood of attempting suicide was not related to age in this research. The p-value was greater than 0.05 (3.094603×10^{-1}) attempting suicide. This made the evidence insufficient. For committing suicide, we used calculus to maximise the estimated odds of suicide with respect to age, we obtain 40.7. This suggests that the risk of suicide among mental health patients increases with age until a peak around age 41 and decreases thereafter. Statistical analysis suggested that the likelihood of a person overdosing or committing DSH decreases with age. Both p-values for overdose and DSH were less than 0.05 (<2e-16) making this evidence sufficient in associating age (Figure 37).

Figure 37: Association of interest - Age Relationships findings



[138] The symbol used to define greater than is > Therefore p-value > 0.05;
The symbol used to define less than is < Therefore p-value < 0.05.

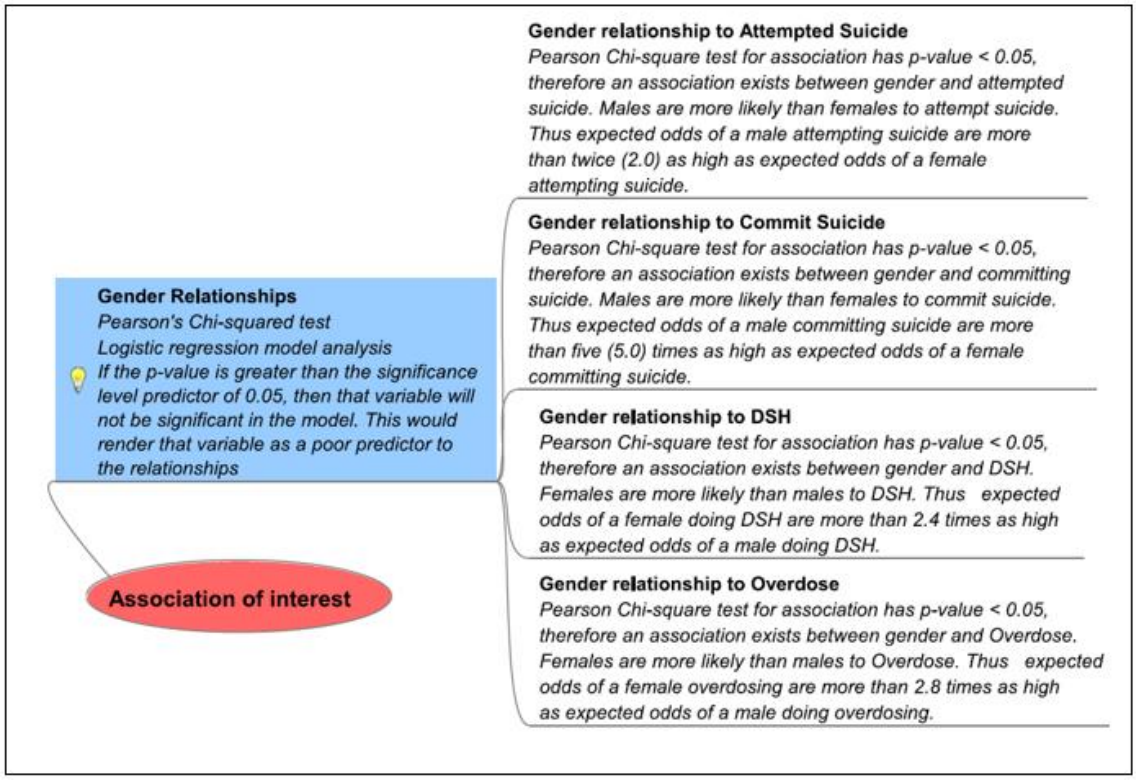
This research suggests that attempted suicide and suicide in the GRD takes on the notion of S.A and the world. It can take place at any age with no barrier or restricting variables (World Health Organization, 2014; Kootbodien *et al.*, 2020). The mean age of attempted suicides in the GRD was 30 years old, while the mean age of committing suicide was 36 years old. A study on trends in suicide mortality in S.A, suggests the mean age for committing suicide was 35 years old for male and female (Kootbodien *et al.*, 2020); presenting similar findings to this research. Globally DSH and overdose/DSP have become a leading burden in society. Overdose/DSP usually ends up as attempted suicide or suicide, often spending time admitted in hospital after the first attempt (Finkelstein *et al.*, 2015; Ani, Ross and Campbell, 2017). The mean age of health care consumers overdosing was 27.3 years of age in a study done in Paarl, Western Cape (Laubscher and Van Rooyen, 2007). The mean age of overdose and DSH for this study in the GRD was 29 years old. Interestingly a study done in Bloemfontein suggested the mean age for DSP to range from 20-29 years of age (Benedict, van Loggerenberg and Steinberg, 2019). In Northern KZN the mean age was between 21-30 years of age (Ani, Ross and Campbell, 2017). There is significance in all mean ages of the study's representing similar age groups. This can provide the WCEMS with an idea of where the target age for DSP lies. Importantly, DSP is a leading cause for attempted suicides and eventual suicide (Gunnell *et al.*, 2007; Benedict, van Loggerenberg and Steinberg, 2019). With every first attempt of DSP, suicide has been imminent, usually with a more fatal dosage or by firearm (Jamison and Bol, 2016; Ani, Ross and Campbell, 2017). The mean ages between overdose, attempted suicide and suicide in this research have a difference of 1-6 years. Early identification of health care consumers with DSH or overdose could help prevent a future attempted suicide or suicide.

5.3. Association of interest interpretation – Gender Relationships

Association of interest provided analysis of gender relationships with attempted suicide, suicide, DSH and overdose. This could provide indicators for early protection towards mental health. Male and Female was categorical variables. Pearson's Chi-squared test and a logistic regression model were conducted to analyse gender relationships. This research generated that a male was twice as likely to attempt suicide and five times more

likely to commit suicide than a female (Figure 38). S.A has reported 8 573 suicide deaths from 1997-2016; 78.1% were men (Kootbodien *et al.*, 2020). Hanging, poisoning (overdose) and firearm (in this order) were most frequent mechanisms of suicide in S.A amongst men. Poisoning (overdose) and hanging were the most frequent mechanisms of suicide amongst females (Kootbodien *et al.*, 2020). Considering the lethality of hanging and firearms, men were thought to have higher frequencies. However, a global prospectus suggests that females attempts are blatantly looked at as DSH rather than an attempt (Gunnell *et al.*, 2007; World Health Organization, 2014; Finkelstein *et al.*, 2015).

Figure 38: Association of interest - Gender Relationships findings



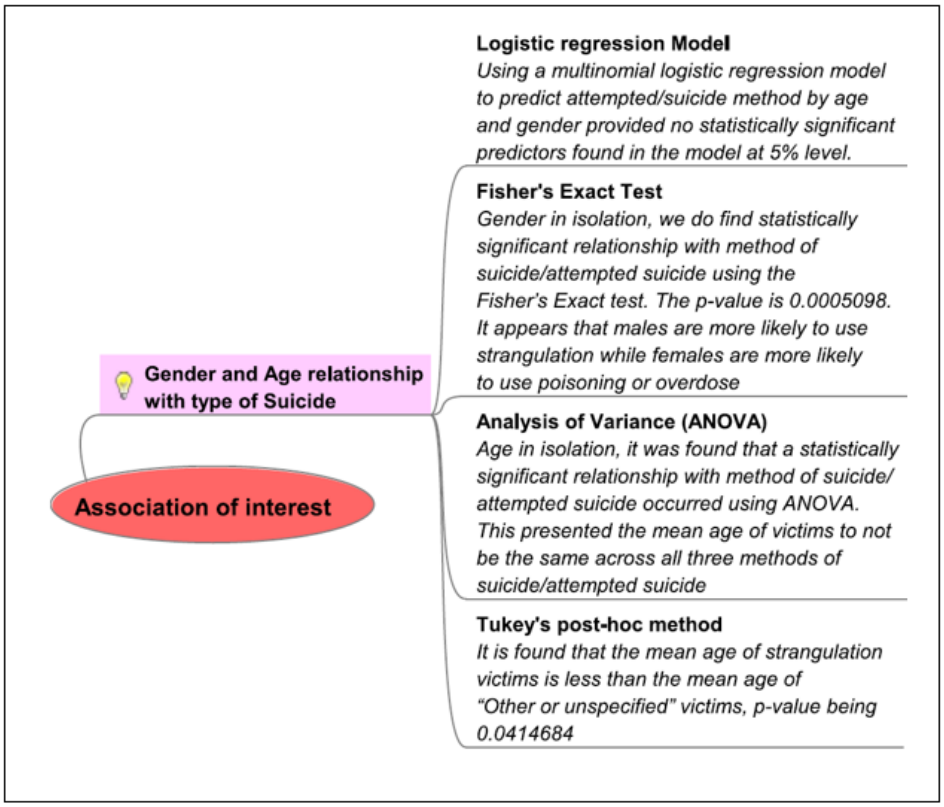
This research suggests that females in the GRD are 2.4 times more likely to DSH and 2.8 times more likely to overdose than a male. Studies concluded in Free-state, KZN and Western Cape hospitals established majority of patients who had overdosed/DSP were female, notably with significant admission to hospital (Laubscher and Van Rooyen, 2007; Ani, Ross and Campbell, 2017; Benedict, van Loggerenberg and Steinberg, 2019). In S.A females were responsible for 39.8% of suicides from 1997-2016; mainly due to overdose/DSP (Kootbodien *et al.*, 2020). In a study on DSP in a North American ED, 40

500 of the 65 784 patients were female. After discharge from hospital due to DSP, 976 had reattempted and commit suicide and 4 176 had died from problems associated to the previous DSP (Finkelstein *et al.*, 2015). It was estimated that there was 585 days between hospital discharge to suicide. From the 976 suicides 107 were teenagers and 371 died in the prehospital setting (Finkelstein *et al.*, 2015). Significance is noted as overdose was the leading presenting problem for this research. This provides DSP/overdose as a significant predictor for suicide. Secondary evidence from global studies has significantly similar findings to the associations of interest in this study (Finkelstein *et al.*, 2015; Kootbodien *et al.*, 2020). Globally, anxiety disorder, depression and substance abuse (alcohol and drugs) are the most frequent types of mental illness. Males presented with a higher frequency of substance abuse, while females presented with higher frequencies of depression and anxiety disorders (Ritchie and Roser, 2018b). Numerous studies indicate depression and anxiety as leading causes for DSH and DSP (Arkins *et al.*, 2013; Mars *et al.*, 2014; World Health Organisation, 2014; Ani, Ross and Campbell, 2017; Ritchie and Roser, 2018b); often leading to suicide (Finkelstein *et al.*, 2015). Association with early predictors (DSH/DSP) of suicide and attempted suicide, could help alleviate this burden.

5.4. Association of interest interpretation – Relationships with type of Suicide

Association of interest provided any relationship between age, gender and suicide type. A logistic regression model, Fisher's Exact test, ANOVA and Tukey's post-hoc method was conducted. Using Fisher's Exact test, it was established that males were more likely to commit suicide by hanging and females were more likely to commit suicide through overdose. An ANOVA found there was no same mean age across all types of suicide. It was also found that the mean age of victims who hung themselves was lower than the mean age of victims from other methods of suicide (Figure 39). These results suggest that the GRD has relatively similar trends to what has been predicted in S.A. Notably, men usually used hanging, while females use overdose/DSP to commit suicide (Kootbodien *et al.*, 2020). Committing suicide with strangulation death (hanging) suggests more fatality. It is significant that the GRD has similar findings to trends in suicide mortality in S.A, applying reference to impact and reduction in suicides trends.

Figure 39: Association of interest - Relationship with type of suicide findings



SUMMARY

The Garden Route District (GRD) provides a milieu for poverty and poor socio-economic circumstances. The population stands at 622 664 residents with only 189 345 households (Western Cape Government, 2019). The unemployment rate is 15.2%; socio-economic risks like slow economic growth, financial sustainability and low income with unemployment all helps provide social inequality (Western Cape Government, 2019). Poverty is present in the GRD with the Gini Coefficient[139] at 0.614 and the Human Development Index[140] at 0.71, suggesting that inequality is present in the district (Western Cape Government, 2019). The Grade 12 school pass rate is 81.3% with a learner retention of 67.6%. There is on average 15.9% teenage pregnancies yearly. The GRD

[139] Gini coefficient is a measure of inequality of a distribution. It is a scale of 1 and 0. Measuring income inequality, 0 would correspond to a perfect income equality (all people have same income), while 1 responds to perfect income inequality (Farris, 2010).

[140] Human development Index is a measure of average achievement in key human development dimensions like being knowledgeable, having a long health life and good stand of living. Standard of living is measured by gross national income per capita. It is stated that 0.3 to 0.5 is low with 0.6 to 1.0 being medium to high (Farris, 2010).

recorded 3 278 burglaries, 1 745 people driving under the influence of alcohol, 7 330 drug related crimes, 215 murders, 1 059 sexual offences and 132 road fatalities due to car crashes (Western Cape Government, 2019).

The GRD is exposed to harsh socio-economic conditions. This socio-economic profile plays precedent to underlying poor mental health and mental illness. Majority of the studies that represent mental illness, poor mental health and the condition of overdose, attempted suicide and suicide, state poor socio-economic climate and poverty to be amongst the leading causes for these problems (Finkelstein *et al.*, 2015; Ani, Ross and Campbell, 2017; Ritchie and Roser, 2018b; Benedict, van Loggerenberg and Steinberg, 2019; Kootbodien *et al.*, 2020). Low learner retention has been suggested due to poverty, unemployment and poor income in households (Ataguba, Day and McIntyre, 2015). This provides the nuance of lack of education leading to poverty and poor mental health. Poverty is increasing in S.A with income percentages usually displayed for the top 10% of the population, with the lowest 5% of the population receiving no income (Western Cape Government, 2019). These concepts mentioned above play contributing roles in inciting mental illness and poor mental health (World Health Organisation and Calouste Gulbenkian Foundation, 2014). This suggests the GRD has antagonistic factors to exacerbate the social determinants of mental health.

Statistical analysis of 2976 (*N*) IMR, presented mental illness and poor mental health as present in the GRD. Mental illness presented in 32% of the IMR from the census. Suicidal (7.6%), Depression (5%, including diagnosed depression), Substance abuse (2.6%) and Anxiety (2%) presented the highest of the minority frequency cases. Known psychiatric presented 15% of the IMR. It is known that anxiety, depression and substance abuse rank the three highest prevalence of mental illness in the world (Ritchie and Roser, 2018b). Behavioural problem presented as 37% of the IMR, with symptoms of psychosis the main concern. No reference was made to whether this would be newly diagnosed or not. Overdose presented in majority of the IMR from the census. Overdose/DSP contributed 52% of the IMR. Poison and unspecified medication were the main toxic agents. In Africa pesticide is the main toxic agent for attempted suicide and suicide (Karunarathne *et al.*, 2019), while in KZN DSP was a leading cause for hospital admissions. Secondary

episodes usually lead to ‘attempted suicide’ and ‘suicide’ (Ani, Ross and Campbell, 2017). In S.A ‘overdose’ has been suggested as a leading cause of attempted suicide and suicide (Benedict, van Loggerenberg and Steinberg, 2019). ‘Attempted suicide’ and ‘suicide’ presented for 5.8% of the IMR from the census sample over the 3-years period. ‘Strangulation death’ (hanging) was the most common method of ‘suicide’ and ‘attempted suicide’, followed by overdose. In S.A, hanging, overdose/DSP and firearm suicide are the main causes for suicide throughout the country (Kootbodien *et al.*, 2020). Associations of interest were provided for gender and age with attempted suicides, suicides, DSH and overdose. It was established in the GRD that age was not significant in attempting or committing suicide, but was significant in suggesting that DSH and overdose would decrease with age. A relationship was discovered between gender and attempted and commit suicide. It was established that males were more likely to attempt and commit suicide with the odds being two times and five times higher than a female respectively. Females where twice more likely to overdose and DSH than men. Men were also found to choose hanging as a main method for suicide, while females opted for overdosing/DSP.

The WCEMS was dispatched to 99% of the IMR from the census, over the 3-year period. SAPS was dispatched to incidents with the WCEMS to assist with combative and aggressive health care consumers; this is required (Mental Health Care Act 17 of 2002, 2002). The outcome of the health care consumers (IMR) was significantly different with 69.5% of the IMR from the census being transported to hospital by the WCEMS. SAPS transported 2.4% of the IMR from the census. Significantly 5.9% of the IMR presented as unknown and 11% presented as no longer required transport. Notably 28% of IMR presented as not being transported to hospital by the WCEMS or SAPS. The concept of unknown suggested 177 IMR (5.9%) were unaccounted for. This risks right 27, access to health care (Constitution of South Africa, 2005). Realistically the mental illness burden is costing society and governments money from medication defaulting and poor or no access to health care (Lund *et al.*, 2011, 2012).

Championing people with mental illness requires Participatory Parity, with equality and equity placed on all members of society to take part in social interaction (Fraser and Bourdieu, 2007). In order to achieve social justice, participatory parity needs to be

presents and consists of three dimensions, Redistribution of resources (economic), Recognition of status (cultural) and social belonging and representation (political). The economic dimension of redistribution of resources needs to ensure all participants have a voice and independence. The cultural dimension of recognition of status was aimed at relation to recognition of gender and age. This recognition of status has the ability to be a remedy for injustice with the misinterpretation of misrecognition; failing to not taking recognition of status seriously, for instance woman and children (Leibowitz and Bozalek, 2015). Social belonging and representation are a political dimension most important. In order to fully comprehend social justice, social belonging of who is included and excluded is important in society, allowing an individual to make justice claims (Fraser and Bourdieu, 2007; Leibowitz and Bozalek, 2015). Mental illness and people suffering from poor mental health could be nuanced from participatory parity due to stigma and isolation from society.

Critical Theory pursues human emancipation, providing liberation from social circumstances (Asghar, 2013). Critical theorists position is one of historical realism[141] and relative subjectivism[142]. (Bergman *et al.*, 2012). Historically, the mentally ill have been ostracised from society, with changes to metal illness and mental health policy only recently been adopted (World Health Organization, 2005). S.A has many historical injustices, inequality and racial divide. The very roots of the S.A history of inequality and poverty embed a prospect for mental illness development. These inequalities have created a difficulty towards access to health care, especially in the black homeland provinces during apartheid (Sobuwa and Christopher, 2019). Post-apartheid S.A has seen further development of the EMS while the practice of EC has seen an increase in development of improved prehospital care (Sobuwa and Christopher, 2019). Relative subjectivism provides the assumption that an object researched is affected by the researcher and influenced by power relations (Bergman *et al.*, 2012). The public EMS has become a champion of access to health care for the public who have been historically

[141] Historical realism suggests: "Reality is shaped by structures of social, political, cultural, economic, ethnic and gender factors" (Bergman *et al.*, 2012, pp. 545)… this suggests that reality as it is, stems from the history of injustice from the past. The present is because the past was. Historical realism's view on reality (ontology) fits the mental illness South African milieu.

[142] Relative subjectivism's theory of knowledge (epistemology) is value dependent and influenced by power relations (Bergman *et al.*, 2012, pp. 545)… this suggests knowledge is gained from the value of the participant/research and influenced through power relations and interaction.

unjustified, improving the rights of poverty-stricken South Africans. Critical theory's historical realism is embedded in the historical reality of mental illness and the EMS in S.A. The methodology of critical theory is transformative, whereby knowledge is gained through emancipation and empowering participants (Rehman and Alharthi, 2016; Bergman *et al.*, 2012). The empowerment of people with mental health needs can be through the improvement of communication centre quality assurances.

The dual continuum model of mental health by Keyes (2014) suggests that prevalence of mental illness could be quelled through positive mental health promotion and protection (Keyes, 2014). Keyes (2014) makes the empirical claim that the *de facto*[143] approach to mental illness hasn't reduced the burden or prevalence of mental illness, with mood, substance abuse disorders and anxiety all preventable problems; unprevented from early age onsets (Keyes, 2014). This model of mental health states mental health as a complete state, being more than the absence of mental illness. This authenticated mental health promotion and protection (Westerhof and Keyes, 2010; Keyes, 2014; Iasiello *et al.*, 2019). A study of mentally healthy participants (with no diagnosis of mental illness) was organized through the 1995 and 2005 waves of the Midlife in the US (MIDUS)[144], where participants were divided into six groups based on their level of positive mental health and mental illness status in 1995. It was concluded over the ten-year duration, that the chance of developing mental illness was decreased in participants who preserved or harvested high levels of positive mental health. Participants who had decline in positive mental health had increased chances of developing a mental illness (Iasiello *et al.*, 2019; Keyes, 2005).

Thus Keyes stated: "the absence of mental illness does not mean the presence of mental health, but the presence of mental illness does not imply the absence of some level of good mental health" (Keyes, 2014, pp. 183; Keyes, Dhingra and Simoes, 2010; Westerhof and Keyes, 2010). Thus, the fundamental axioms of mental health promotion and protection suggest gains in mental health decreased risk of mental illness over time-

[143] In reality, *de facto* will allude to the reality of what has been the present or norm

[144] The Midlife in the United States (MIDUS) is a collaborative and interdisciplinary investigation of patterns, predictors and consequences of midlife development in the areas of physical health, psychological well-being and social responsibility. (Radler, 2014)

promoting mental health can reduce prevalence and incidence of mental illness. Loss of mental health increased risk of mental illness over time-protecting against loss of mental health can decrease prevalence and incidence of mental illness. This made mental health dynamic over time (Keyes, 2005, 2007, 2014). This hypothesis has been strongly supported by recent publications by Keyes, Dhingra and Simoes (2010) and Iasiello *et al* (2019) suggesting that positive mental health is an important resource for recovery of mental illness (Keyes, Dhingra and Simoes, 2010; Iasiello *et al.*, 2019). Majority of the IMR from the census sample over the 3-year period provided poor mental health as the major dilemma. It is well understood that not all people with mental illness commit suicide, however a substantial amount who have, have had a mental illness (Klonsky, May and Saffer, 2016). If it is proven that positive mental health can be a predictor for positive recovery from mental illness (Iasiello *et al.*, 2019), then promotion and protection could help maintain mental illness. Provided socio-economic climates can be stabilized.

This research has provided sufficient evidence that mental illness and mental health should be concentrated on within the GRD. The percentage of IMR from each sub-district provides a needs assessment of the GRD for improved quality assurance and care for people already feeling stigmatised, vulnerable and misrepresented. A call centre agent in the communications centre doesn't have the aid of a DSM-5[145] manual and training on the mental health needs to understand the mental health needs of mental health care users, relying solely on public communication. The presentation of 2976 (N) IMR related to mental illness and poor mental health over 3-years, suggests that the WCEMS would begin to feel the burden of mental illness over time.

[145] Diagnostic manual for mental illness used in hospitals for psychiatric diagnosis

CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS

Chapter Six concludes the thesis, by bringing forward the conclusions and recommendations. A quantitative Descriptive Retrospective study methodology enabled the researcher to provide a description of the research topic. The paradigmatic lens of Critical Theory allowed for the championing of human rights. People with mental illness and poor mental health are considered amongst the vulnerable, and as such, considering their health needs and the EMS responses provides a mechanism for social justice (Fraser and Bourdieu, 2007). Keyes (2014) suggests the idea of mental health promotion and protection with a salutogenic model as an holistic approach to alleviating mental illness (Keyes, 2014). From an EMS perspective, social justice and a holistic approach to poor mental health and mental illness needs to be considered. Conclusions follow, with recommendations ending the chapter.

6.1. Conclusions

The aim of this thesis was:

> *To appraise access to health care for health care consumers who present to a public EMS with mental health needs:*

This was the formal assessment of access to health care as per the socio-economic Right 27 in the Bill of Rights in the South African constitution. This appraisal focused on how health care consumers with mental health needs (a marginalised group) are received by the public EMS, which in this case was the WCEMS. It was established that the WCEMS was dispatched to 99% of the health care consumers requiring an ambulance, with the SAPS being used as a secondary service (usually for combative health care consumers). This suggested that the WCEMS and SAPS followed the Mental Health Care Act 17 of 2002 (Mental Health Care Act 17 of 2002, 2002). The effectiveness of this dual service is unknown. The WCEMS transported 69.5% of health care consumers (IMR) with mental health needs, while the SAPS transported 2.4% of health care consumers (IMR) deemed unmanageable by the EMS. Statistically this suggests that 71.9% of the health care consumers from the census over the 3-year study received access to hospital from an Emergency Service dedicated to mental health needs. Alarmingly 28% of the health care

consumers (IMR) who required the WCEMS were not transported to hospital. Notably 5.9% was unknown, 11% no longer required the ambulance, 8.3% refused transport, 1.8% took own transport and 1% of the health care consumers were not found. The data could not explain why 28% of the health care consumers didn't receive transport to hospital. However, stigma towards police transport should not be ruled out. Qualitative research would be required to illuminate answers as to why 28% of the health care consumers didn't receive transportation to hospital. As the aim states, access was appraised and access is received by health care consumers with mental health needs. The retrospective data limitations do not give answers to these types of questions.

Through completion of this thesis, three of the four objectives could be achieved, however all four would benefit further research through a mixed methods or qualitative methodology. Objective one was to:

Quantify the burden of mental illness cases for the EMS:

This was achieved by noting the more common mental illness that presented in the research data. Alarmingly a poor mental health burden presented a larger frequency than mental illness. The burden of mental illness was quantified at 39.6% (N=1178) of the health care consumers (IMR) from the census over the 3-year period. Health care consumers (IMR) with a presumed poor mental health burden presented in 59.7% (N=1776) of the IMR. Poor mental health is an indicator for eventual mental illness (Keyes, Dhingra and Simoes, 2010). The burden of mental illness cases was quantified. Objective two was to:

Describe the problem space that emergency medical services are located in with regards to care and transportation of health care consumers with mental illness:

This was achieved by noting the need for SAPS as a dual service for combative mental health care users (involuntary). The problem space illuminates when negotiating the concept of health care consumers refusals, not founds and unknown outcomes of health care consumers. This problem space could be stigma from the criminalisation of the ill and the fear of human rights violation through SAPS transport of involuntary mental health care users. From retrospective data, the exact problem spaces could still be undiscovered, as retrospective data only provides what has been recorded. This could

pose more questions and further research. Notably a mental illness problem space is prevalent, with evidence that all common mental illness is present in the GRD. Thus, one needs to consider praxis in the aspects of how to care, manage and transport health care consumers with mental illness conditions. More training from a tertiary level of education could equip new EC providers with knowledge in mental illness sequela. Objective three was to:

> *Describe the problem space that emergency medical services are located in, with regards to deliberate self-harm and poor mental health:*

It is proven that poor mental health can induce mental illness (Keyes, Dhingra and Simoes, 2010; Keyes, 2014). The problem space that provided the greatest evidence was the frequency of overdose/DSP. Effectively poor mental health provided majority of the IMR, with 59.7% of the health care consumers (IMR) presenting with a poor mental health emergency. Significantly, 'overdose' accounted for 52% of the IMR (health care consumers) from the census who presented to the WCEMS over the 3-year period. Overdose/DSP is proven to be a leading cause of attempted suicide and suicide (Ani, Ross and Campbell, 2017). 'Attempted Suicide' and 'Suicide' accounted for 5.8% of the IMR from the census combined. 'Suicide' averaged at 2.8 suicides a month in the GRD over the 3-year period. These percentages locate the EMS in a challenging space with regards to poor mental health and DSH. Postulation is needed on how to deal with this problem space. Objective Four was to:

> *Investigate the association between EMS practice and health care consumer poor mental health, deliberate self-harm and mental illness burden*:

This objective was not fully achieved due to the limitations of the retrospective data used in the study. Further research involving collection of new data would be needed to shed lighter on these associations. Through association it was found that Emergency Medical Care praxis is imperative to help, care and provide emergency (acute) care to health care consumers with mental health, DSH and mental illness emergencies. The question posed for this thesis was:

How can the Emergency Medical Services increase its value proposition for access to health care for health care consumers suffering from mental illness, poor mental health and deliberate self-harm?

Effectively value proposition looks at what makes a company or service relevant to a customer. Theoretically this suggested how could the EMS improve its attractiveness to the health care consumers with mental illness, poor mental health and DSH. This thesis quantified people regarded to have mental illness and poor mental health who presented to the WCEMS. From the census of 2976 (N) IMR, 52% of health care consumers (IMR) 'overdosed' and 2.8% (IMR) 'commit suicide', hanging as the main mechanism for suicide. Furthermore, health care consumers with depression, suicidal ideation, schizophrenia, bipolar disorder, autism, anxiety, PTSD and dementia all presented in the census over 3-years (2017-2019). The census illuminates the locale needing majority of specialised treatment and management for an underestimated burden. The WCEMS have a large frequency of health care consumers from the GRD who have overdosed/DSP, suggesting attempted suicide and suicide could follow. Significantly, knowing that mental illness and poor mental health is present in the GRD adds value proposition. Knowing suicide could be a final outcome, monitoring and managing health care consumers who overdose/DSP should be considered. The concept of "theory of planned behaviour" (Ajzen, 2011) could simplify this burden through the WCEMS communications centre monitoring the behaviour of health care consumers with mental illness, poor mental health and DSH. This predictability of observed behaviour could provide a rubric for an improved and destigmatized approach for access to health care for health care consumers with mental health needs.

6.2. Recommendations

The recommendations below are four categories the researcher feels would improve participatory parity and enhance mental health and mental illness awareness. These categories are: *Recommendations from international laws; Recommendations of mental health promotion and protection; Recommendations for further study; Recommendations to improve EMS value proposition.*

6.2.1. Recommendations from international law

Two concepts from an Australian and USA EMS perspective were illuminated. In Australia, more specifically in the Australian Capital Territory, a law was passed in mental health legislation. This law provided approved paramedics (EC providers) of the state of ACT, the powers of apprehension (Bradley, Townsend and Eburn, 2018). The powers of apprehension are usually held by police, and provide the ability to apprehend a person. In this situation, these powers provide the ability to apprehend a mentally ill person who is refusing management and transport, but requires urgent help (Bradley, Townsend and Eburn, 2018). An EC provider is seen to have greater ability to make a mental illness diagnosis than a policeman (Bradley, Townsend and Eburn, 2018; Shaban, 2018). Apprehending a person removes rights, however if an involuntary mental health care user needs urgent attention, apprehension could save that person's life or a life of a bystander (Bradley, Townsend and Eburn, 2018). Importantly, substance abuse in S.A is rife (Stein and Bateman, 2007; Lund *et al.*, 2012), being a co-morbidity of mental illness. The National Institute on Drug Abuse (2020) state that many individuals who develop a substance abuse disorder, usually diagnose with a mental disorder (National Institute on Drug Abuse, 2020). This statement alone raises the question: when should paramedics invoke incapacity/incompetence? The forced provision of care and transportation is not equal to apprehension.

The USA has established guidelines (Regions Hospital Emergency Medical Services, 2000) for restraining involuntary mental health care users without the need of police dual service, as in S.A. This protocol provides relevance around restraint for involuntary mental health care users (Van Huyssteen, 2016). As mental illness is a growing burden on society, the need for a more effective and efficient handling of affairs is required for health care consumers with mental health needs requiring the EMS. Understandably both countries (Australia and USA) have put in place procedures to alleviate the need for police with involuntary mental health care users. A protocol to deal with mental health care users could help alleviate stigma and poor outcomes associated with mental illness and poor mental health. The initiative has been made to put laws up for mechanical health care consumer restraint, however there seems to be no initiative to invent a set prehospital

EMS mental illness protocol. Australia has taken huge steps in the powers of apprehension, teaching EC providers from a tertiary level to manage and treat health care consumers with mental health needs and emergencies (Shaban, 2018). Eliminating the need for police on incidents as such could alleviate stigma around mental illness. Importantly, both these concepts would require further study. It is recommended that these two concepts should be looked at to improve the human rights of health care consumers with mental health needs. Annexure 11 provides a concept of restraint protocol from the USA that allows for no police presence. This would be an alternative to powers of apprehension as in Australia.

Section 40 of the South African Mental Health Care Act (17 of 2002), in terms of governance for out-of-hospital management for voluntary and involuntary mental health care users (Mental Health Care Act 17 of 2002, 2002) makes huge previsions for in hospital patients, while little emphasis encompasses elaborate guidelines for prehospital treatment. The Mental Health Care Act of 2002 (section 40) states that in the case where a mentally incapacitated person is seen to be of harm to themselves or their surroundings, the South African Police service (SAPS) must be contacted for assistance in relation to restraint (mechanical or chemical). The SAPS and the Emergency Medical Provider will transport the health care consumer to the appropriate facility (Parliament of South Africa, 2002; Thom, 2003). The HPCSA further incorporated that safety of the EC provider is prioritized; de-escalation of the situation should be priority; Appropriate restraint should be used (chemical or mechanical); safe dosages of chemical restraint must be used, while mechanical restraint should not be used for longer than 30 minutes; immediate transfer to appropriate facility (HPCSA, 2017). USA law on restraint allows for autonomy and provides guidelines to restrain a person under the headings Indications, Precautions, General restraint procedures, Advanced Life Support Care, Paediatric considerations, Pregnancy considerations and Documentation requirements (Regions Hospital Emergency Medical Services, 2000). These guidelines are precise compared to the guidelines provided by the South African Mental Health Care Act (17 of 2002). This could be an alternative.

6.2.2. Recommendations for mental health promotion and protection

Mental health promotion and protection is a concept championed by Keyes. Keyes (2014) makes the suggestion that to alleviate mental illness is not to cure it, but to prevent it through mental health promotion and protection (Keyes, 2014). Theoretically Keyes suggests that poor mental health can lead to mental illness, and that positive mental health is a good predictor for mental illness recovery (Keyes, Dhingra and Simoes, 2010; Keyes, 2014; Iasiello *et al.*, 2019). As an attempt to alleviate the burden of mental illness, the promotion and protection of mental health could provide good prediction of the level of mental illness increase and decrease in society. The two fundamental axioms of mental health promotion and protection for addressing mental illness and mental health needs suggest that:

> *Gains in mental health decreased risk of mental illness over time, whereby promoting mental health can reduce prevalence and incidence of mental illness. Loss of mental health increased risk of mental illness over time, whereby protecting against loss of mental health can decrease prevalence and incidence of mental illness. This made mental health dynamic over time (Keyes, 2005, 2007, 2014).*

Promoting and protecting mental health in a poverty-stricken country like S.A could help alleviate the mental illness burden. Mental health promotion and protection won't eradicate mental illness, but will make it more manageable for health care consumers and EC providers. Participatory Parity (Fraser and Bourdieu, 2007) could help to solidify this concept. A term in Australia that has become synonymous with mental health promotion and protection, is 'promoting self-agency'. 'Self-agency' is described as how individuals maintain homeostasis through good physical and mental health, prevention of illness and accidents and managing acute care and chronic care, all while maintaining social and psychological goals (NSW Mental Health Commission, 2014). Knowingly that people who experience mental illness, still have capacity to influence their health outcomes (NSW Mental Health Commission, 2014). A concept of recovery linked to self-agency is e-health, an online portal that assesses peoples mental health and provides a platform for better understanding of the mental illness situation for the mental health care

user (NSW Mental Health Commission, 2014). Ideally this would promote and protect positive mental health.

6.2.3. Recommendations for further study

For further study it is recommended that a qualitative methodology be added to this research, creating a mixed methods combination research. There was some grey area with analysis of the data. Having the qualitative dimension, the inferences that are produced in the quantitative dimension can be answered by EC providers or communication centre call agents (dispatchers). This grey area could be decreased by EC providers or dispatchers. Subjectively a whole new research could be developed to trace the transport and management of a health care consumer with mental health needs. This could follow a process tracing, case study or qualitative dimension. The health care consumers perspective could help alleviate the problem space with regards to management and transport of health care consumers with mental health needs. Alternatively, a needs assessment for mental health praxis among EC providers could be relevant. It would be valuable to research the impact of education provided around mental illness in the Emergency Medical Care milieu, especially from a tertiary education perspective.

6.2.4. Recommendations to improve EMS value proposition

The recommendation to improve value proposition for the EMS with regards to access to health care for health care consumers suffering from mental illness, poor mental health and DSH is important. The WCEMS finds themselves in a problem space of DSH, Overdose, attempted suicides and suicides. Notably many health care consumers who had DSH or overdosed/DSP were recurring visitors for the WCEMS. Yearly, overdoses and DSH keep the WCEMS busy, transporting health care consumers to hospital and back for recurring mental health issues. By consistently transporting and managing these health care consumers without trying to promote or protect mental health provides a vicious cycle. For this, the researcher has created a DSH screening assessment tool, adapted from Safe T suicide assessment tool (American Psychiatric Association, 2012b). The idea of this tool is to provide evidence on recurring DSH as a predictor for poor mental

health and eventual mental illness. This screening tool could quantify the need to promote and protect mental health. By knowing the mental health burden through frequency of DSH, one could develop a system to then promote and protect these health care consumers mental health, to alleviate plausibility of mental illness development.

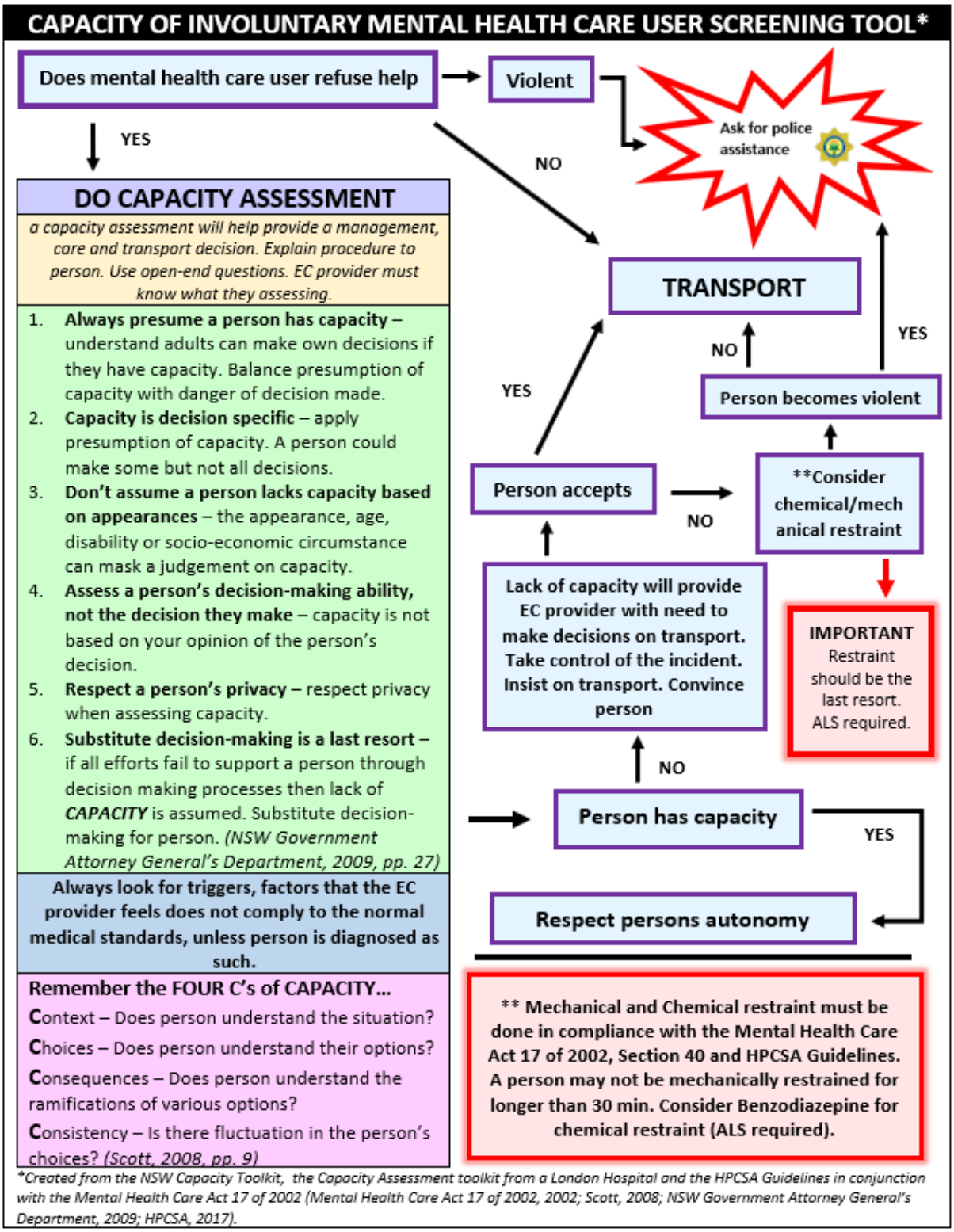
The concept of such screening tool is to validate when the health care consumer begins to become more serious. Triage will provide the idea of worsening, suggesting that the person has developed further with poor mental health. The increase in severity will suggest that the need for relief outweighs the severity of DSH (Arkins *et al.*, 2013). Using this screening tool would be simple and only requires following the questions in each Block. Each Block would fall as an individual Block in the screening tool and doesn't require answering Block A to get to Block B, but follows in a flow chart fashion. The aim of this tool is simply to record the severity of DSH per health care consumer, as to monitor and assess for suicidal ideation. Knowing the severity and progression of DSH amongst GRD health care consumers could help alleviate suicide risk. The screening tool would require further study and research and can be used by dispatchers and EC providers (See Annexure 12 for EMS DSH screening tool).

To further value proposition, the concept of a *'Capacity and involuntary transport'* screening tool has been developed (see Figure 40). The aim is to assess the capacity an involuntary mental health care user has to make decisions, to determine the care, management and transport needed. Capacity is a legal word that looks at the ability of an adult to make decisions for themselves (NSW Government Attorney General's Department, 2009). A capacity screening tool for EC providers for involuntary mental health care users could help alleviate or lighten the need for dual service of police and EMS at incidents as per Section 40 of the Mental Health Care Act 17 of 2002 (Mental Health Care Act 17 of 2002, 2002). Involuntary doesn't necessarily mean the mental health care user is violent, but could just feel stigma and need persuasion to attend the hospital. Mental health care users who are violent and pose a risk to themselves and others would still require police assistance. The screening tool looks at the principles of a capacity assessment while providing the four C's of Capacity to guide the EC provider. In Chapter 2 section *2.1.5. Considering Capacity with Mental Illness*, a brief model and

break down on how a capacity assessment works; examples of questions used to assess capacity is also provided. The screening tool follows prompts and pathways based on the situation and is self-explanatory. The screening tool is created from the NSW Capacity Toolkit, the Capacity Assessment toolkit from a London Hospital and the HPCSA Guidelines in conjunction with the Mental Health Care Act 17 of 2002 (Mental Health Care Act 17 of 2002, 2002; Scott, 2008; NSW Government Attorney General's Department, 2009; HPCSA, 2017).

Importantly, improvement is needed with data capturing. Improved quality governance with IMR management and creation could enhance the WCEMS experience for a health care consumer with mental health needs. When health care consumers are registered to the system, addresses and types of mental health needs that are required should be noted. This could provide a blue print similar to the theory of planned behaviour, whereby the WCEMS could cater to the needs of health care consumers through predictability on presentable behaviour over time (Ajzen, 2011). This could aid in improved access to health care while providing a destigmatized approach to access to health care. There seems to be a need to document 'deprivation data' and publish quarterly reports for public consumption. This will create transparency, ensuring quality assurance and improved services for health care consumers with mental health needs. A call centre agent in the communications centre doesn't have the aid of a DSM-5 manual to accurately understand the incident and relies on the health care consumers communication. This suggests that more dispatcher training could be required to provide quality assurance to access to health care for health care consumers with mental health needs.

Figure 40: Capacity of Involuntary Mental Health Care User screening tool



Created from the NSW Capacity Toolkit, the Capacity Assessment toolkit from a London Hospital and the HPCSA Guidelines in conjunction with the Mental Health Care Act 17 of 2002 (Mental Health Care Act 17 of 2002, 2002; Scott, 2008; NSW Government Attorney General's Department, 2009; HPCSA, 2017).

CONCLUSION

Finally, it can be stated that mental illness and poor mental health is prevalent in the GRD. Mental illness and poor mental health have maintained from 2017 to 2019 in the GRD from an EMS perspective. Poor mental health stagnates mental enthusiasm and antagonises mental illness. Mental illness is present in the Western Cape (Folb *et al.*, 2015), with a quantifiable number of health care consumers with mental health needs present in the GRD. Significantly, mental illness presented to the WCEMS over the 3-year period from the census of 2976 (N) IMR. This is important as it provides evidence that the WCEMS needs to be able to manage and transport health care consumers with mental illness emergencies. Notably, section 40 of the Mental Health Care Act 17 of 2002 provides a poor protocol for EC providers to handle involuntary mental health care users (Mental Health Care Act 17 of 2002, 2002). The dual service of SAPS and EMS, provides stigma and could be the cause of 28% of the health care consumers not using the WCEMS after requesting EMS service. Due to this a prehospital protocol (Van Huyssteen, 2016) to manage health care consumers with mental illness and poor mental health needs, should be considered. This could alleviate the risk of stigma. It should also be noted that no research is present on the long-term effects of Covid-19 on mental illness and poor mental health. This could change the presence of mental health altogether. The EMS sees mental illness but have no vision (strategy) to alleviate it. This vision could be the promotion and protection of mental health as a predictor for mental illness prevention and recovery through capacity assessment and self-agency promotion (NSW Government Attorney General's Department, 2009; Keyes, Dhingra and Simoes, 2010; Keyes, 2014; NSW Mental Health Commission, 2014). The burden of mental illness requires team work and an effective protocol to ameliorate human rights and attenuate stigma from an EMS perspective. This study demonstrates the EMS burden of mental illness and related exposure. It represents a critical first step in problem-space definition upon which a determination of need for EMS responses can be based.

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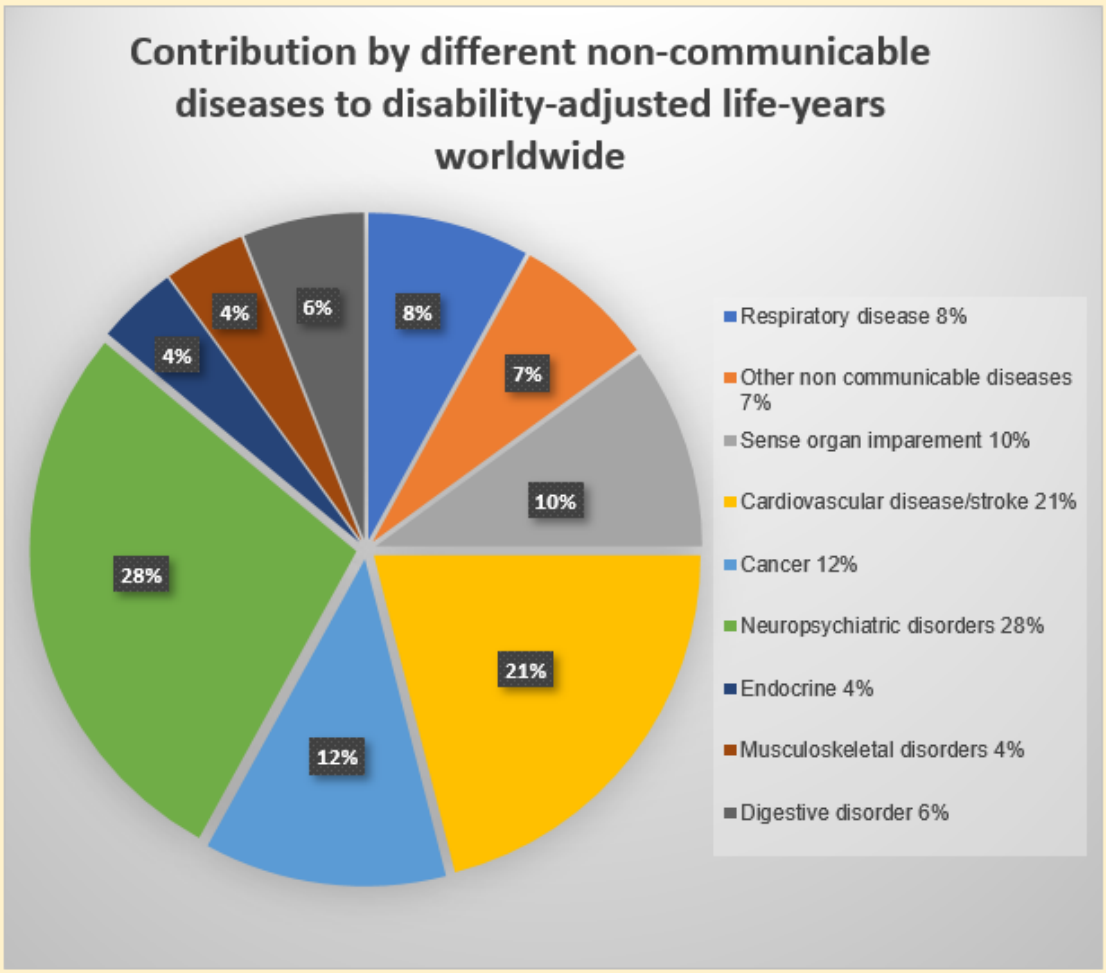
ANNEXURES

Annexure 1: Contribution of Neuropsychiatric disorders to DALY worldwide



(Prince *et al.*, 2007)

Annexure 2: Development of a data collection instrument (Scriven, 2007b)

Development of the data collection instrument adapted from Scrivens Evaluation checklist methodology (Scriven, 2007a; *Scriven, 2007b)*

Foundations	1. Background and Context 2. Descriptions and Definitions 3. Consumers 4. Resources 5. Values
Sub-Evaluations	6. Process Evaluation 7. Outcome Evaluation 8. & 9.Comparative Cost-Effectiveness 10. Exportability 11. Overall Significance

1. ***Background and context***:
This is stipulated in the document and is substantiated in the background to the research, thus on short the need to appraise promotion of access to health care for health care consumers with mental health needs.

2. Descriptions and Definitions:
This is describing the evaluand or instrument used to do the research. Each section of the data collection instrument covers the questions who, what, where, when, why. Health care consumer is also referred to as patient in this report.

Requisition No. / Date	Tick the appropriate box Fill in the Requisition No. Fill in the date. Fill in age. Specify where possible.	Triage Colour B R O Y G

This section of the checklist states instructions and focuses on the severity of the patient (Triage). Requisition number is the number given to the Incident Management report.

WHAT IS THE PRESENTING PROBLEM AND HISTORY OF PATIENT?

Known Psychiatric	Substance Abuse
Schizophrenia	Anxiety
Bipolar disorder	PTSD
Autism	Delirium
Depression	Alzheimer's
Suicidal	Dementia
Behavioral Problem:	
Overdose:	
Commit Suicide:	
Attempted Suicide:	
Other:	

Any other Medical condition?	
Diabetes	Hypertension
Cardiac problems	HIV
Asthma	TB
Epilepsy	CVA
Other:	

Specify type if applicable

Here we are looking at the types of most common problems that present to the WCEMS daily regarding patients with mental illness. The concept of the other usual diseases is also present in this

section to present any comorbidities with mental illness. These presenting problems are synonymous with how a patient with mental health needs will be recorded. This section explains to the researcher what type of mental health needs are most prevalent

WHAT IS THE AGE, RACE AND GENDER OF THE PATIENT?		
AGE		Unknown
GENDER		
Male	Female	Unknown

This next section of the checklist is necessary to distinguish between the age and gender to have a holistic view of burden of mental illness.

WHAT EMERGENCY SERVICE IS DISPATCHED?			
Private EMS	WC Gov. EMS	SAPS	AMS Helicopter

The next section is pertinent to understand where the need is lying. It is important to understand that only these four options are available for dispatch, prompting the need to distinguish how the access was chosen.

WHAT IS THE DEMOGRAPHIC AND OUTCOME OF THE PATIENT?

Transported to hospital by EMS	Transported by SAPS	Patient refused transport
Patient took own transport	Ambulance no longer required	Unknown
		No patient found

George	Plettenburg
Knysna	Uniondale
Mosselbay	Riversdale
Heidelberg	Ladismith
Carlitzdorp	Oudtshoorn
Dysselsdorp	Other:

FILL IN SUBURB UNDER EACH TOWN AND NAVIGATION CATEGORY BELOW

This next section is important as the researcher will be able to ascertain what area in the garden route the patient has come from, but also how the patient was further dealt with and transported, as per Section 40 of the mental health care act. This section is where the questions will be asked and answered. Are health care consumer with mental health needs receiving access to health care from an EMS perspective.

3. Consumers:

The impactees of this program would be the patients requiring mental health care and access to health care. The consumers that will be targeted are the patients with a marginalized voice, to championing access to health care and de-stigmatization.

4. Resources:
The resources available to be used is the communications centers electronic archives, presenting a retrospective data over three years. This data will have a clear illumination on the topic at hand, without having to reposition and use prospective data. The captivation of using the communications Centre is the positioning. One Centre function for the 11 towns in the garden route conclusive of all the patient report forms.

5. Values:
Valuing the evaluands, comes from the experience gained working in such a constraint work environment, that the necessity to find what is needed through a critical lens, will add value to the evaluands. The need to be straight forward and uncomplicated will set the criteria. For a master's study, the need to evaluate to aid in findings will present the value of the evaluand if the study can be presented in an uncomplicated manor then the evaluand would serve its purpose. The evaluand needs to find the answer to the research question.

6. Process Evaluation:
The evaluation of the process and the evaluands is discovered through a pre-test. Using retrospective data, one could use a previous patient report form to fill out a checklist. The evaluand will prove successful once data collection is scrutinized, weighing up proportions and associations.

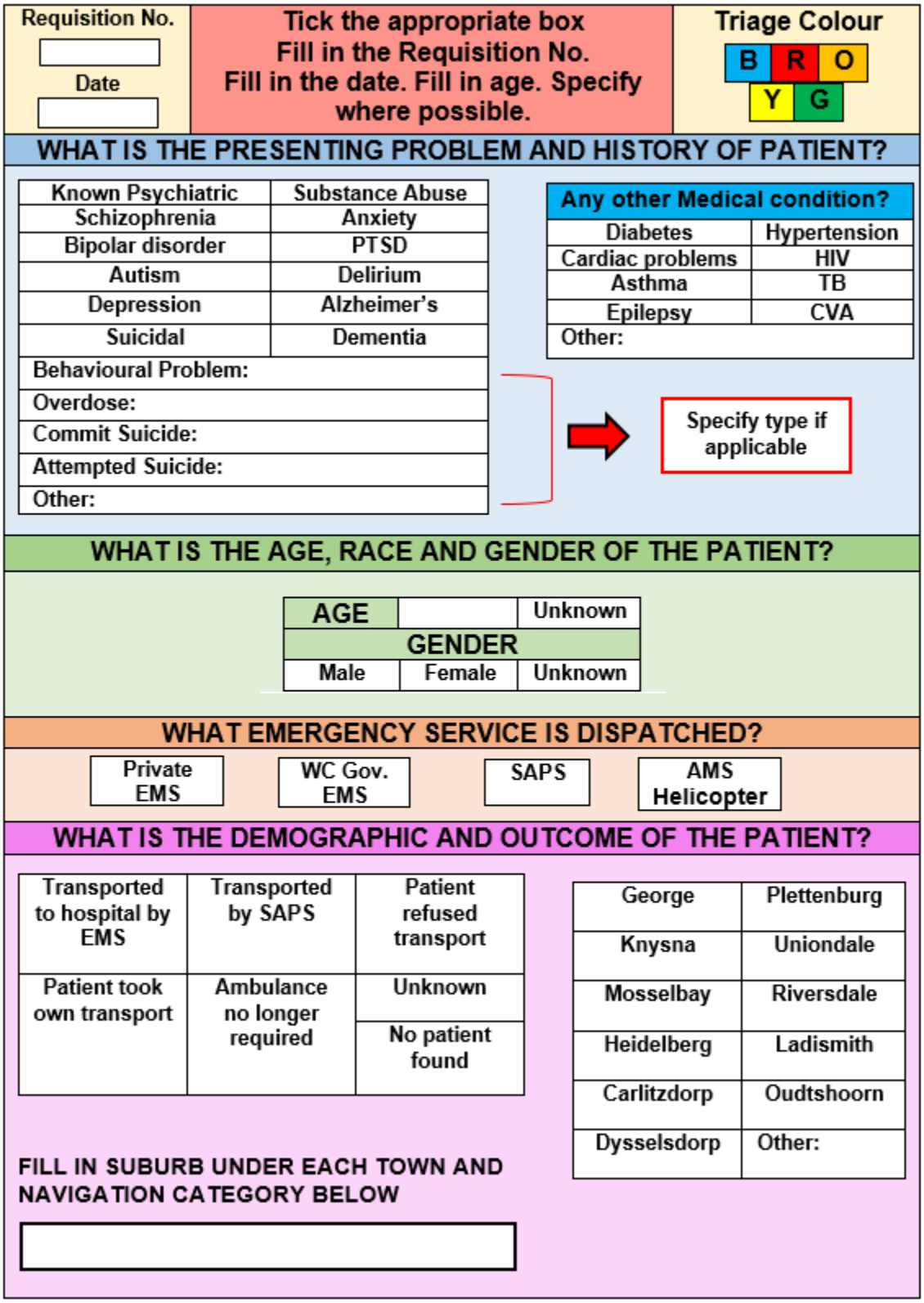
7. Outcome Evaluation:
The outcome evaluation of the research instrument will prove over time, suggesting that the simpler the concept the easier to enroll.

8 and 9. Cost effectiveness:
The cost of this evaluand will be noted with statistician scrutiny, however no cost was used to create or use. The printing of paper will be costly.

10. Exportability:
The simplicity of the evaluand makes it self-explanatory, which is precisely what is needed to export out the data collection tool to aid in further and more data collection.

11. Overall Significance:
The need to develop a simple instrument to evaluate the evaluands at a cost-effective price that works which predicts the closest outcome to answering the research question will be the clinical significance.

Annexure 3: Data Collection Instrument



Requisition No.	Tick the appropriate box Fill in the Requisition No. Fill in the date. Fill in age. Specify where possible.	Triage Colour B R O Y G
Date		

WHAT IS THE PRESENTING PROBLEM AND HISTORY OF PATIENT?

Known Psychiatric	Substance Abuse
Schizophrenia	Anxiety
Bipolar disorder	PTSD
Autism	Delirium
Depression	Alzheimer's
Suicidal	Dementia
Behavioural Problem:	
Overdose:	
Commit Suicide:	
Attempted Suicide:	
Other:	

Any other Medical condition?	
Diabetes	Hypertension
Cardiac problems	HIV
Asthma	TB
Epilepsy	CVA
Other:	

Specify type if applicable

WHAT IS THE AGE, RACE AND GENDER OF THE PATIENT?

AGE		Unknown
GENDER		
Male	Female	Unknown

WHAT EMERGENCY SERVICE IS DISPATCHED?

Private EMS	WC Gov. EMS	SAPS	AMS Helicopter

WHAT IS THE DEMOGRAPHIC AND OUTCOME OF THE PATIENT?

Transported to hospital by EMS	Transported by SAPS	Patient refused transport
Patient took own transport	Ambulance no longer required	Unknown
		No patient found

George	Plettenburg
Knysna	Uniondale
Mosselbay	Riversdale
Heidelberg	Ladismith
Carlitzdorp	Oudtshoorn
Dysselsdorp	Other:

FILL IN SUBURB UNDER EACH TOWN AND NAVIGATION CATEGORY BELOW

Annexure 4: Ethical Clearance Certificate CPUT, CPUT/HW-REC 2019/H17

Cape Peninsula
University of Technology

HEALTH AND WELLNESS SCIENCES RESEARCH ETHICS COMMITTEE (HWS-REC)
Registration Number NHREC: REC- 230408-014

P.O. Box 1906 • Bellville 7535 South Africa
Symphony Road Bellville 7535
Tel: +27 21 959 6917
Email: simonsy@cput.ac.za

4 November 2019
REC Approval Reference No:
CPUT/HW-REC 2019/H17

Dear Mr Daniel Derrick Tilley,

Re: APPLICATION TO THE HW-REC FOR ETHICS CLEARANCE

Approval was granted by the Health and Wellness Sciences-REC to Mr Daniel Derrick Tilley for ethical clearance on 4 November 2019. This approval is for research activities related to student research in the Department of Emergency Medical Care at this Institution.

Title: Access to health care for patients with mental health needs: An Emergency Medical Service perspective

Supervisor: Dr Navindhra Naidoo

Comment:

Approval will not extend beyond 5 November 2020. An extension should be applied for 6 weeks before this expiry date should data collection and use/analysis of data, information and/or samples for this study continue beyond this date.

The investigator(s) should understand the ethical conditions under which they are authorized to carry out this study and they should be compliant to these conditions. It is required that the investigator(s) complete an **annual progress report** that should be submitted to the HWS-REC in December of that particular year, for the HWS-REC to be kept informed of the progress and of any problems you may have encountered.

Kind Regards

M. le Roes-Hill

Dr Marilize Le Roes-Hill
Deputy Chairperson – Research Ethics Committee
Faculty of Health and Wellness Sciences

Annexure 5: Ethical Clearance Certificate DOH, WC_201911_033

Western Cape Government
Health

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www.capegateway.gov.za)

REFERENCE: WC_201911_033
ENQUIRIES: Dr Sabela Petros

P.O. Box 1906
Bellville
7535
South Africa

For attention: MR Daniel Tilley and DR Navindhra Naidoo

Re: Access to health care for patients with mental health needs: An Emergency Medical Service perspective

Thank you for submitting your proposal to undertake the above-mentioned study. We are pleased to inform you that the department has granted you approval for your research.
Please contact the following people to assist you with any further enquiries in accessing the following sites:

Emerency Medical Services	**Dr Shaheem De Vries**	**021 508 4523**

Kindly ensure that the following are adhered to:

1. Arrangements can be made with managers, providing that normal activities at requested facilities are not interrupted.
2. Researchers, in accessing provincial health facilities, are expressing consent to provide the department with an electronic copy of the final feedback (**annexure 9**) within six months of completion of research. This can be submitted to the provincial Research Co-ordinator (Health.Research@westerncape.gov.za).
3. In the event where the research project goes beyond the *estimated completion* date which was submitted, researchers are expected to complete and submit a progress report (**Annexure 8**) to the provincial Research Co-ordinator (Health.Research@westerncape.gov.za).
4. The reference number above should be quoted in all future correspondence.

Yours sincerely

DR G DENICKER
ACTING DIRECTOR: HEALTH IMPACT ASSESSMENT
DATE: 23/12/2019
CC

Annexure 6: Permission for Research Site

Western Cape Government
Health

DIRECTORATE: **EMERGENCY MEDICAL SERVICES**
ENQUIRIES: **Dr Shaheem de Vries**
• shaheem.devries@pgwc.gov.za
☎: +27 21 508 4523

Attention: Mr Daniel Tilley

RE: ACCESS TO HEALTCARE FOR PATIENTS WITH MENTAL HEALTH NEEDS: AN EMERGENCY MEDICAL SERVICES PERSEPCTIVE

Dear Mr Tilley,

Your request on the above matter refers.

Thank you for the request to conduct research within the Western Cape Government Emergency Medical Services. Your proposal has been evaluated by the Emergency Medicine Division Research Committee and has been recommended for approval by this office.

I am therefore pleased to inform you that such approval is hereby granted.

I wish you well in your endeavor and trust that you will keep this office and its department informed of your findings when these become available. I look forward to the insights that your research will afford us.

Yours sincerely

Dr Shaheem de Vries
Head: Emergency Medical Services
Western Cape Government Health

Date: 6th January 2020

Annexure 7: Letter to conduct research

Cape Peninsula University of Technology

Department of Emergency Medical Sciences

Department of Health

Director of Western Cape Emergency Medical Services

RE: Permission to conduct research within the Communications Centre in the Garden Route

Dear Sir/Ms.

As part fulfilment of a master's degree in Emergency Medical Care I have chosen to conduct research on a fairly unresearched topic in the Emergency Medical Care field – Mental Illness.

Title: *Access to health care for health care consumers with mental health needs: An Emergency Medical Service perspective.*

Background: Mental Illness is a global crisis; seen as a pandemic of the 21st century-advocating a compelling cause for global morbidity and mortality. The World Health Organisation state that at least 700 million people worldwide were affected with behavioural, mental or neurological problems in 2010 and increasing, advocating that all people with mental disorders should be protected from discrimination and inhumane treatment, having the right to acquire high quality treatment and care, delivered by responsive health care services. The Emergency Medical Services are responsible for the transport of public mental health care users as well as being first to scene responders to mental illness emergencies. With protracted sequential growth in the burden of mental illness, inevitable stigma thereof and deinstitutionalization without compensatory community mental health care services, the public EMS needs to appraise access to health care for voluntary and involuntary mental health care users, as a basis upon which interventions for ameliorating human rights can be based.

Question: How can the Emergency Medical Services increase its value proposition for access to health care for patients suffering from mental illness, poor mental health and deliberate self-harm?

Aim: To appraise access to health care for health care consumers who present to a public EMS with mental health needs

Objectives:

I. Quantify the burden of mental illness cases for the EMS.

II. Describe the problem space that emergency medical services are located in with regards to care and transportation of health care consumers with mental illness.

III. Investigate the association between EMS practice and poor mental health, deliberate self-harm and mental illness burden.

IV. Describe the problem space that emergency medical services are located in with regards deliberate self-harm and poor mental health.

Methods: A Descriptive Retrospective Study

The rights of mental health care users who present to a public EMS are challenged when involuntary mental health care users display disillusion and combativeness, presenting a complex scenario requiring police assistance in accordance with the Mental Health Care Act 17 of 2002 section 40. The nuance of treatment becomes vague with public service staff shortages, challenging human rights for EMS personal and mental health care users as a whole.

Upon commencement of this research topic it was established that mental health care users have increased substantially in the last 2 years in the Garden Route district. The challenge faced by me is that an increase of mental health care users' needs to be quantified to see the significance of access to health care from an EMS perspective. The concept of quantising an increase will be the roots to an improved concept of scrutinising access to health care for a marginalised group. Mental illness is a grey concept in the EMS often leaving the EMS bound to stigma conceptual understanding of mental illness, while abstract semantic qualifying mental psychosis for substance abuse. By appraising access to health care for health care consumers with mental health needs, I can prescribe statistics to open up the path to effect change and enhance forensic-accountability (Waldron, 2014).

Please may I have authorization to carry out this research through the WCEMS Communication Centre in the Garden Route. Research will be in the form of checklists, sieving through the past year of retrospective data collected in electronic patient report forms.

I eagerly await your response. If there are any ethical considerations or any further information needed, please feel free to contact me. I have attached my proposal for ethics of research commencement.

Thank you so much for your time

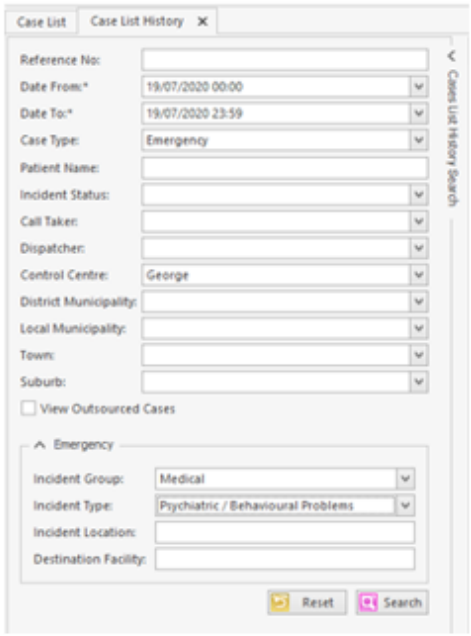
Kind regards

Daniel Tilley
0829204035
danieltilley88@gmail.com

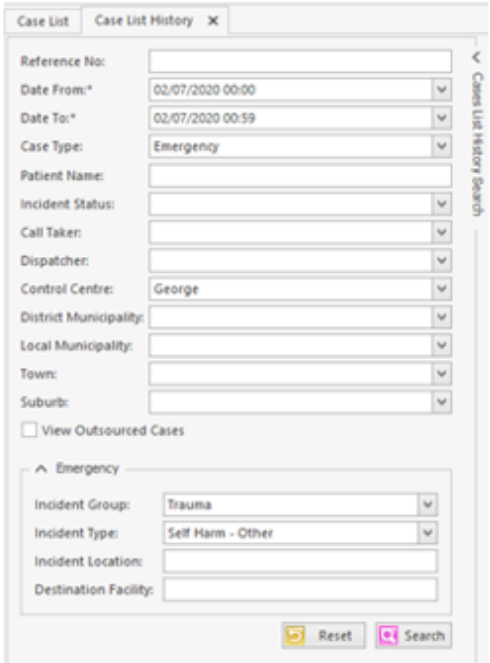
Annexure 8: Examples of how data is captured in the Communications Centre

These are screenshots of the categories (incident types) in the database as chosen for the sample and where the retrospective archive data is stored. A Screen shot of how the category with Incident Management records is also provide. A screenshot of an Incident Management Record is provided.

1. Psychiatric/Behavioral problems



2. Self-Harm-other



3. Self-Harm-poisoning

4. IFT-psychiatric/behavioral problems

5. Screenshot of Incident Management Records and how it is stored in the categories.

6. Screenshot of Incident Management Record

Incident Management Record

Call Information

Reference No:	20190728-0465
Case Type:	Emergency
Case Priority:	P1
Caller Name:	[redacted]
Caller Phone 1:	[redacted]
Caller Phone 2:	
Call Taker:	[redacted]
Call Time:	28/07/2019 04:32:44
Incident Time:	28/07/2019 04:32:44
Diagnosis/Special Considerations:	drank pills escort waiting @ Saps
Incident Location:	Sap,Thembalethu,Thembalethu,George,Eden District Municipality
Incident Group:	Trauma
Incident Type:	Self Harm - Poisoning
Navigation Notes:	drank pills escort waiting @ Saps

Call Modification Information

Created By:	[redacted]	Created At:	28/07/2019 04:33:04
Last Updated By:	[redacted]	Last Updated At:	28/07/2019 04:33:42

Patient Information

Patient Name:	Unk
Patient ID:	
Patient PHI:	
Patient Age:	

Dispatch Detail

Unit:	AMB406	Unit Type:	Ambulance
Dispatched By:	[redacted]	Crew Name:	[redacted]

Status	Status Time	Status By	Status Notes
Dispatched (D)	28/07/2019 04:34:21	[redacted]	Intelligent Dispatch
Unit Released (D)	28/07/2019 04:34:21	[redacted]	Unable To Handle
Received (M)	28/07/2019 04:34:31	[redacted]	

Dispatch Detail

Unit:	AMB406	Unit Type:	Ambulance
Dispatched By:	[redacted]	Crew Name:	[redacted]

Status	Status Time	Status By	Status Notes
Dispatched (D)	28/07/2019 04:34:33	[redacted]	Quick Dispatched
Received (M)	28/07/2019 04:35:12	[redacted]	
Accepted (M)	28/07/2019 04:36:53	[redacted]	
Enroute (M)	28/07/2019 04:36:56	[redacted]	
Arrived At A (M)	28/07/2019 04:41:52	[redacted]	
Stand Down (M)	28/07/2019 04:55:42	[redacted]	Patient Refused Transport
Completed (M)	28/07/2019 04:55:45	[redacted]	

Annexure 9: Call taking protocol

Figure 41: General call taking rubric (WCEMS Communications Centre, 2003, pp.1)

General call taking rubric *(Information to be asked with every patient)*

1. Precise location of emergency?
2. Chief complaint?
3. Age?
4. Conscious or Unconscious?
5. Breathing?
6. Heartbeat?
7. Telephone number for call back

The caller should then be interrogated or questioned using appropriate question protocol for the relevant complaint.

The call taker must ask **KEY QUESTIONS** and obtain **ADDITIONAL INFORMATION**.

According to the protocol (problem) – the call taker will give **PRE-ARRIVAL INSTRUCTIONS**.

The dispatcher will decide on priority according to **DISPATCH GUIDELINES.**

(WCEMS Communications Centre, 2003, pp.1)

Figure 42: Drug Overdose call taking protocol (WCEMS Communications Centre, 2003, pp. 18)

DRUG OVERDOSE

KEY QUESTIONS

1. Drug taken?
2. Amount of drug taken, number of tablets?
3. Conscious or unconscious?
4. Vomiting?
5. Confused or violent patient?

ADDITIONAL INFORMATION

1. Name of prescribing Doctor?
2. Name of Psychiatrist?
3. Past history of suicide attempt?
4. Alcohol as well?
5. Any lacerations of wrist?

PRE-ARRIVAL INSTRUCTIONS

1. Turn on side if vomiting or unconscious.
2. Open airway, neck tilt.
3. Calm and reassure.
4. If violent – clear a safe area.

DISPATCH GUIDELINES

SITUATION	LEVEL OF CARE	PRIORITY
Unconscious, Resp. problem	ILS/ALS	At once (P1)
Violent; Dangerous	Police	At once (P1)
Conscious; Breathing	ILS	ASAP

(WCEMS Communications Centre, 2003, pp. 18)

Figure 43: Poisoning call taking protocol (WCEMS Communications Centre, 2003, pp. 29)

POISONING

KEY QUESTIONS

1. Time taken?
2. Conscious or unconscious?
3. Age of patient?
4. Accidental or intentional?

ADDITIONAL INFORMATION

1. Poison centre – Red Cross Tygerberg (021 689 5227 / 021 931 6129)

PRE-ARRIVAL INSTRUCTIONS

1. Do not induce vomiting if paraffin ingested.
2. Oral milk/fluid.
3. NPM if unconscious.
4. Support airway.
5. Collection poison or drug sample for EC providers

DISPATCH GUIDELINES

SITUATION	LEVEL OF CARE	PRIORITY
Conscious, alert (Age 1-11)	Refer to poison centre	
Conscious, alert (Age < 1YR)	ALS	At once (P1)
Conscious, alert (Age > 12YR)	ILS	ASAP
Semi-conscious	ALS	At once
Unconscious	ALS	At once

(WCEMS Communications Centre, 2003, pp. 29)

Figure 44: Psychiatric/Behavioural problem call taking protocol (WCEMS Communications Centre, 2003, pp. 30)

PSYCHIATRIC / BEHAVIOURAL PROBLEM

KEY QUESTIONS

1. Type of problem?
2. Is patient violent?
3. Is drugs or alcohol involved?
4. Psychiatric history of depression/schizophrenia?

ADDITIONAL INFORMATION

Consider other cause for confusion and behavioural change:

Hypoxia; Hypoglycaemia; Overdose; Hyperpyrexia; Hypothermia

PRE-ARRIVAL INSTRUCTIONS

1. Calm the patient, talk to them.
2. Beware of attack.
3. Observe patient don't leave alone.
4. Protect patient from themselves.
5. Be truthful with patient.

DISPATCH GUIDELINES

SITUATION	LEVEL OF CARE	PRIORITY
Level of care confused	ILS	ASAP/At once
Conscious, Alert	ILS	ASAP
Violent	Police	At once

(WCEMS Communications Centre, 2003, pp. 30)

Figure 45: Suicide call taking protocol (WCEMS Communications Centre, 2003, pp. 32)

SUICIDE

KEY QUESTIONS

1. Location of patient?
2. What is patient doing?
3. Previous suicide attempt?

ADDITIONAL INFORMATION

Stay on line with suicidal caller, reassure

PRE-ARRIVAL INSTRUCTIONS

1. Calm patient.
2. Patch through to lifeline, provide alternative help.
3. Stay online.

DISPATCH GUIDELINES

SITUATION	LEVEL OF CARE	PRIORITY
Appropriate rescue and medical care	Rescue / ILS	At once
Fire services	ILS	At once

(WCEMS Communications Centre, 2003, pp. 32)

Annexure 10: Chapter Five Maps and Graphs

Graph 11: Prevalence by mental and substance use disorder – South Africa (Ritchie and Roser, 2018b, pp. 2)

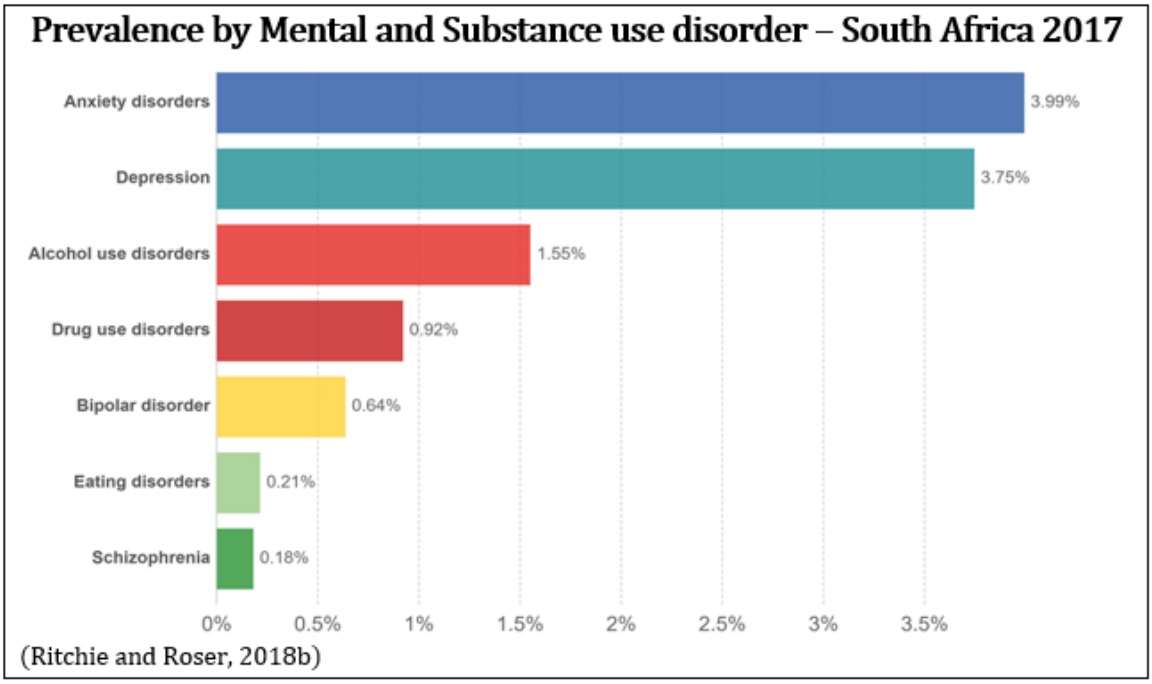
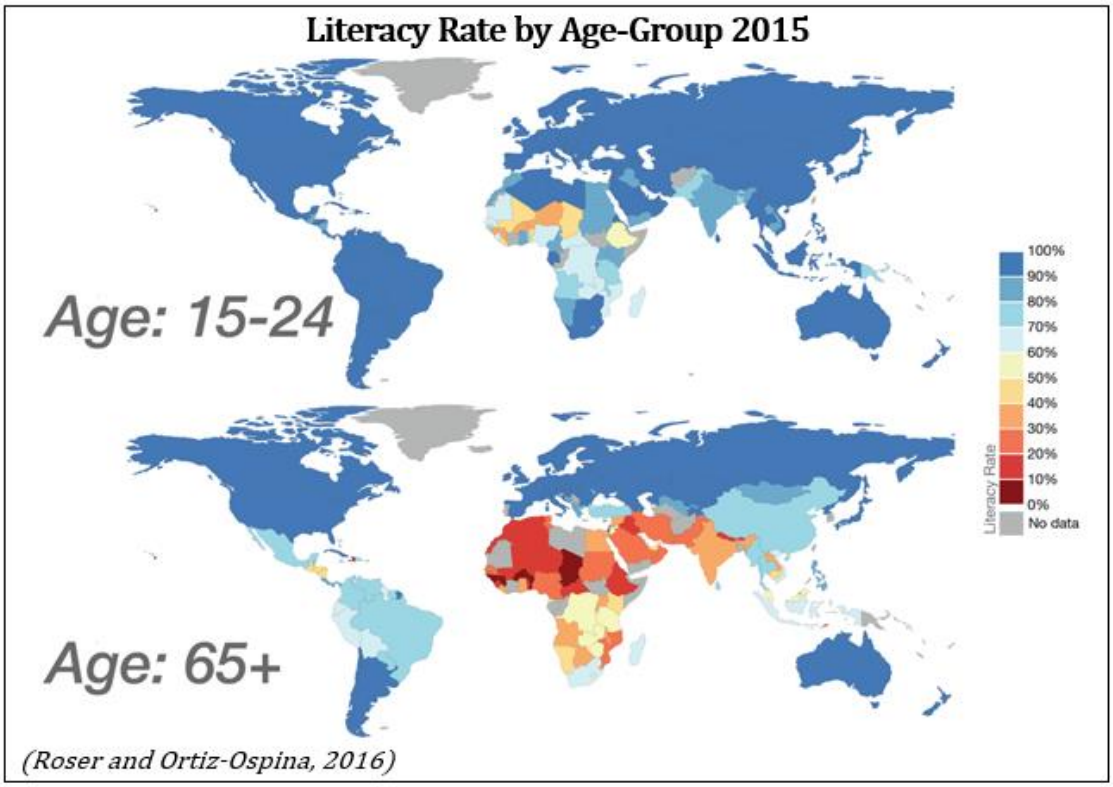
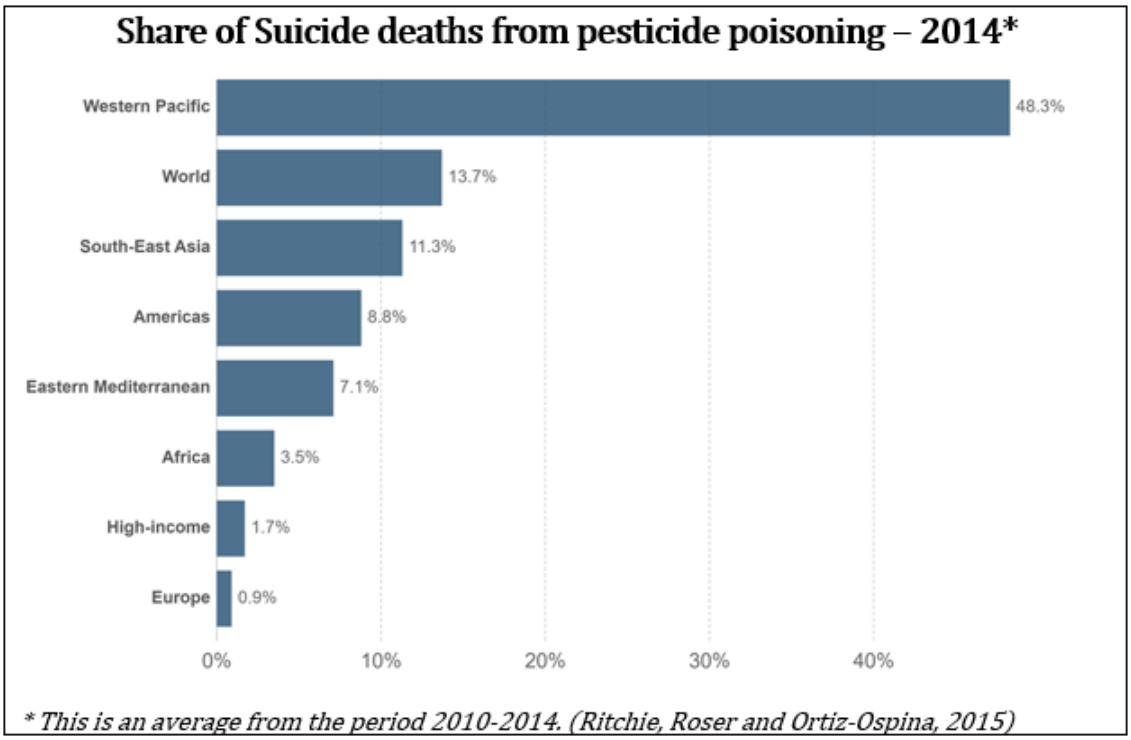


Figure 46: Literacy rate by age group (Roser and Ortiz-Ospina, 2016, pp. 5)



Graph 12: Global share of suicide deaths from pesticide self-poison (Ritchie, Roser and Ortiz-Ospina, 2015, pp. 11)



Graph 13: People with depression in South Africa from 1990-2017 (Ritchie and Roser, 2018b, pp. 10)

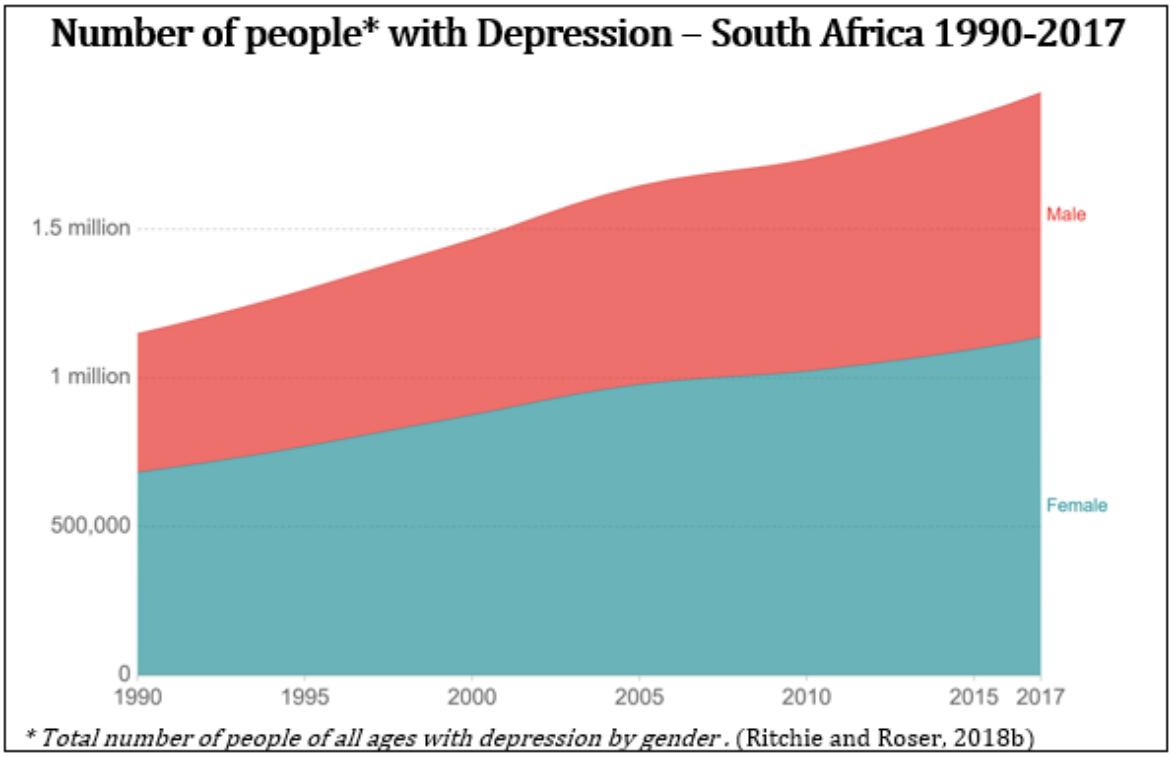
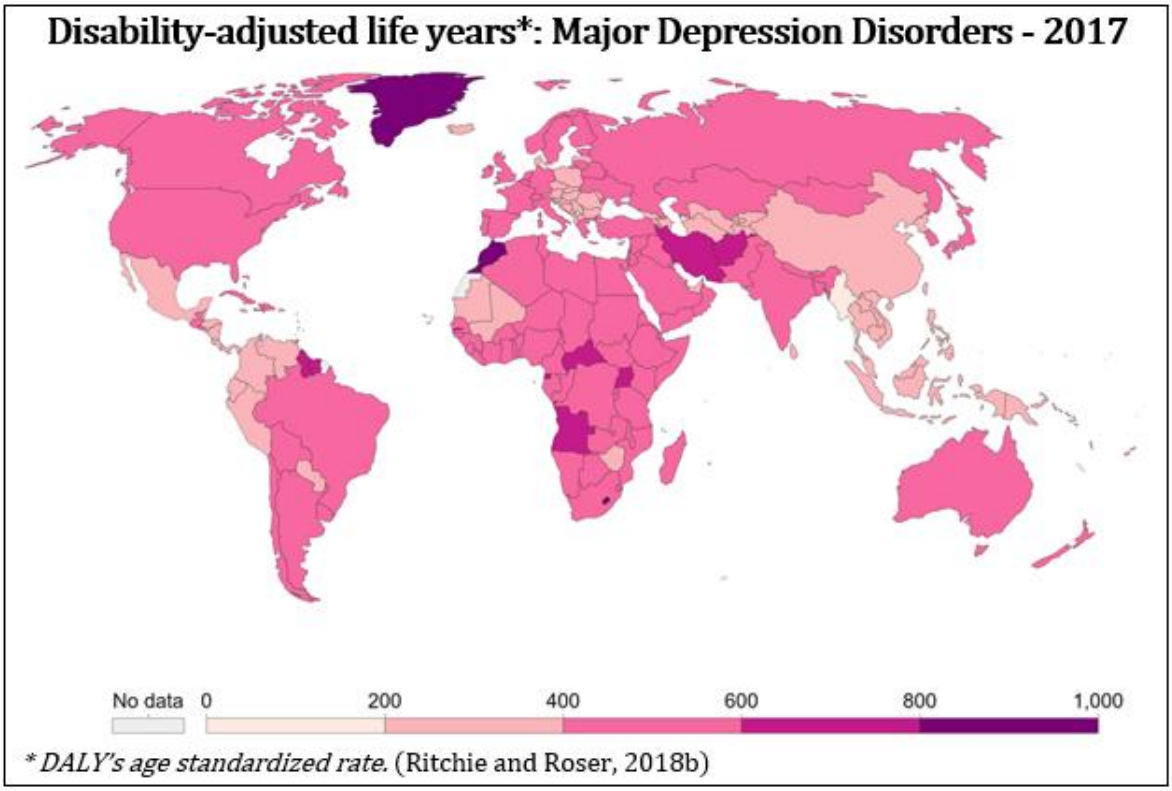


Figure 47: DALY's - Major Depressive Disorder (Ritchie and Roser, 2018b, pp. 9)



Annexure 11: USA patient restraint legislature

Patient restraint (USA Law)

INTRODUCTION

Patients have the right to refuse treatment and/or transport if they are of legal age and are competent. Competence is defined as the capacity or ability to understand the nature and effects of one's acts or decisions. A person is considered to be competent until proven otherwise. There are situations, however, in which the interests of the general public outweigh an individual's right to liberty:

I. *The individual is threatening self-harm or suicide.*
II. *The individual presents a threat to the community because of a contagious disease or other physical dangerousness.*
III. *The individual presents a specific threat to innocent third parties.*

INDICATIONS

- → *Behavior or threats that create or imply a danger to the patient or others*
- → *Safe and controlled access for medical procedures*
- → *Change in behavior that results from improvement or deterioration of patient condition, i.e., hypoglycemia, overdose, intubation*
- → *Involuntary evaluation or treatment of incompetent combative patients*

PRECAUTIONS

- → *Be aware of items at the scene or medical equipment that may become a weapon.*
- → *Assure that the scene is safe before approaching the patient.*
- → *Patients that are actively seizing should never be restrained.*
- → *The patient should be restrained in the prone position only as a last resort and only with continuous monitoring. This position may interfere with the patient's ability to breathe.*
- → *Restraining a patient's hands and feet together behind the patient (hog-tying) is not allowed. The only exception is a prisoner or suspect in the custody of law enforcement or prison authorities.*

GENERAL RESTRAINT PROCEDURES

- → *Make every attempt not to aggravate or worsen pre-existing injuries or medical conditions.*
- → *Attempt first to control the patient with verbal counseling.*
- → *The least restrictive means of control should be employed.*
- → *Only "reasonable force" may be used when applying physical control. This is generally defined as the use of force equal to, or minimally greater than, the amount of force being exerted by the resisting patient.*
- → *Restraints should not interfere with the assessment or treatment of the patient's ABCs.*
- → *The decision to restrain a patient should usually be made prior to transport.*
- → *Do not remove restraints once applied unless the patient seizes. If circulation becomes compromised, the benefit of removing the restraints must be weighed against crew safety.*
- → *EMS does not apply handcuffs or hard plastic ties (flex cuffs), but if already in place and circulation is adequate, may be left on. Handcuffs must be double locked to prevent inadvertent*

tightening, and should allow one little finger to fit between the handcuff and the wrist. Assure that a key is available during transport.

- → *Restraints should be individualized and afford as much dignity to the patient as the situation allows. Attempt to accommodate patient comfort or special needs whenever possible.*
- → *Ensure that enough help is available to insure patient and provider safety during the restraint process. Optimally, five people should be available to apply full body restraint (one for each limb and one for restraint application). Communicate the restraint plan to all help.*
- → *Assure that the patient's clothing and personal belongings have been searched for weapons prior to transport.*
- → *An emergency transport hold must be obtained and completed whenever a patient is transported against their will for the above-mentioned reasons.*

ADVANCED LIFE SUPPORT CARE

- → *For combative behavior that is compromising the ability to provide patient care, consult with medical control for sedation medication orders.*

PEADIATRIC CONSIDERATIONS

- → *Always attempt to involve parents when restraining children.*

PREGNANCY CONSIDERATIONS

- → *Pregnant women should be restrained in a semi-reclining or left lateral recumbent position.*

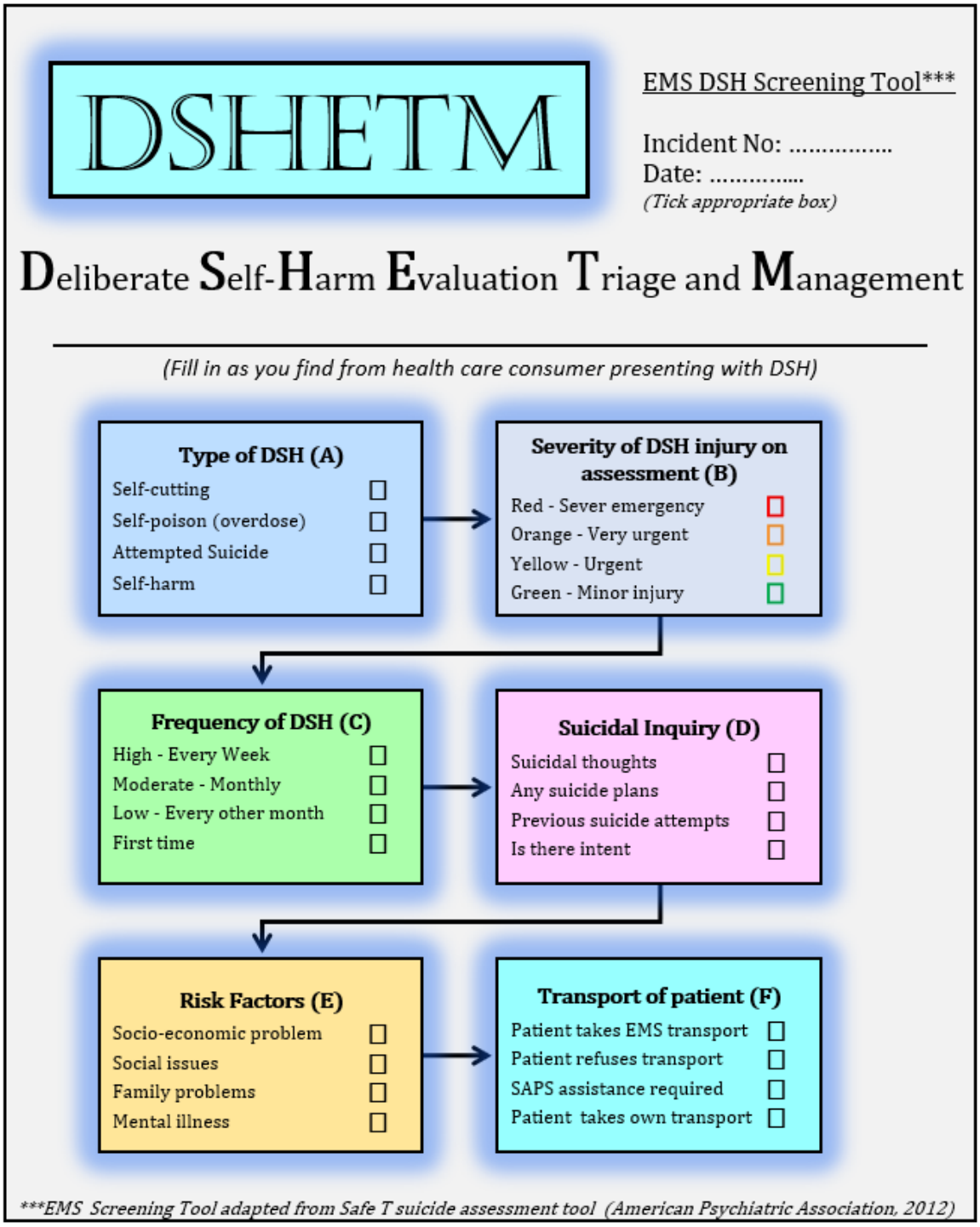
DOCUMENTATION REQUIREMENTS

- → *An emergency existed*
- → *The need for treatment was explained to the patient (regardless of competence)*
- → *The patient refused treatment or was unable to consent to treatment*
- → *Evidence of the patient's incompetence to refuse treatment*
- → *Failures of less restrictive methods of control (such as verbal counsel)*
- → *The restraints were used for the safety of the patient or others*
- → *The reasons for restraint were explained to the patient (regardless of competence)*
- → *The type/method of restraint used and which limbs were restrained*
- → *Injuries that occur during the restraint procedure*
- → *Which agency placed the restraints*
- → *Continuously assess CMS (distal to the restraints) and the patient's ability to breathe*

(Regions Hospital Emergency Medical Services, 2000, pp.1; Van Huyssteen, 2016, pp.107)

Annexure 12: EMS DSH Screening Tool

Instructions to use EMS DSH Screening Tool
'Type of DSH' (Block A) focuses on the type of DSH that has been committed, with the four main types of DSH presented. The type of DSH committed could lead inquiry into severity of persons emotions. *'Severity of DSH injury on assessment'* (Block B) allows the EC provider to provide a colour code to the severity of the injury caused by the health care consumer. *'Frequency of DSH'* (Block C) would provide the EC provider/Communications Centre agent with an idea of how DSH has been perceived by the health care consumer. A person who inflicts DSH every week or for a first time, would present the idea of severity of DSH mental health problems. *'Suicidal Inquiry'* (Block D) is very important as it provides a chance to identify suicidal ideation. Here the assessment must be straight forward, being accurate with the inquiry. *'Risk Factors'* (Block E) focuses on DSH burdens and provides the EC provider/Communications Centre Agent with options on the cause to negate the need for DSH. This would provide evidence of a health care consumers background. *'Transport of patient'* (Block F) provides the EMS with vital information on necessity. Knowing the transport status of the health care consumer, the EMS could provide a needs assessment for how often a person requires the EMS and for what DSH; this could alleviate stigma. The concept of such screening tool is to validate when the health care consumer begins to become more serious and regiment of questioning should be precise. Ask questions relevant to each block. Triage will provide the idea of worsening, suggesting that the person has developed further with poor mental health. The increase in severity will suggest that the need for relief outweighs the severity of DSH (Arkins *et al.*, 2013). Using this screening tool would be simple and only requires following the questions in each Block. Each Block would fall as an individual Block in the screening tool and doesn't require answering Block A to get to Block B. The aim of this tool is simply to record the severity of DSH per health care consumer, as to monitor and assess for suicidal ideation. Knowing the severity and progression of DSH amongst GRD health care consumers could help alleviate suicide risk.


DSHETM
EMS DSH Screening Tool***
Incident No: .....
Date: .....
(Tick appropriate box)
Deliberate Self-Harm Evaluation Triage and Management
(Fill in as you find from health care consumer presenting with DSH)
Type of DSH (A)
Self-cutting
Self-poison (overdose)
Attempted Suicide
Self-harm
Severity of DSH injury on assessment (B)
Red - Sever emergency
Orange - Very urgent
Yellow - Urgent
Green - Minor injury
Frequency of DSH (C)
High - Every Week
Moderate - Monthly
Low - Every other month
First time
Suicidal Inquiry (D)
Suicidal thoughts
Any suicide plans
Previous suicide attempts
Is there intent
Risk Factors (E)
Socio-economic problem
Social issues
Family problems
Mental illness
Transport of patient (F)
Patient takes EMS transport
Patient refuses transport
SAPS assistance required
Patient takes own transport
***EMS Screening Tool adapted from Safe T suicide assessment tool (American Psychiatric Association, 2012)