FOOD CONSUMPTION PATTERNS OF FIRST-YEAR STUDENTS AT HIGHER EDUCATIONAL INSTITUTION'S RESIDENCES

by

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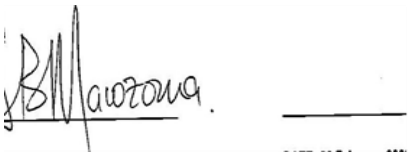
DECLARATION

I, **Sibusiso Macozoma**, declare that the contents of this thesis represent my own unaided work and that the thesis has not previously been submitted for academic examination towards any qualification. Furthermore, it represents my own opinions and not necessarily those of the Cape Peninsula University of Technology.



SIGNED: S.S. Macozoma **DATE: 22 February 2023**

ABSTRACT

Dietary habits play an important role in people's health and mortality, thereby placing nutrition as an agent for a healthy balanced life for a prolonged life as such nutritional foods are the basis for lifelong survival against communicable diseases. Hence, variants in nutrition (such as fruits, vegetables, nuts, dairy products, & staple foods) are a vehicle for the well-being of the human body and mind. Hence, this study aimed to investigate food consumption patterns of first-year students living at residence facilities of higher education institutions in the Cape Town Metropole.

The study further aimed at identifying the factors that cause a change in consumption patterns of first-year students living at residence facilities of higher education in the Cape Town Metropole: what the respondents now ate in relation to what they ate while still at home. Furthermore, this research aimed at recommending a balanced diet for healthy living at residence facilities of higher education based on the findings. In meeting the set objectives for this research, a quantitative research method was applied in a form of a structured survey questionnaire (close-ended). The survey questionnaire was divided into three sections (Section A, B & C); the first section focused on the demographic information, the second section investigated the availability, access, and frequency of food consumption; and the third section provided food diversity lists that illustrate different foods that are likely to be consumed by first-year students at residential facilities.

The research instrument used a categorical manner questionnaire format for easy processing of the data. The study collected 150 questionnaires from first-year higher education students at the two residences in the Cape Town Metropole area. The received data were acquired using snowballing and convenient sampling procedures.

The obtained data were analysed using Stata Statistical Software version 15. The first stage of data analysis employed univariate descriptive analyses (frequencies, mean and standard deviation) to describe respondents' profiles and views; and the second stage used Logistic Regression analysis for inferential statistics. The final stage of data analysis conducted reliability tests on the categorical variables in Section B and Section C parts of the questionnaire using Cronhan's Q-Test. Findings from this study reveal that first-year students at institutions of higher learning food consumption patterns in the Cape Town Metropole have changed (68%) since they became responsible for their own catering.

Convenience and affordability were found to be the main drivers of change in food consumption patterns of students at residential facilities in the Cape Town Metropole area. Those with funding receive variants of food items when compared to their counterparts without funding. Also, those

with higher incomes are most likely not affected by a dietary change in their eating habits. Therefore, the study suggests that institutions of higher learning create farming spaces for university students that will be inclusive to all students irrespective of discipline. This will allow students to earn an income through farming in universities, which will create a culture where farming becomes part of South African society and is perceived as a means of expanding income as well as being of nutritional benefit to South African society at large. The use of land for farming in universities will create a culture where farming becomes fashionable to youngsters, thereby curbing food insecurity in the country.

Further research may look at the dietary consumption of students in institutions of higher learning across disciplines and levels to identify similarities or differences among these groups as this study was limited to first-year students only.

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DEDICATION

I dedicate this dissertation to my children (Sbabalwe “ Sbashy” Nwabisa and Mntungwa Lwethu Macozoma). It is meant to teach you that education is important and with your intelligent minds, you will soar greater than what I have accomplished in life. Therefore, make grandpa proud! This is what I was doing when I spent less time with you guys. I might be terrible at showing it at times, but I would easily give all I have for you to be in a better place. Not forgetting all my family members both living and late, a reality.

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ACRONYMS AND ABBREVIATIONS

3rd	Third
CBD	Central Business District
CPUT	Cape Peninsula University of Technology
CT	Cape Town
DDS	Dietary Diversity Score
ETHICS	Ethical
FAOS	Food and Agriculture Organization Statistical
FBS	Food Balance Sheet
DGA	Pyramid and the Dietary Guidelines
HEI	Higher Education Institution
NCDs	None-communicable diseases
NFCS	National Food Consumption Survey
NHANES	National Health & Nutrition – Examination survey
RDA	Recommended Dietary Allowance
RES	Resident
SA	South Africa
SANHANES	South African National Health and Nutrition Examination Survey
SF	Street Foods
STARTER	Data analysis and statistical software
TVET	Technical and vocational education and training
WHO	World Health Organisation

CHAPTER 1
INTRODUCTION AND BACKGROUND OF THE STUDY

1.1 Introduction

People's lifestyles, health, morbidity, and mortality are influenced by their dietary behaviours (Mikolajczyk et al., 2009:31). Behaviours are described by Murray et al. (2016:144) as everyday decisions in relation to food choices, eating habits and food purchasing decisions. Vardanjani et al. (2015:53) state that proper nutrition increases one's physical and intellectual efficiency while undoubtedly safeguarding a person from any diseases, especially chronic ailments. The consumption of various foods in the correct quantity and quality is an important 'vehicle' for ensuring that sufficient nutrients are made available for the human body's well-being (Ogunniyi et al., 2012:27). This further makes it essential for the intake of food by humans to be made according to the classification and combination of essential nutrients in appropriate proportions to maintain what is considered a healthy and balanced diet (World Health Organisation, 2015). These include carbohydrates, protein, fats and oil, vitamins, and minerals (Olowa, 2012:27; Arya et al., 2016:35). Goetzke et al. (2014); Food Insight (2016) state that it is important for humans to consume a variety of food items from all food groups in moderation to achieve the desired objective. Capone et al. (2014:15) argue that diets are influenced by factors such as income, prices, individual preferences, cultural and traditional beliefs, environmental dynamics, and the interaction in an intricate manner to shape food consumption patterns. This is supported by Terry et al. (2017:2) stating that diets are not influenced only by the above-mentioned but also by socially based determinants, inclusive of educational attainment, employment, gender, and socio-economic status. The many influences on the consumption of food can be seen in repeated arrangements of food consumed, which is often characterised by a combination of food items in different quantities to make up meals and dishes, termed food consumption patterns (Gerbens-Leenes et al., 2010:602; Reisch et al., 2013:7).

Therefore, it is imperative to highlight the importance of food items as a solid basis for the formation of food consumption patterns (Kearney, 2010:2795; Agostoni et al., 2011:664). When food consumption patterns are expressed in terms of food items, differences among the patterns are large, and studying them requires a great amount of data and time because factors that contribute to changes in patterns are diverse and require research (O'Sullivan et al., 2010). Yahai et al. (2016:232) state that assessing students' health-risk behaviours is important to help reduce or prevent development of non-communicable diseases inherited later in life. Tam et al. (2017:7) note that tertiary settings provide a unique opportunity to access, influence and conduct research

in a large population of mostly young adults. Thus, this study aims to establish food consumption patterns of first-year students at two selected higher education institutions (HEIs) in Cape Town.

1.2 Literature review

According to Elneim (2013:396), changes in food habits and trends relating to the consumption of various foods are often determined by the availability of information provided through food consumption surveys together with the location, habitat, and socio-economic status of the consumer. These can be elucidated as food consumption patterns, which are defined by Ogunniyi et al. (2012:32) as recognisable ways in which food is consumed, the consumption is often influenced by availability, accessibility, and choice of food (Kearney, 2010:2795; Lubis et al., 2019:2). However, consumption patterns change over time with the development of technology (Higgs & Thomas, 2016:2-4), while the population's socio-economic status, culture, education, lifestyle, knowledge, and accessibility also influence food choices and patterns of consumption (Lubis et al., 2019:2). Nesbitt et al. (2008:375) and Capone et al. (2014:15); add that the determinants of food intake are embedded by seasonality, price, and income of consumers.

According to Sogari et al. (2018:1-2), the transition from adolescence to young adulthood challenges this group to continuously make healthy food choices as unhealthy eating habits increase when independence increases. Hence, substantial life-changing transitions happen when young adults finish high school to start university or a working life. Painter et al. (2016:492) indicate that universities can be smaller versions of cities based on their large population sizes therefore their financial and environmental implications for their activities are potentially substantial. Sogari et al. (2018:2) report that university life is a critical period for young adults regarding food choices and their relationship with weight gain. The movement of young people from their familiar surroundings of home to a new environment (university) can be especially challenging for first-year students (Manwa, 2013:192) without the added pressure of taking responsibility of preparing one's own food amid modifications influenced by technology, fast foods, and social conditions (Deliens et al., 2014:2). A study on eating patterns at HEIs conducted at the Faculty of Pharmacy at Al Azhar University in Gaza by Lubbad (2011:6) discovered that eating habits of students gradually changed to include low consumption of healthy food items such as fruits, green vegetables, and milk in favour of increased consumption of snacks, sweets, carbonated drinks and not having breakfast. This is further exacerbated by a pattern of increased consumption of foods that are high in fat and alcohol (Deliens et al., 2014:2). In addition, Lubbad (2011:6) indicated that life away from home has seen students developing unfavourable eating

habits simply because of limitations such as adequate financial resources and the support of a family environment.

A study undertaken by Roy et al. (2017:121) reported on the influence of significant decreases in the availability of prepared food in the eating patterns of students, often resulting in ill health. Other studies support this argument (Larson et al., 2006:82; Deliens et al., 2014:2), attributing the phenomenon to the hurried pace of student life and the foreign environment in which the students find themselves. This can be mitigated through efforts by students to frequently prepare their meals as this will allow for healthier choices inclusive of higher intakes of fruits and vegetables as opposed to lower intakes of fat and fried foods (Seguin et al., 2016:5).

The movement of students away from home, especially to more urbanised areas (city or country), for purposes of attaining an education brings with it new and exotic selections of food items and choices, thereby leading to new eating patterns formed because of the new environment in which the students find themselves (Sogari et al., 2018:2). This gives credence to assumptions of increased consumption of fast foods – which is a frequently used indicator of unhealthy eating – to play a significant role in the shift away from traditional cooking towards meals that are made outside the home (El Ansari et al., 2012: 32; Mak et al., 2012:92).

1.3 Problem statement

The movement of young people from home to institutions of higher learning is not a new phenomenon (Guruz, 2012:16). This dates to the 17th-century culture termed the “the grand tour”, a rite of passage undertaken by young men of English aristocracy to European centres of culture such as Paris, Rome and Florence) to attain an education in preparation for government administrative employment, diplomatic services, and future political leadership (Goldsmith, 2020:1). The transition from living at home to HEI residences results in a challenge for first-year students, in terms of the type of food to consume and when it is consumed. The underlying cause of this challenge results from limited income, busy study timetables, and lack of facilities such as stoves, ovens, or microwaves to prepare food, and fridges to store perishable food items. In addition to inflexible lecture timetables that provide limited breaks for food intake, the dietary patterns of students at HEIs are often altered to suit the weekly lecture timetables. Coupled with a new environment that is very different from the household setup to which undergraduate students were previously accustomed, dietary patterns often tend to be very erratic.

1.4 Research questions

The research was guided by the following research questions:

1 What are the food consumption patterns of first-year students living at residence facilities of HEIs in the Cape Town Metropole?
2 What factors, if any, cause a change in the food consumption patterns of first-year students at residence facilities of HEIs in the Cape Town Metropole?
3 What measures can be put in place to encourage healthy food consumption practices among students living at residence facilities of HEIs in the Cape Town Metropole?

1.5 Aim and objectives of the study

The aim and objectives of the study are detailed below:

1.5.1 Study aim

The study aims to establish first-year students' eating patterns in two HEI residences in Cape Town, to recommend basic healthy eating habits that will sustain them during their study periods.

1.5.2 Study objectives

Emanating from the above-mentioned aim, the study formulated the following objectives in line with the research questions indicated above.

- To investigate the food consumption patterns of first-year students living at residence facilities of HEIs in the Cape Town Metropole.
- To identify the factors that cause a change in consumption patterns of first-year students living at residence facilities of HEIs in the Cape Town Metropole.
- To recommend a balanced diet for healthy living at residence facilities of HEIs based on the findings.

1.6 Research methodology

Choy (2014:99) and Creswell (2017:18) bring to the fore that research methods consist of qualitative, quantitative, and mixed methods. Ezeuduji (2013:4) and Ferreira (2015:120) add that qualitative methods rely on arguments as the component of analysis; whereas quantitative methods involve numbers, and their component of analysis may be statistical. This study adopted a quantitative research approach to provide comprehensive responses to the research questions formulated above. This approach works based on generating statistics using a survey method,

such as questionnaires (Ezeuduji, 2013:4). The applicability of the chosen methodology is aligned with the data needed to respond to the study questions. The data required to satisfy the objectives of this study needs to be collected and presented in a manner befitting for the study to be empowered to objectively draw conclusions and inferences that can be generalised, as prescribed by Kumar (2014:14).

1.6.1 Research design

This study employed an explanatory research design. This design seeks to explain the patterns and trends being observed by the research. This enables difficult questions to be raised, thereby establishing causality (Veal, 2011:7). This can be exemplified in the study's aim to investigate the change in food consumption patterns of first-year students upon arrival at residence facilities of HEIs. This agrees with Veal's (2011:7) example stating an increase in A (change in food consumption pattern) may be affected by a corresponding drop in B (move from home).

1.6.2 Primary research

Conducting the primary research for the study was undertaken using a questionnaire distributed by the researcher and one fieldworker (a recruited university student) at the two residences of HEIs in the Cape Town Metropole area, collected over a two-week period. The whole tertiary first-year student body from two HEIs in the Cape Town Metropole area was identified in this study. This group was the sample size of this study. Permission to collect data from this group was granted through the researcher's university (CPUT) affiliation ethical clearance certification. Upon receipt of the ethical clearance letter from the university; managers of the residence facilities of two HEIs in the Cape Town Metropole area granted the researcher permission and scheduled the data commencement of this study. The researcher recruited one university student at a third-year level from the nearby university from one of the residential facilities in the area. The researcher communicated with the manager and asked for a referral to a senior student to assist in the study. The manager identified and introduced the senior (third year) student to the researcher. The researcher introduced the study to the student and thereafter trained the student on how the questionnaire is intended to be filled. The use of a senior student in the investigated residence was a strategic approach to gain access to student participants in this area. The recruited senior students were able to identify possible first year students to participate in the study. In addition, the identified respondents were instrumental in identifying other students until saturation was reached. In collecting data, the researcher and the fieldworker introduced the research to the students, and they were briefed about how to complete the questionnaire. Thereafter, the researcher and the fieldworker browsed through the completed questionnaires for accuracy.

1.6.3 Population and sample selection

According to (Blumberg et al. (2011:166) every research project is subjected to a studied population. The study population refers to the number of possible participants that may be used in a research study (population in the study area). The researcher elected to employ a sample of the total population as described by Creswell (2014:33) to be determined by factors such as the expense of data collection and the need to have sufficient statistical data. The population for this study comprised only first-year students residing at the residential facilities in the Cape Town Metropole. These facilities house first-year students, who were the participants and were required to respond to questions formulated in the questionnaire. The population of the two residences varies but the sample aimed for was:

- From the TVET College at Cape Town Metropole area, a total of 70 first-year students residing in this facility, due to the size of the facility and the number of students residing there.
- From the Cape Peninsula University of Technology in the Cape Town Metropole area, a total of 291 first-year students. This sample was from a total first-year student population of 1 232 in residence at CPUT.

Therefore, the study aimed at collecting a minimum of 350 respondents to ensure a 95% validity and reliability level. A snowball sampling technique was employed in this study in a convenient approach. The snowball sampling technique employs a process of selecting a sample using networks of respondents. Kumar (2014:244) explains the snowballing technique to begin with the collection of data from a few individuals in a group or organisation selected and then the respondents are asked to identify other people in the population or organisation to part-take in the survey. Thus, the snowballing process in this study continued until the data collection was done.

1.6.4 Data collection instrument and analysis

A questionnaire was designed by the researcher following gaps identified from the review of the literature. This brought to the fore gaps in knowledge that the study intended to fill. This saw the structuring of a questionnaire that provided numerical data to be generalised to the entire population of first-year students staying at residences at the two Cape Town HEIs. The questionnaire comprised three sections. The first section collected demographic information, the second section looked into availability, access and frequency of food consumption and the third section provided food diversity lists that show categories of food that were likely to be consumed by the first-year students at residential facilities in Cape Town. This section was presented

categorically, measuring the frequency of food consumption, ranging from 1-2 times a day (1), 2-3 times a week (2), 4-5 times a week (3), and 1-2 times a month (4).

The collected data were analysed using Stata Data Analysis and Statistical Software version 15 (StataCorp, 2015). Leckie and Charlton (2013:2) state that Stata Statistical Software is used for statistical analysis reasons due to its good quality graphics that allow publication. In this study, the first stage of data analysis employed univariate descriptive analyses (frequencies, mean and standard deviation) to describe respondents' profiles and views and the second stage used Logistic Regression analysis for inferential statistics. The final stage of data analysis conducted reliability tests on the Likert-scale variables in Section B and Section C of the questionnaire using Cronhan's Q Test and a Chi-Square test.

1.7 Ethical considerations

To ensure ethical standards were maintained, personal information such as the names of individual respondents was not included in the questionnaire. The collection of data was conducted with approval from the management of the HEI residences where the study took place. A consent form was given to the first-year participants to inform them of the study and request their willingness to participate by accepting to complete a questionnaire. The study was undertaken following approval from the CPUT Faculty of Business and Management Science Ethics Committee. Participation in this study was voluntary and confidentiality of all information was assured. Participants were allowed to withdraw from the study at any time without suffering any prejudice.

1.8 Significance of the study

Patterns of food consumption are essential for the sustainability of a healthy lifestyle, not only for students but people in general. This makes it important for any research endeavour to make recommendations to solve problems faced by students in relation to the maintenance of healthy dietary habits. In addition, dietary choices made by students could have far-reaching effects on their lives and their quest for educational attainment and development. A dearth of literature on dietary habits are found in South Africa. However, this study closed the gap by the investigation of dietary habits of first-year university students rather than the general youth. Therefore, this study contributed to the body of literature in the South African context with specific regard to university first-year food choices and consumption. The study is of significance to South African HEI facilities to design and implement policies aimed at facilitating healthy dietary habits for university students. The nurturing of first-year university students is paramount for the country's wellbeing as the future

depends on this group. Therefore, if not properly nurtured, the group could indulge in unhealthy dietary habits that may lead to non-communicable diseases that are the leading causes of early death in adulthood. Thus, the investigation, understanding and education on dietary habits and food consumption are important to South Africa and other developing countries.

1.9 Clarification of terms

Consumption patterns: “The way elements of food are combined to form a complete particular level of consumption” (Porter & Hotchkiss, 2012:3).

Food: “Any substance or material consumed to give the consumer nutritional support for the body or for pleasure, which normally consists of plant or animal origin aimed at stimulating growth and maintaining life” (Abdulmumeen et al., 2012:36).

Food consumption: “The act of using or eating food at a particular time” (Cruz-Cunha et al., 2013:48)

Higher education institution: “An educational institution that admits as regular students only persons having a certificate of graduation from a school providing secondary education, or the recognised equivalent of such a certificate, or persons who meet the requirements of section…” (U S Legal, 2018:1).

Higher education residence: A facility that provides lodging for students registered with a particular institution of higher learning (Barnard-Brak et al., 2010).

Undergraduate student: Undergraduates are students at universities and colleges that have graduated from high school and have been accepted to college or university, but they have not graduated yet (Kansas State University, 2018)

1.10 Outline of the study

Chapter 1 introduced the study, provided a background to the study, and briefly addressed the literature reviewed and the research methodology used in the study.

Chapter 2 explored the available literature on consumption pattern of higher education students, drawing on examples from studies that have investigated students’ consumption patterns in different parts of the world.

Chapter 3 provided discussions on the qualitative research methodology that was used in the study.

Chapter 4 expounded on the findings made in relation to the respondents' answers, including eating patterns and food groupings.

Chapter 5, which is the final chapter of the dissertation, summed up the study with a conclusion, and made recommendations including possible future research that can be made to ensure healthy living for students at residences of HEIs.

1.11 Chapter summary

The movement of young people from the familiarity of the home environment to residence facilities in HEIs can bring a change in healthy dietary habits to unhealthy lifestyles and eating habits. This chapter explained the migration from healthy dietary habits to unhealthy eating choices that get adopted by students when they have to prepare their food when living in residences at HEIs. This study identified the research problem, its aims and objectives and the methodology adopted in gaining the empirical findings of this study.

The study reviewed existing literature to assist the researcher to formulate pertinent questions. This provided a platform for the study to respond to these questions, thereby providing a clear rationale for recommendations to be made emanating from the findings of the study.

The next chapter reviews literature related to food consumption of students and the implications thereof.

CHAPTER 2:
LITERATURE REVIEW

2.1 Introduction

Higher education and training are a gateway to independence for most high school leavers. Some may and some may not welcome the idea of being responsible for own wellbeing either than that of being nurtured by parents throughout their lives. According to Rodrigues et al. (2019:1634), a key population in a community are young adults in a transitional stage of life, the authors stress that the habits gained in the transitional life stage of young adults during their college/university years is taken through their lifestyle. The commencement of an individuals' higher training and education requires that one takes control of own lifestyle, food choices and practices (Bipasha & Goon, 2013) especially those residing at the institutions' boarding facilities (in South Africa; these are referred to as "residence facilities"). Rossi et al. (2017:392) add that changes in environment might influence perceptual and behavioural responses. Ogunniyi et al. (2012:2) note that the transition in the environment leads to imbalanced meal consumption. In addition, the United States of America Department of Health (2005) articulated that the transition from dependence to independence may lead to the adoption of eating habits that are considered unhealthy, which may lead to adverse medical conditions. With such transitions students adapt to a foreign environment (Deliens et al., 2014), which often results to the assumption of eating habits that often lead to health challenges such as obesity, cardiac problems, and diabetes (Lima et al., 2016:3). Rodrigues et al. (2019:1635) escalates that most higher education students unhealthy eating behaviour includes the high intake of fast foods, snacks, sweets, soft drinks and alcoholic beverages and the low intake of vegetables, fruits, fish, whole grains, and legumes. The authors add that the poor dietary behaviour of this group is among the key factors that contribute significantly to weight gain trajectory and increased risk in non-communicable disease (NCDs). The NCDs include heart disease, cancer, and type II diabetes. These NCDs are estimated to have caused 71% (41 million) deaths globally on a yearly basis. Alakaam et al. (2015:108) state that such ways of food consumption encompass decisions made individually and (Pitt et al., 2017:2393) are greatly influenced by the environment under which the individuals find themselves. The change in food consumption patterns is further dependent on large and complex factors related to food availability, accessibility and choice, socio-economic status of the population and availability of food per season (Kearney, 2010:2793; Pitt et al., 2017:2393). Tam et al. (2015:7) add that managing own dietary needs is at times a challenging responsibility faced by many tertiary students as they live away from home and, for most of them, for the first time. In addition,

Tam et al. (2017:7) state that young adulthood stage is critical for the development of food behaviours that are carried later into life including weigh gain risk factors. According to Mpofu (2015:157), it is important to understand the impact that the change in eating patterns may bring in the health and lifestyle of students. Therefore, the following section provides an overview of student transitioning stage and food consumption patterns.

2.2 Students transitioning from home environment to independence in institutions of higher learning

Tam et al. (2017:8) state that tertiary students spend substantial amount of time on campus and as such the food environment at such places plays an important role in shaping their food behaviours. It is during this period of life that students carry out the responsibility of purchasing own food items and preparing own meals which may lead to the practice of unhealthy dietary habits such as high consumption of snack foods, high intake of fast food and skipping of meals (Kabir et al., 2018:10). According to Rodrigues et al. (2019:1634), the transition of young people from school to university results in changes in type and quality of food that students consume. It is a time of increased responsibility for food choices and practices. When students translocate to an HEI residence environment, they become independent for the first time and are required to make choices between following a food pattern that they were accustomed to at home or choosing a convenient diet that suits their disposable income and study timetable (Kearney, 2010:2793). The first year of higher education life is a challenging period, especially for first-year students who must leave their familiar surroundings and settle in a new environment, resulting in the modification of food consumption patterns due to the influence of technological advancements, easy access to fast foods and the social conditions the students find themselves (Manwa, 2013:192; Rodrigues et al., 2019:1634).

Madiba (2013:55) states that the change in the life of the student, especially the move to more affluent university locations brings with it added demands on the time of the student, leaving meal preparation last on the list of things to do. This transition period is usually associated with the need to adjust and adapt to a new academic setting which is accompanied by extra tasks coupled with stress and a lack of time that could impinge on student's lifestyle choices (Wu et al., 2015). The stressful academic activities of university students have been described as a significant determinant and an immense contributor of poor eating behaviours (Ndlovu, 2017). Such behaviour is depicted in Table 2.1 as Alakaam et al. (2015) identified the differences between meals students have at their homes and at residence facilities in HEIs.

Table 2.1: Dietary habits at home versus dietary habits at university

Dietary patterns	Home	University
Eating patterns	Mainly traditional food	Mainly fast food
	Simple and basic	Convenience food
	Commensal eating	Eating alone most of the time
Meals	Home cooked meal	Simple preparation food
	Specific mealtime	Unstructured meal periods
	Eating meals with three courses	Consuming more meals
	Small food portion size	
	Consuming breakfast daily	Large food portion sizes
		Skipping breakfast / light breakfast
	No late-night meal available	Late night meal available
	More varied	Less varied
	Less meat	More fast food and meat
	Fresh fruits and vegetables	Less fresh fruits and vegetables
		Consuming snacking and desserts
		Drinking coffee
	Drinking water	

Source: Alakaam et al. (2015:9)

Alakaam et al. (2015:9) indicated that once students gained their independence, they are likely to adopt eating patterns that are not limited to time (meal any time of the day or night), they consume less varied foods especially with fruits and vegetables. The students in such environments depend more on fast foods with big portions, and as a result, skip other meals of the day, such as breakfast. Tam et al. (2017:8) add that food purchasing behaviours of young adults is heavily influenced by taste, convenience, cost, and healthier settings. Furthermore, Tam et al. (2017:8) indicated that adequate education and point of purchase nutritional information in university settings have a positive effect on food choices. Hence, the following section discusses the food consumption patterns of university students.

2.3 University students' food consumption patterns

Painter et al. (2016:492) states that universities have the potential of the pool of knowledge and expertise which they possess, therefore have the potential to change the habits that are detrimental to the environment. Tam et al. (2017:8) expand that those tertiary institutions have a

responsibility of providing an environment that is conducive for students' healthier food intake. However, the tertiary environment has been recorded to be filled with energy-dense poor nutritional foods promotions (Tam et al., 2017:8). Murray et al. (2016:144) made known that college students are not exempted from obesity as they consume high numbers of sugar-sweetened beverages, and excessive amounts of high fat and high sodium foods. When this group is away from home is when such poor eating behaviours are adopted. Vardanjani et al. (2015:53) report that children's eating habits are greatly influenced by family situations; however, as they enter school age, their eating habits adapt to an outside eating environment. Murray et al. (2017:144) add that research shows this behaviour is associated with the level of confidence about food preparation, cooking skills and time constraints in preparing meals. Therefore, fast foods become an easy option and less time-consuming. Zagorsky and Smith (2017:13) explain that fast food materials include hamburgers and pizzas. Fast food is convenient and appealing to consumers, using salt, sugar, and fats. These ingredients are high in calories and sodium but contain low nutrients, hence, they are regarded as unhealthy. These ingredients are addictive and can induce physiological responses that promote weight gain. These fast foods are also associated with insulin resistance, including diabetes and other metabolic problems. Vardanjani et al. (2015:53) indicate that non-communicable diseases are formed in childhood and remain constant in adulthood, based on behavioural and biological risk factors. These risk factors include obesity, dyslipidaemia, and high blood pressure, which later in life lead to the emergence of non-communicable diseases. The authors add that most of the risk factors that lead to non-communicable diseases are controllable and preventable from childhood. According to Vardanjani et al. (2015:54), junk foods contain high sugar and fat, which force the setting for affliction with chronic diseases (obesity, diabetes, and cancer later in life). These authors go further to say that teachers, school authorities and peers have a crucial role in children's choices in food and eating habits. Thus, the schooling environment is a suitable place for health education. Children need sufficient knowledge, skills, attitude, and values for promoting their health. The following section discusses literature related to factors that contribute to the food consumption of students.

2.4 Factors contributing to changes in the food consumption of students

The dietary habits of a person are often influenced by a variety of factors that include people's standing within society, the economy, religion, culture, and the way these factors interact (Kim et al., 2015:190). These bring context to the importance of an enhanced understanding relating to the changes that happen in the food consumption of students brought about by the changes in the environment under which the students find themselves at residence facilities of HEIs, and the impact of such changes on the life and health of the student (Neff et al., 2009:298). The

consumption of food by students at HEIs is influenced by an array of factors. This is often attributed to numerous influences that include the availability of food products for students, affordability, culture and background of the students, and lifestyle adopted by students upon arrival at an HEI (Neff et al., 2009:285). The study acknowledges that other factors are related to food consumption patterns. However, the above-mentioned factors will form the core to be articulated in this study. Hereunder, the factors related to the campus environment are discussed.

2.4.1 Campus environment

The change in students' geographical location and the environment in which they find themselves on campus can play a significant role in their food consumption patterns. This movement often becomes a significant turning point in terms of a student's eating habits and behaviour in relation to food. Such a change can be attributed to the responsibility that comes with the newfound independence away from home, signalling the beginning of adulthood that often requires management of their life, including deciding on meals that they consume (Kim et al., 2015:194). This has seen food consumption patterns of students change to less fruits, vegetables, and fish than the rest of the population, with most of them consuming meat, pastries, and carbonated drinks (Álvarez et al., 2015: 2657). The change in food consumption in the campus environment could be attributed to the availability of food to students at residence facilities. The availability of food variants is discussed further in the following section.

2.4.2 Availability of food

Alakaam et al. (2015) indicate that the availability of food refers to the consistent accessibility of food within proximity of a person's area of residence. The availability, or lack thereof, of food variants introduces a host of challenges as many students from outside the university's geographical location find it difficult to procure traditional and familiar food ingredients (Bridle-Fitzpatrick, 2015:205). The influence of the availability of food on the consumption patterns of students is further compounded by the student's ability to afford the type of food that can be both nutritious and filling at the same time (El Ansari et al., 2012:30) in these new geographical landscapes. This often leaves a student with few choices but to settle for what is affordable in terms of starchy staple foods that include wheat, rice, and potatoes, all of which are high in carbohydrates and very little other nutrients needed for healthy living (Gerbens-Leenes et al., 2010:2; Legwegoh & Riley, 2014:258).

The accessibility of food for consumption by students living at residence facilities at HEIs is also dependent on the food preferences of students. This is mostly influenced by the availability of imported products and foreign produce available for students in grocery stores (Potter &

Hotchknock, 2011:21). This can also be attributed to the worldwide nutrition transition in which people make a shift towards affluent food consumption patterns (Gerbens-Leenes et al., 2010:597) resulting from the development of economies in many parts of the world. Affordability plays a major role in the food consumption patterns of individuals, including students. The next section discusses factors that influence food patterns in relation to affordability.

2.4.3 Affordability

The level of income of individuals in the 21st century has become touted as an important factor in the food consumption patterns of human beings (Madiba, 2016:11). This is seen in the way socio-economic characteristics of households and individuals influence the type and amount of food they can afford (Gerbens-Leenes et al., 2010:2). Gerbens-Leens et al. further express that the typical food-composition of less affluent households consist of cheap starchy staple foods such as wheat, rice, and potatoes (Gerbens-Leenes et al., 2010:2). This was earlier suggested by Madiba (2006) citing that households with higher levels of income are more likely to access food items that are considered to have greater nutritional value than their low-income counterparts. The above discussion reveals the situation in which many students find themselves upon arrival at residence facilities of HEis. With the little income available to students residing at these facilities, maintaining a healthy diet is difficult to maintain (Munt et al., 2017:12). This leaves students with little or no choice in the type of food items they can afford (Deliens et al., 2014), making income an important factor in the consumption patterns of students at HEIs (Zsóka et al., 2013). Cultural norms, values and race appeared to be among the factors that influence the choice in food consumption patterns. The following section reviews literature related to cultural norms and values in food consumption choices of students residing at HEI residential facilities.

2.4.4 Culture norms, values, and race

Culture, norms, values, and race have often been touted as important factors in the food consumption patterns of communities (Freeland-Graves & Nitzke, 2013). This is given credence by the complexity of culture in relation to differences in societies in terms of knowledge, beliefs, morals, and customs in terms of food, eating and nutrition (Schütte & Ciarlante, 1998). This is confirmed by Fieldhouse (2013:25) indicating culture to be among the strongest determinants of food choice within a particular society, as it also allows for reflection of the society's dietary history while determining the quality and acceptability of the food consumed within the community (Scaglioni et al., 2018:711). Thus, the cultural values, norms and race surrounding the campus may lead to food and eating habits of members of a particular community because there are hardly any innate taste preferences at birth, but rather the development of certain likes and dislikes for

certain types of food as people are socialised into specific cultural cuisines (Savage et al., 2017:24), while Tomiyama (2015:216) found that gender and time of daily food consumption to be associated with food choice. Also, different cultures bring in different taste preferences in food due to social and cultural upbringing. Therefore, the cultural background of students also lays a foundation for individual product consumption as it fundamentally determines the kinds of products that are consumed by society (Schütte & Ciarlante, 1998). The students' change in lifestyles was found to be among the factors that may lead to newly adopted eating patterns while away from home. This is further discussed hereunder.

2.4.5 Change in lifestyle of first-year students

The transitionary period between adolescence and adulthood, including the stay at residence facilities of HEIs, is often characterised by independence, thereby requiring individuals to take responsibility for the food they consume daily (WHO, 2019). This leads to a change in lifestyle because students in residence facilities of HEIs may tend to cook simple and easy foods, and also undertake the practice of unfavourable eating behaviours such as irregular meals, skipping breakfast, frequent eating out and late-night meals (Kim et al., 2015).

What is noted above is a result of the change in the lifestyle of the students upon arrival on campus. This necessitates the promotion of healthy eating habits as this time is pivotal in building a foundation for lifelong healthy eating habits, thereby assisting in the management and avoidance of chronic health issues such as diabetes, or obesity among others (Hilger et al., 2017). Therefore, the determinants of food environments and food consumption patterns are discussed further in the section that follows.

2.5 The determinants of food environment and food consumption patterns

The determinants of food environments and consumption received much attention in the academic arena. Claasen et al. (2016) used a system-based tactic in establishing environmental attributes that influence consumption patterns. The authors classified the environmental determinants into physical availability, economic costs, political rules, socio-cultural attitudes, and beliefs. Claasen et al. (2016) modelled food environmental determinants into four nutritional environments:

i. A community that is distinct for accessibility of food outlets (for example retail stores, restaurants).
ii. Organised nutritional intake environments: these include home, school, and work environments.

iii. Nutritious information gathered by students based on ranges of choices, freshness, prices, nutrition on food items and promotions.
iv. Media and advertising environment. Hilmers et al. (2012:1648) affirm that micro environmental factors affect the food patterns of a population.

The authors state that food consumption and environmental conditions include:

i. Cognition, behaviour, biological, and demographic factors which are individual level.
ii. Interactions with family, friends, peers, and others in the community are social environments.
iii. Home, childcare, schools, work sites, retail food stores, and restaurants are a physical environment that includes restaurants where people eat, and
iv. Socio-cultural norms and values, policies, prices, and marketing are all micro-level factors.

Figure 2.1 illustrates the relationships between food patterns and consumption.

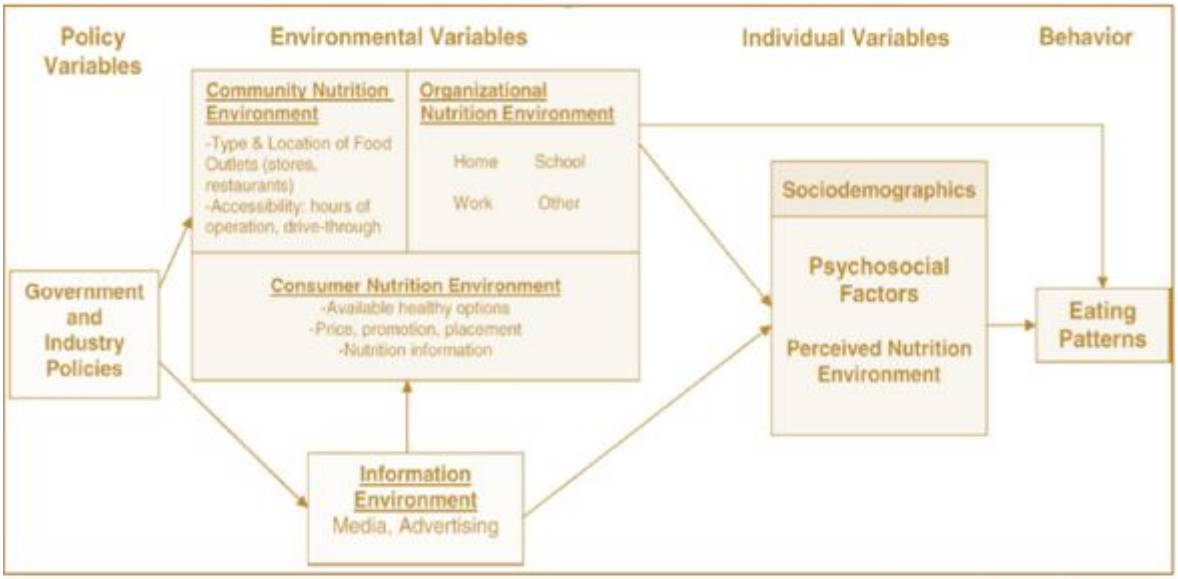

Figure 2.1: food consumption patterns

Source: Hilmers et al. (2012)

Hilmers et al. (2012) identified the food consumption determinants and created the model portrayed in Figure 2.1. Seemingly, environmental factors such as the availability of certain kinds

of foods in a certain area; as well as the organisational environments (school, home, work or other) play a significant role in people's selection of food patterns and consumption. Swinburn et al. (2013) noted that the most recent and comprehensive concept of food environment with relevant determinants are defined by the International Network for Food and Obesity/non-communicable diseases Research, Monitoring and Action Support (INFORMAS). The authors add that the INFORMAS identified four main dimensions of food environments (physical, economic, policy and socio-cultural). These food environments are influenced by the following factors:

i. the food industry;
ii. government;
iii. society; and
iv. individual factors.

According to Swinburn et al. (2013), the food industry creates the supply, promotes consumption, and contributes to sociocultural norms about food while Government policies, laws and regulations provide a framework within which the food industry must operate. Society establishes cultural norms, for example through traditional, religious, and cultural practices, whereas individuals interact with the food environment towards their food choices. Swinburn et al. (2013) created a framework with outputs that enable benchmarking and monitoring of food environments. According to this framework, process determinants refer to organisations, including the manner of investigating all sectors concerning compliance with policies and activities, while impact determinants refer to food environments including research on food composition, labelling, promotion, provision, retail, prices, trade, and investment. Crino et al. (2015) add that outcome determinants refer to the investigation of population diet, physiological and metabolic risk factors including health outcomes.

Figure 2.2 below depicts the interconnectivity of individual factors associated with food patterns intake based on environments.

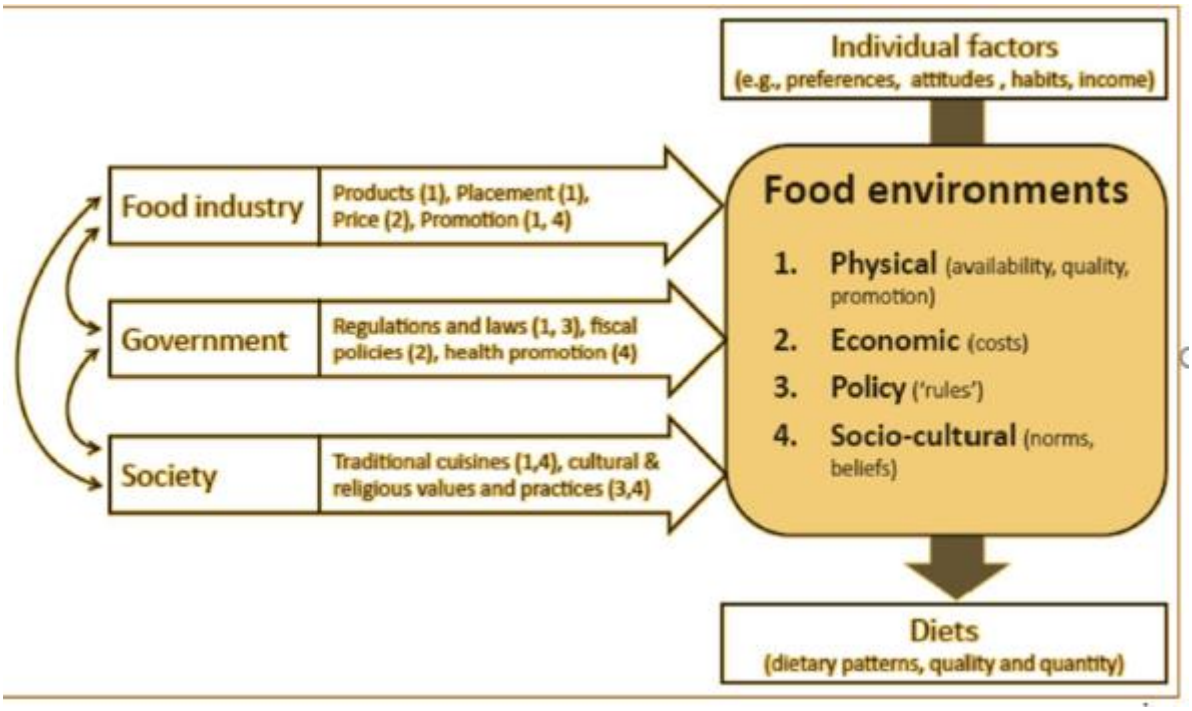

Figure 2.2: Individual factors affecting food environments.

Source: Swinburn et al. (2013)

From Figure 2.2 above, it is worth noting that physical, economic, policies, and socio-cultural norms and beliefs regulate the food choices of individuals. The section that follows reviews literature related to the relationship between food environments and diet.

2.6 The relationship between food environments and diet

According to Florack et al. (2013:114), internal cues such as satiety or eating pleasure are the driving forces behind the decision of what and how much to eat food. The authors escalate that literature on food consumption suggests that dietary decisions can also be motivated by internal cues such as ambience, package, size, plate shape, previous exposure to food-related cues and consumption by other people. The authors go further to say that social modelling of food intake influences the decision about dietary habits. Individuals follow the social eating guidelines regardless of whether they feel hungry, follow dietary restraints, or obesity. Florack et al. (2013:114-115) state that when inner restraints for eating are vague and concrete rules of eating are missing one can adopt the behaviour of others. Tam et al. (2017) mention that the World Health Organisation (WHO) suggested that an intake of various fruits and vegetables reduces the

risks of developing non-communicable diseases (NCDs); this dietary intake may also help to ensure an adequate daily and congestion of dietary fibre in one's body system. This recommendation from the WHO seems to be difficult to maintain and people across the globe struggle to adhere to this recommendation. Then again, the relationship between food environments and diet was studied by Larson and Story (2009), focusing on the periods between 1999 and 2009. In their study, they observed that there is a strong correlation between social, physical, and macro environments on food choices. Larson and Story (2009:59) acknowledged that many studies identified close relationships between food environments and food choices. Even so, their study concluded that most studies regarding food consumption patterns had methodological limitations that lead to questioning their credibility in guiding environmental interventions and policies**.** Claasen et al. (2016:6) supported that future research on food environments needed to address the study design, and also required multilevel investigations that include diverse subgroups such as age, gender and socio-economic status. Claasen et al. (2016:6) further state that future studies need to develop and evaluate the standard measures of dietary assessment methods. The following section reviews literature on food consumption patterns by geographical region.

2.7 Food consumption patterns by regions

Rodrigues et al. (2019:1634) state that the young adulthood period is an important time for the promotion of healthy eating behaviours as such behaviours are adapted later in life. This stage of life is a period wherein significant changes such as leaving family, commencing college/university, entering the workforce, partnering, or becoming a parent which lead to many people not concentrating on following a healthy and balanced diet or struggling to prioritise. As such, college and university students are among the group that needs to take full ownership of their diet. The worthless eating material is greatly influenced by the increase in urbanisation, mass media advertisement, including TV and nutrition knowledge of parents (Vardanjani et al., 2015: 54). Also, the change in eating behaviour is not country-specific but rather a worldwide phenomenon. The following sections bring forth literature to shed light on changes in eating patterns from different regions of the world. The section will first discuss literature related to changes in eating patterns in South Africa.

2.7.1 Food consumption patterns in South Africa

Claasen et al. (2016) observed that the food environment in South Africa changed drastically from the 1990s. The change in the food environment has been inspired by traders, foreign direct investment, and transnational food and beverage industries, including supermarket retailers and fast-food chains. The food environmental changes resulted in the availability of non-healthy but affordable food items in the country (Claasen et al., 2016:1). Meanwhile, Ronquest-Ross et al. (2015:1) observed that food consumption in South Africa is affected by food availability, accessibility, and choice. Ronquest-Ross et al. (2015) explained that dietary patterns or food intake choices are influenced by factors such as geography, seasons of the year, education levels, demographics, disposable income, government and other support services, urbanisation, globalisation, marketing, religion, culture, ethnicity, social networks, time, and the consumer. Ronquest-Ross et al. (2015) observed that since 1994, certain changes occurred in South Africa, which dramatically affected food consumption patterns which are continuing to grow due to shifts in food availability, accessibility, and choices. These changes include the growth of supermarkets, rising urbanisation, and growing capital incomes. The authors go further and state that the demand for high-value foods such as dairy, meat, fresh fruit, vegetables, processed, packaged, and prepared food has doubled. A study conducted by Steyn et al. (2011) found that the South African population commonly consumed street foods and fast foods; with 33.5% consuming street food and 35% consuming fast food at least once a week. However, socio-economic status seems to be one of the major influencing factors that play a role in fast food and street food consumption. Steyn et al. (2014) gave reference to a national representative cross-sectional survey that established similarities amongst fast food consumption patterns of South Africans, with 21.4% Black, 26.8% Coloureds, 30.1% Indian, and 28.3% White South Africans consuming fast foods two or three times per month. Hill et al. (2016:26) add that street foods are a local option for cheap and labour-free meals as most people lack proper housing and cooking facilities. Claasen et al. (2016:9) note that street food is commonly bought by young people who normally do not cook: 45.3% Black South Africans, 22.4% Coloureds, 15.2% Indian and 9.6% White South Africans. Seemingly, fruits and carbonated drinks are the most frequently consumed street food among all ethnic groups. Steyn et al. (2011:8) explained that vendors in the city areas are convenient, specifically for students who had little time to prepare a meal. People who have difficulty consuming regular meals at home often substituted home-cooked meals for ready-to-eat street foods that are easily accessible and affordable. Claasen et al. (2016) observed that there was an increase in demand for supermarket services in urban areas of South Africa due to changing consumer demographics. Urbanisation and westernisation have caused households to become more diversified, including the number of women who are more active in the labour force, while

increased access to information and improved education levels has facilitated individual health consciousness and food safety. The authors noted that there is a dependency on vendors and supermarkets due to less time for cooking and a greater need for convenience foods and new foods with high taste profiles (Claasen et al., 2016:13)**.** Equally important, the buyer's ability to purchase will increase depending on the salary accumulated with its advantages, such as distance and refrigeration for food storage that allowed the adaptation of purchasing patterns towards less frequent food purchases (Claasen et al., 2016:13).

2.7.2 Food consumption patterns in Brazil

Barreto-Neto et al. (2015:319) affirm that Brazil's young population has experienced a significant change in dietary patterns. This significant change in dietary lifestyle has led to an increase in overweight and obesity in this population. Barreto-Neto et al. (2015:319) express that an analysis of the eating habits of the population allows the identification of dietary factors associated with excess weight and the possibility of creating interventions and public policies for the control and prevention of obesity and associated diseases.

2.7.3 Food consumption patterns in Saudi Arabia

In Saudi Arabia, young adults are the group that is most exposed to unhealthy dietary patterns such as fast-food consumption. The change in dietary habits is greatly affected by lifestyle changes in this area (Alfaris et al., 2015:26488). In this population, the most consumed fast foods were burgers and carbonated soft drinks from restaurants at least once a week. This group was least concerned about the hygiene and safety standards at restaurants and only focused on the delicious food. This group prefers to eat at international restaurants as compared to local restaurants.

2.7.4 Food consumption patterns in the United States of America

Zagorsky and Smith (2017:13) state that the income disparities in America are traced back to the 1960s, 1980s and the early 1990s (1989-1991). In this era, the difference in food consumption patterns was gathered through a Nationwide Food Consumption Survey and Continuing Survey of food intake by individuals. In the period covering 1971-2002, an analysis of National Health & Nutrition – Examination Survey (NHANES) showed no improvement in dietary intakes in relation to income and race. The American food-based dietary guidance consisted of a MyPyramid and the Dietary Guidelines for Americans (DGA). The MyPyramid translated the DGA into eating patterns and five major food groups, namely 1) Fruits, 2) Vegetables, 3) Grains, 4) Meat, and 5) Milk.

This guidance indicated the fruit that should be consumed as a whole, and grain should be consumed to ensure adequate fibre intake. Thus, a shift in dietary patterns exists in this population. Although a paradigm shift is needed in the entire population; the lower-income households and non-Hispanic blacks were found to be the largest population that had poor dietary requirements in America. According to Kirkpatrick et al. (2012:624), differences in dietary intake are associated with income and race/ethnicity. American health disparities are seen to be an income-related phenomenon; as the lower socio-economic status of the minority sub-groups are prone to chronic ailments (Kirkpatrick et al., 2012: 24). Murray et al. (2016:143) state that type 2 diabetes and childhood obesity is a global threat to public health and public health systems with America ranking 3rd. Murray et al. (2016:143) report that research on type 2 diabetes and childhood obesity shows that these diseases will continue to increase morbidity and mortality rates if left unattended. Additionally, Murray et al. (2016:144) further state that effective treatment for type 2 diabetes and childhood obesity includes personal behaviour.

Murray et al. (2016:144) further note that physical activity and a healthy diet can greatly impact a person's Body Mass Index (BMI). A person's BMI is affected by the recommended fruits and vegetables, lean protein, whole grain, and fat-free or low-fat milk products daily. Murray et al. (2016:144) express that since World War 2, America experienced a major shift in dietary and lifestyle behaviours. Family income and single-parent households have shifted the balance of meals due to the time constraints of an industrialised society. This society consumes frozen ready-to-eat and food service takeaway meals and is becoming dependent on processed foods. Processed foods are a major contributor to obesity and diabetes. According to Rodrigues et al. (2019:1634), improved health outcomes such as reduced obesity and food-related no-communicable diseases can be gained through vegetable consumption. Although this may be the case; the following section discusses literature related to the importance of being informed about the foods which individuals consume.

2.8 Importance of information on food consumption for consumers

The importance of consumer awareness in the kinds of food they eat and how it is processed has been observed. Rosenheck (2011) posits that comparatives on food consumption information will assist in understanding trends in food and eating patterns among young adults. Educating first-year students on different kinds of food groups and food consumption patterns is important for understanding nutrition and promoting healthier food purchases (Videon & Manning, 2013:376). Labadarios et al. (2011) found that the most-consumed food groups for South Africans aged 16 and older, are cereals/roots, meat/fish, dairy, and vegetables other than vitamin A-rich vegetables,

while eggs, legumes, and vitamin A-rich fruit and vegetables were least consumed. Thus, students must be educated on the health implications of food consumption imbalances. However, to conclude on the imbalance in their food consumption patterns, more data needs to be gathered to create informed decisions on where or how to assist the students. The data on the food consumption patterns of students can be achieved through conducting surveys.

2.8.1 Balance food sheets

To conduct food consumption pattern surveys various sources of data are used which are derived from Food and Agriculture Organization Corporate Statistical Database food balance sheets (FAOSTAT FBS), household budget surveys or individual dietary surveys. Each method has merit based on desired outcomes. This can be used as a total amount of commodities that are accessible for students' consumption during the year. A balanced food sheet or food balance sheet demonstrates a broad picture of a country's food supply during a particular period. Ronquest-Ross et al. (2015:3), note that for each food item, the food balance sheet indicates the availability for human consumption, which corresponds to the sources of supply and their utilisation. When describing the consumption of foods per capita of a population, FAOSTAT FBS does not represent the actual amount of food consumed and will invariably result in an overestimation of food consumption compared with individual dietary surveys. The FAO FBS can illustrate an estimated food availability, estimated population, an individual dietary estimation and protein and fats supply daily (Ronquest-Ross et al., 2015). Even so, nationwide surveys appeared to be effective tools for measuring the nutritional levels of the population in countries.

2.9 The importance of individual dietary surveys

Ronquest-Ross et al. (2015) report that nationwide surveys are conducted by several countries in understanding the food and nutrition of their populations in longer terms. Smaller surveys in smaller numbers of groups are often used because they are easy to study and obtain objective information from using simple random sampling. This, however, has not been the case in developing countries due to a lack of resources for conducting such surveys (they are expensive and labour intensive). In developing countries like South Africa, the nationwide survey on the nutritional levels of the population was conducted only in 1999. The survey only targeted children aged between one and nine years old. Therefore, in South Africa, nationwide data related to dietary surveys among its population remains limited. Van Heerden and Schönfeldt (2011:12) affirm that nationally representative food and dietary intake data in South Africa is limited. Even so, Colbin (2013) in Cape Town found that rural migrants in cities neglected their traditional food which includes grains, root plants, lentils, and greens. Once rural migrants move to the city, they

tend to adopt foods that are associated with status, such as meat and fast foods. With the change in lifestyle in the city, the consumption of foods such as samp (corn), beans, greens, and root plants get to be associated with poverty**.** Hill et al. (2016:25) found that people living in low and middle-income countries such as South Africa consume high amounts of street food. Their study found that in Cape Town, this applies particularly to Black single males with a high school education. This group was found to be consuming street food on a daily and weekly basis. The most frequently consumed street food was found to be fruit, foods and baked products, cold drinks, sweets, peanuts, crisps, fruit juice, biscuits, and chocolates. The study found that this sample group was willing to purchase healthier foods if available. The healthier food choices option for this group was fruit, meat/chicken and vegetable stews, yoghurt, and nuts.

Puoane et al. (2006:92) conceptualised food as a cultural symbol and eating is a symbolic act through which people communicate, perpetuate, and develop their knowledge, beliefs, feelings, and practices in life. Therefore, dietary surveys must be conducted in developing countries such as South Africa based on the country's diverse cultural wealth. This type of data will enable the monitoring and measuring of healthy dietary intakes of its population. Puoane et al. (2006:92) express that an understanding of cultural influences on eating habits is essential for the provision of realistic educational interventions designed to modify dietary practices. Ronquest-Ross et al. (2015:1) note that there has been a great change in food consumption patterns in South Africa as people have shifted to more convenient western-oriented diets. According to Claasen et al. (2016:7), knowing what South Africans eat is essential in determining their food choices. Claasen et al*.* (2016:7) indicated that the first National Food Consumption Survey (NFCS) was conducted in 1999, the main objective of which was the collection of baseline information. This information was used to direct the food fortification policy in analysing norms on foods that are eaten. Research has identified that the five foods mostly consumed by South African children (1–9 years) were maize meal, sugar, tea, whole milk, and brown bread (Claasen et al., 2016:7). Then again in 2010, a survey on dietary diversity was conducted among 3 287 teenage participants across the country (Labadorios et al., 2011). The survey used non-quantified recall to record all food and beverages consumed during the previous 24 hours. In this survey, types of food were categorised into nine different food groups: 1) cereals, roots, tubers; 2) meat, poultry, fish; 3) dairy, 4) eggs; 5) Vitamin A rich fruit and vegetables; 6) legumes; 7) other fruit; 8) other vegetables; and 9) fats and oils (Labadarios et al., 2011:7). To determine results, a Dietary Diversity Score (DDS) was calculated by counting each food group once. A DDS of 9 indicated a very varied diet while a DDS less than or equal to 4 indicated poor dietary diversity and food insecurity (Labadarios et al., 2011). The results of the study showed that 38.3% of South Africans had only consumed between one

and three food groups the previous day. The food groups included cereals, meat and poultry, dairy, and vegetables, with consumption of Vitamin A-rich fruit and vegetables being low. Claasen et al. (2016:8) gave reference to the latest South African National Health and Nutrition Examination Survey (SANHANES-1, 2014:5) which showed similar findings to Labadarios et al. (2011:12). From SANHANES-1, a national average of DDS of 4.2 was calculated, where 39.7% of the population having a DDS of more than or equal to 4 were observed. South African nutritional intake of fats (as fatty meat, fried foods, and high-fat snacks), and sugar (sweetened beverages, confectionery, and sweet snacks) was also provided by SANHANES-1. The results showed that high fat and sugar intake was discovered to be a problem across the country's population, particularly for students at tertiary institutions.

2.10 Chapter summary

This chapter reviewed literature related to food consumption, food environment and food patterns. The chapter provided an overview of student movements and their food consumption, followed by the factors that contribute to changes in the food consumption of students. Literature on food consumption patterns of students was reviewed, including the importance of individual dietary surveys as well as the determinants of the food environment and food consumption patterns in South Africa. The chapter further reviewed literature on the relationship between food environments and diet.

The following chapter discusses the methodological approaches employed in the study.

CHAPTER 3
RESEARCH METHODOLOGY

3.1 Introduction

A decision to study a phenomenon of any nature requires processes that will provide the study with credible underpinnings (Bryman, 2016:2). Tummons and Duckworth (2013:30-31) add to the notion that if research is to be strong, it must apply scientific principles. Therefore, the methodology section demonstrates the plan to address the research objectives (Tummons & Duckworth, 2013:55). Choy (2014:99), Creswell (2017:180) and Walliman (2017:72) note that there are two forms of research approaches, namely quantitative and qualitative methodologies. Quantitative research quantifies attitudes and opinions from a larger sample population whereas qualitative research uncovers insight into society (Creswell, 2017:18). The use of quantitative or qualitative primary research is determined by the chosen research design (Wang, 2015:146; Creswell, 2017:13; Walliman, 2017:9). Walliman (2017:9) states that there are numerous research designs available to address the relevant research problem such as descriptive, exploratory and correlation design.

According to Walliman (2017:10), descriptive studies require prior knowledge of the research problem. Wang (2015:224) and Walliman (2017:10) add that in descriptive studies a phenomenon is observed and recorded. Furthermore, Creswell (2017:14) states that descriptive studies often make use of surveys with a sample of the population, while the exploratory design investigates uncertain phenomena (Wang, 2015:226; Creswell, 2017:14; Walliman, 2017:11). Choy (2014:99) and Wang (2015:257) make known that exploratory studies are often less structured and make use of in-depth interviews and panel discussions, whereas correlation studies examine the effect an independent variable has on a dependent variable (Wang, 2015:73; Walliman, 2017:10). According to Wang (2015:74), correlation studies often find a link between the variables and consist of laboratory or field experiments. This study mimicked the descriptive research approach as the basis for this investigation; therefore, the exploratory and correlation approaches were deemed to be irrelevant based on the nature of this study.

An overview of the research methodology applied in this study is discussed hereunder.

3.2 Overview of research methodology

The Oxford English Dictionary (2002) defines research as a systematic process of studying material and sources to establish facts to reach new conclusions. Such enquiry requires the development of a logical and rational way of thinking that allows for critical examination of every aspect of day-to-day situations (Kumar, 2014:2). This definition may sound simple and straightforward, but the open-ended nature of research often generates many questions and answers (O'Leary, 2004:1). This is further given credence by Kumar (2014:10) quoting the work of Lundberg (1942:5) as follows:

> "Scientific methods consist of systematic observation, classification, and interpretation of data. Now, obviously, this process is one in which nearly all people engage in the cause of their daily lives. The main difference between our day-to-day generalisations and the conclusion usually recognised as scientific method lies in the degree of formality, rigorousness, verifiability, and general validity of the latter".

The above affirms Kumar's (2014:11) assertion of research as a systematic way of collecting, analysing, and interpreting raw data to reach conclusions and respond to research questions formulated for the study. The consequence of this school of thought confirms the assertions of Henn et al. (2006:10) who state that research is not an arbitrary activity but an activity that follows certain characteristics, which are articulated by Kumar (2014:11) to include:

- Controlled – in real life many forces can affect the outcome(s) of an event. In the social sciences, a particular event seldom occurs for a single reason. It is this multiplicity of factors that determines the outcome of an event. This makes it important to establish a cause-and-effect relationship, which will enable a study design to establish a link between the cause(s) with the effect(s) and vice versa.
- Rigorous – this refers to being scrupulous in ensuring that the procedures followed to find answers to questions are relevant, appropriate, and justifiable.
- Systematic – this implies that the procedures adopted in the study follow a logical sequence.
- Validity and verifiable – refers to the findings that can be verifiable by another researcher. This, however, is arguable in social science. Ezeudiji (2013:5) states that it is not possible that different researchers investigating the same subject at the same location at different times may come up with the same findings. Ezeudiji (2013) explains that humans, being the subject of this study, are highly mobile. Therefore, access to the same sample when the second researcher investigates is impossible.

- Empirical – this refers to the conclusions drawn from the data gathered from the desired population.
- Critical – referring to the critical scrutiny in procedures and methods employed in the investigation. Kumar (2014:11) escalate that the process of investigation must be free from any drawbacks and should be able to withstand critical scrutiny.

3.3 The research process

This section provides detail of the sequential steps for the planning of the adopted research process. Bell et al. (2031:20) state that a research project requires planning and procedures. Sarantakos (1998:96) presented a model that presents the summary of the main elements of research. Even so, Kumar (2014:35) argued that there is a need to develop a generic model suitable for multiple disciplines that will provide a step-by-step research approach. Kumar (2019:31) states that there are various types of research approaches that scientists can embark on, ranging from application research, research objectives enquiry and enquiry modes. Figure 3.1 illustrates the variants in research approaches.

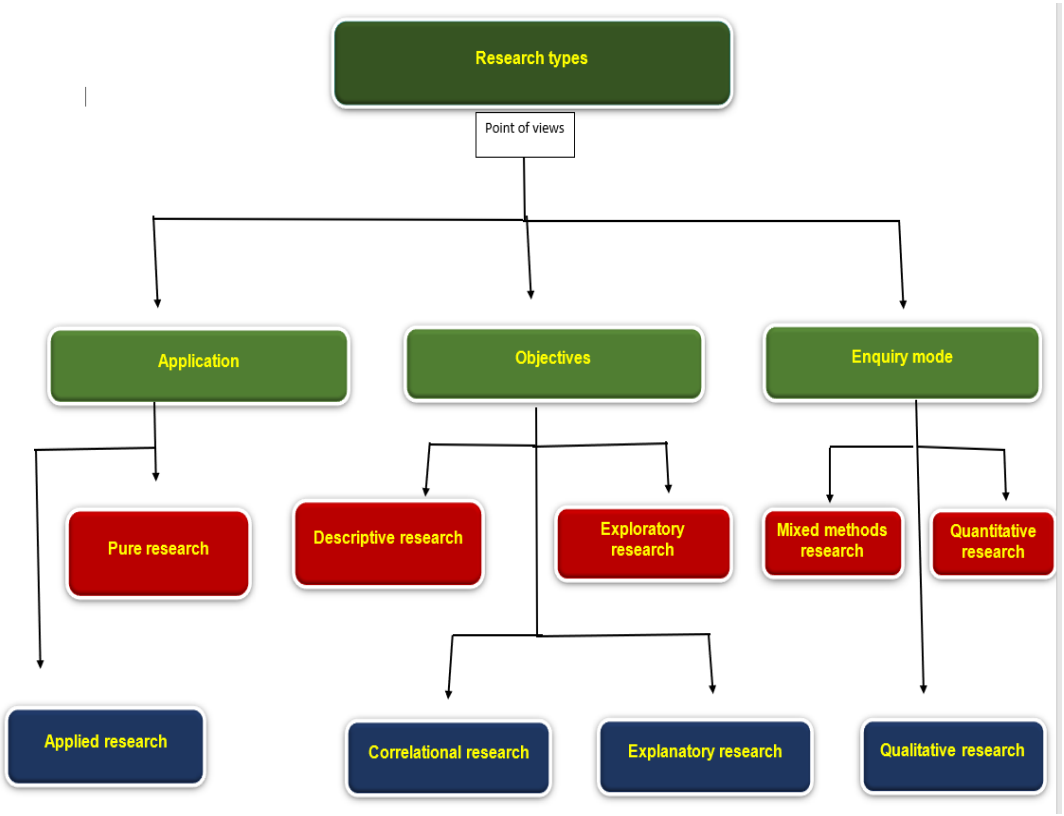

Figure 3.1: Various research approaches

Source: Kumar (2019:39)

Kumar (2019:31) notes that social science research is geared toward the processes of meeting the expectations of the study. Even so, the broader approach is similar irrespective of the discipline, thereby identifying research to be a simple activity designed to respond to questions related to our day-to-day activities. Therefore, this study was guided by the basic research process of a social science exploratory approach, which includes the formulation of the research problem, review of related literature, determining of research aim and objectives, research methodology as well as data collection and handling approaches. The next section discusses how the research problem was formulated.

3.3.1 Formulation of research problem

The first and arguably most important step in the research process is the formulation of a research problem (Kumar, 2014:38). This concept is defined as “an intellectual stimulus calling for a response in the form of scientific inquiry” (Henn et al., 2006: 53). This can be undertaken in three distinguishable steps aimed at narrowing the range of interests a particular study may have:

- The selection of a topic area.
- The selection of a general problem, and
- The reduction of the general problem to one or more specific, precise and well-delimited questions (Bless et al., 2013:43).

The steps above involve a process of focusing from the general to the specific (Henn et al., 2006: 55). This is proposed by Mouton (1996: 65) indicating that research moves from a point of reflection of the world in which the researcher lives. The reflection need not be structured, as it can be a thought, a conjecture, a question or even a hypothesis. Such processes are not instantaneous as they can occur through the consultation of existing theories, and issues that arise from academic and/or professional literature over a period of time (Henn et al., 2006: 55). This is further asserted by Kumar (2014: 66-67) indicating considerations to be kept in mind when formulating a research problem:

- *Interest* –Selecting a topic that does not greatly interest the researcher could prove difficult to sustain the required motivation, time, and energy to complete the project. A research journey is usually time-consuming and requires hard work and unforeseen problems could occur.

- *Magnitude* – Investigation into a certain area requires sufficient knowledge about the research process to be able to visualise the work involved in completing the proposed study.
- *Measurement of concepts* – The use of concepts in the study (especially in quantitative studies) requires clarity in terms of indicators and their measurement.
- *Level of expertise* – The researcher is required to ensure that he/she has an adequate level of expertise for the proposed task.
- *Availability of data* – If the topic entails the collection of information from secondary sources, the researcher needs to ensure that this data is available and in the format that the researcher wants before finalising the proposed topic.
- *Ethical issues* – In the course of conducting a research study may adversely affect some respondents/participants where sensitive and private information may be shared, or respondents/participants may be 'guinea pigs', part of an experimental investigation. How ethical issues can affect the study population and how ethical problems can be overcome should be thoroughly examined at the problem formulation stage (Kumar, 2014:66-67).

The above discussion provides a solid platform for the generation of issues for this investigation, allowing the study the ability to delineate the area of interest in a specific and manageable phenomenon, while developing an awareness of the way others have sought to explain the issue(s) (Henn et al., 2006: 55).

3.3.2 Review of related literature

The review of literature plays an important role in the research process, as it enables the study to identify inconsistencies and gaps, provide background information about the phenomenon under study, and indicates the place in which the study fits (Bless et al., 2013:57). For this study, various sources were used to provide information on food consumption patterns for first-year students staying at HEI residential facilities. Relevant publications such as books, journals, conference papers, newspapers, and reports, amongst others, were obtained from libraries of universities, research institutions, organisations, and trade associations.

- Key journals, mainly the *Journal of Food Security, the Journal Paediatric Gastroenterology and Nutrition, the Journal of Food Science and Technology* and the *American Journal of Clinical Nutrition* were used in finding articles related to food consumption patterns of first-year students living in the Cape Metropole area.

- Keywords (for example, food, consumptions patterns, nutritional value, school residences, undergraduate student, and HEI) were used to search a variety of databases.
- A review of the contents of the abovementioned sources was carried out to identify additional relevant material.

The process of reviewing literature is not just useful for the establishment of background information on the phenomenon under study but also plays a significant role in the articulation, development of the framework proposed by the study, and formulation of recommendations. In addition, literature provides a platform for the study to undertake a sound discussion that enables the contextualisation of the results, thereby confirming or challenging existing theory and providing the study relevance in terms of the body of knowledge to which it aims to add (Henn et al., 2006: 282).

3.3.3 Determining the research aim, objectives, and questions

This study aimed at establishing the eating patterns of first-year students living at HEI residences in Cape Town. The study targeted two residential properties at HEIs in Cape Town, South Africa. The study endeavoured to establish basic healthy eating habits that will sustain students residing at residences while they study at HEIs.

The research aim and objectives of the study are:

- To investigate the food consumption patterns of first-year students living at residence facilities of HEIs in the Cape Town Metropole.
- To identify the factors that cause a change in consumption patterns of first-year students living at residence facilities of HEIs in the Cape Town Metropole.
- To recommend a balanced diet for healthy living at residence facilities of HEIs based on the findings.

Thus, every research project must follow a specific philosophy in meeting its objectives. Research philosophy is a system of beliefs and assumptions that are geared towards the generation of ideas into knowledge (Saunders, Lewis & Thornhill., 2016:135). The main research philosophies are critical realism, interpretivism, positivism, pragmatism, and postmodernism. Critical realism is about the discussion of the underlying structures of reality (experience and what we see), while interpretivism is about the creation of a newer and wealthier understanding of the interpretations of social worlds and contexts. Whereas positivism is about testing and confirming data from

existing theories. Meanwhile, pragmatism is about concepts that support a particular action, while, postmodernism uses the role of power relations and language in deconstructing the line of thought and empowerment of the marginalised views (Saunders et al., 2016:135-143). Based on the aims and objectives set for this study; this research reviewed existing literature in understanding the phenomenon under investigation and as such, the positivist paradigm was perceived to be appropriate for this type of research. This grounding allows the researcher not to claim to discover the "truth" of anything but to establish probable facts which can be used until new information and theories which can provide more comprehensive explanations of a phenomenon under study are discovered or explained (Veal, 2011: 32).

3.3.4 Selection of research approach and design

Bryman (2004:19) states that the two most common strategies for research are quantitative and qualitative research methodologies. These research strategies make use of various tools in collecting data. The quantitative research strategy focuses on collecting data in large numbers (survey questionnaires) and further analyses this data in a statistical procedure. Then again, the qualitative research strategy is concerned with collecting data through words such as hosting interviews, focus group meetings and participatory observations. This section provides the research strategy utilised in this research and the following section discusses the research approach to this study.

3.3.4.1 Approach followed for this study

The study employed a quantitative approach relying on a questionnaire to collect the data needed to respond to the research questions formulated in Chapter 1. This approach works based on generating statistics through the use of a survey method. The applicability of the chosen methodology is aligned with the data needed to respond to the study questions. The data required to satisfy the objectives of the study needs to be collected and presented in a manner befitting for the study to be empowered to objectively draw conclusions and inferences that can be generalised, as prescribed by Kumar (2014:14).

3.3.4.2 Research design

This descriptive study aimed at explaining the patterns and trends observed from the target audience (first-year students at HEI residences). This enables difficult issues to be raised, thereby establishing causality (Veal, 2011:7). This can be exemplified in the study's aim to investigate the change in food consumption patterns of first-year students upon arrival at residence facilities of HEIs. This is aligned with Veal's (2011:7) proposition that there is an an increase in A (change in food consumption pattern) because of a corresponding fall in B (move from home).

3.3.4.3 Population and sampling techniques

A research population refers to the actual number of potential participants who have the probability to participate in a study (Blumberg et al., 2011:166). The provision of a comprehensive understanding of data collection techniques requires that the study identify subjects (population) from which the required data can be solicited. This can be done in two ways—a census, which needs all elements within the population to be studied, which is impossible; and sampling, a method that constitutes that data be collected from a proportion of the entire population. This has been undertaken through the identification of the population from which a sample was drawn using methodical sampling techniques discussed in the section that follows.

The study elected to employ a sample from the total population as described by Creswell (2014:33) to be determined by factors such as the expense of data collection and the need to have sufficient statistical data. Alvi (2016:12), Etikan et al. (2016:1) and Mesa et al. (2016:327) state that there are two groups of sampling methods, namely probability and non-probability. According to Mesa et al. (2016:329), probability sampling occurs when all respondents of the target population have a chance of being selected. Mesa et al. (2016:329) and Alvi (2016:22) explain that simple random and cluster sampling methods form part of the probability sampling procedures. Simple random sampling occurs when the respondents know they have an equal chance of being selected while cluster sampling involves sampling based on geographic areas such as cities and towns (Alvi, 2016:22).

When pursuing a non-probability sampling technique, the subjects of an investigation do not have an equal chance of being selected (Etikan et al., 2016:2; Mesa et al., 2016:327; Alvi, 2016:13). Non-probability methods include convenience sampling where the sample is chosen based on accessibility to the researcher and snowballing sampling that creates a chain of respondents from selecting one subject (Alvi, 2016:29; Mesa et al., 2016:328). Studies can use non-probability sampling when probability sampling is not feasible. Convenience sampling is described as an approach that obtains information from the population that is available (Quinlan, 2011:479; Zikmund et al., 2013:392;). Tummons and Duckworth (2013:79) indicate that a convenient sampling approach is about including people who are easily recruited, easily available and who are willing to participate. This study applied a non-probability sampling route in a form of convenience and snowballing sampling techniques. Kumar (2014:244) explains that the snowballing technique collects data from a few individuals in a group or organisation selected and then the respondents are asked to identify other people in the population or organisation to partake in the survey. In this study, this process continued until the fieldwork was finalised.

The population for this study comprised only first-year students residing at the residential facilities of two HEIs located in the Cape Town Metropole area. These facilities house first-year students who are the respondents and were required to respond to questions formulated in the questionnaire. The population of the two residences varies but the sample aimed for was:

- From the TVET College in the Cape Town Metropole area, a total of 70 first-year students residing in this facility were intended, due to the size of the facility and the number of students residing there.
- From the Cape Peninsula University of Technology in the Cape Town Metropole area, a total of 291 first-year students were aimed for. This sample was derived from a total first-year student population of 1 232 in residence at CPUT.

However, due to limitations in data collection, a total of 150 questionnaires were used in this study. The limitations are this study are discussed later in this chapter.

3.3.5 Selection of data collection techniques

According to Almalki (2016:290) and Bacon-Shone (2015:40), the data collection techniques used for qualitative research differ from quantitative research. Bacon-Shone (2015:48), Almalki (2016:291), Ramakumba (2016:65) and Creswell (2017:14) stated that there are three common data collection techniques, namely interviews, observations and survey questionnaires. The interview method aims to interpret respondent's opinions and beliefs on relevant topics (Bacon-Shone, 2015:49; Parveen & Showkat, 2017:3). The interview method can be either structured, semi-structured or unstructured (Parveen & Showkat, 2017:4), while the observation method enables a systematic recording of events as they happen (Parveen & Showkat, 2017:5). When an observation method is applied the researcher must not influence the behaviour of respondents (Bacon-Shone, 2015:49; Parveen & Showkat, 2017:5). The survey questionnaire method aims to quantify people's beliefs and opinions (Creswell, 2017:14; Parveen & Showkat, 2017:5). The most common survey tools are questionnaires (Parveen & Showkat (2017:5). Creswell (2017:14) and Parveen and Showkat (2017:5) indicate that questionnaires provide quantitative information about a proportion of the population. This study made use of a survey questionnaire technique as the measuring instrument. Brace (2018:3) reveals that questions in a questionnaire survey can be developed either in an open or closed-ended manner. Open-ended questions allow the respondents to give more detail in their answers, whereas closed-ended questions guide the respondent to select how they feel (Brace, 2018:3). Based on the quantitative nature of this study, close-ended questions were applied.

The questionnaire was designed from the literature reviewed in understanding the student food consumption phenomenon and the researchers' personal knowledge of food consumption. The questionnaire comprised three sections. The first section collected demographic information, the second section investigated availability, access, and frequency of food consumption, while the third section provided food diversity lists that show categories of food that were likely to be consumed by first-year students residing in Cape Town. The questionnaire was divided into these sections so as to measure and distinguish differences or similarities in food consumption and possible changes in the eating behaviour of students and possible changes in dietary habits since relocating to resident facilities of HEIs. Also, the questionnaire aimed at capturing the variants of foods consumed by first-year students. The questions were presented in a categorical manner format for easy management and interpretation. The categorical manner was in a 4-point measuring scale on food consumption and frequency of consumption, ranging from 1-2 times a day (1), 2-3 times a week (2), 4-5 times a week (3) and 1-2 times a month (4). The following section discusses the primary data of this study.

3.3.6 Primary research

The primary data collection for this study commenced upon receipt of ethical approval from the researcher's institution of affiliation (CPUT). Before receiving approval for data collection, the researcher approached the targeted residence managers and introduced the study aims and objectives, seeking permission to conduct research on their premises. Both managers of the targeted residence facilities granted consent to collect data on their premises. The managers granted the researcher consent letters which were later used for the application process of ethical clearance from the researcher's university. Upon receipt of ethical clearance permission, the researcher went back to the managers and scheduled the dates on which the researcher may collect data on both premises. Primary data for this study was pursued via a survey questionnaire distributed at two HEI residences in the Cape Town Metropole area. The data were collected by the researcher and a fieldworker. The researcher recruited one third-year student from one of the residential facilities of a nearby university. The researcher communicated with the manager and asked for a referral for a senior student to assist in the study. The manager identified and introduced the senior (third year) student to the researcher. The researcher introduced the study to the student and thereafter trained the student on how the questionnaire needed to be completed. The recruited senior students were able to identify possible first year students to participate in the study. Additionally, the identified respondents were instrumental in identifying other students until saturation was reached. In collecting data, the researcher and the fieldworker introduced the research to the students, and they were briefed about how to complete the

questionnaire. Thereafter, the researcher and the fieldworker browsed through the completed questionnaires for accuracy. The data collection occurred over a two-week period in June/July 2019. During the two weeks, the researcher and the fieldworker approached first-year students with the assistance of other students and the fieldworker in identifying the first-year students at the residential facilities. The researcher and the fieldworker were stationed at the entrances to both residential facilities and students were approached as they were passing, either entering or leaving the residence. The data collection occurred daily for a week from one residence and another week from the other residence. The collection was conducted from Monday to Sunday in both residences. However, the response rate in collecting data in both these residences was rather low. This may be because students attend classes during the day at different times. Therefore, to improve the response rate, data were also collected during weekends (Saturday & Sunday) in both residences and a total of 150 usable questionnaires were obtained.

3.3.7 Instrument validity and reliability

According to Kumar (2014:7), the research instrument must be validated. Therefore, this section discusses the reliability and validity of the research instrument used in this study.

3.3.7.1 Validity

Kumar (2014:7) explains that validity is about ensuring that correct procedures have been applied in research. This is referred to by Tummons and Duckworth (2013:98) as the truthfulness of the research, while Bernard (2013:45) explains that validity is the accurate trustworthiness of instruments, data, and findings in research. The extent of generalising (external validity) the obtained results studied to a bigger population increased with the relative size of the sample employed (150 respondents). According to Veal (2011:46), absolute validity in social sciences cannot be definite. The use of variables identified in the literature and the researcher's personal knowledge enhanced the internal validity of this research (Veal 2011:46; Ezeuduji, 2013:5). Bernard (2013:46) adds that respondents need to be asked questions that are not alien to their culture, otherwise the research instrument becomes invalid should they not understand their questioning. The validity of this study was increased using a relatively large sample size and the use of variables emanating from previous studies. Also, the questionnaire was piloted prior to data collection. This was done to test the validity of the measuring instrument. A total of 10 questionnaires were distributed by the researcher to determine the understanding of the research instrument by respondents at two residential facilities of HEis in the Cape Town Metropole area. Upon piloting, the study used the questionnaire as it was apparent that this research instrument was user-friendly as the respondents easily navigated through self-administering the research instrument.

3.3.7.2 Reliability

Tummons and Duckworth (2013:99) explain that reliability is all about ensuring consistency in research. Kumar (2014:7) opine that for research results to be validated as reliable, similar results should be obtainable should there be a repeat of the same study. In social sciences, however, comprehensive reliability (attaining the same results from a repeat study using different respondents) is uncommon. This is based on humans (the subjects of this investigation) living in an ever-changing socioeconomic status and high mobility. Ezeudiji (2013:5) indicates that further studies are always necessary in keeping track of the ever-changing human situation and desires. The reliability of this research can be viewed by the way data were handled. The first stage of data analysis employed univariate descriptive analyses (frequencies, mean and standard deviation) to describe respondents' profiles and views and the second stage used logistic regression analysis for inferential statistics. The final stage of data analysis conducted reliability tests on the categorical measuring scale variables in Section B and Section C part of the questionnaire using Cronhan's Q-Test. A Cronhan's Q-test is defined by Glen (2016) as a non-parametric way of finding the difference in matched sets of three or more frequencies of proportions. The author goes further to say that the Q-test is usually used in a group of people performing a series of tasks to monitor success or failure.

3.4 Data analysis

The collected data were analysed using Stata Data Analysis and Statistical Software version 15 (StataCorp, 2015). Leckie and Charlton (2013:2) state that Stata Statistical Software is used for statistical analysis reasons due to its good quality graphics that allow publication. Furthermore, the authors add that Stata Data Analysis and Statistical Software is an effective data management tool. Moreover, Leckie and Charlton (2013:2) say that Stata Statistical Software is a standard and advanced commander for statistical model fitting for various forms of multilevel models to manage variables at different levels of data hierarchies, including the calculation of statistics across the groups or replicates. Landau and Everitt (2004:28) state that in general, data analysis begins with the calculation of several summary statistics, which involves the mean, median and standard deviation through the creation of informative graphical displays of data such as histograms, box plots, stem, and leaf plots. At this stage, the aim is to describe the general distributional properties of the data and to identify any unusual patterns of observations that may cause problems later in the analysis (Landau & Everitt, 2004:28). This study employed univariate analysis of demographics in understanding the sample. Moreover, univariate analysis with regard to food availability, food access, and frequency of food consumption summarised the statistics of food diversity. The patterns in the data are shown in a graphic format which is followed by logistic

regression modelling so as to predict changes in food patterns and factors that determine diversity. Ranganathan et al. (2017:148) define a logistic regression analysis as a statistical technique employed to evaluate the relationship between various predictor variables (categorical or continuous) and an outcome that is binary (dichotomous). Stoltzfus (2011:1099) notes that regression analysis is a valuable research method based on its versatile application to various study contexts. According to Sperandei (2014:12), logistic regression is used to gather the odds ratio in the presence of more than one explanatory variable. The author adds that the greatest advantage of logistic regression is that it allows the use of continuous explanatory variables, and it is easier to handle more than two explanatory variables simultaneously. Sperandei (2014:14) further indicates that logistic regression models affect the chances of an outcome based on individual characteristics. These results were presented using tables and graphs revealing the food consumption patterns of first-year students in the HEIs in the Cape Town Metropole area.

3.5 Limitations of the study

This study was limited to first-year students at two HEI residences in the Cape Town Metropole area. This was a limitation of this study as data can only be obtained from this group, which is not always easy to identify the first years from the rest of the students. Therefore, the researcher needed to be constantly looking out and asking students what year they were. The nature of this study “food patterns of students” also only permitted the collection of data while students were busy with their curriculum activities. Students were not always available at the residential premises; some were busy with school-related activities, and some were busy with social activities on the weekends. Thus, only 150 usable questionnaires were obtained. Other limitation were the impacts of Covid-19 on face-to-face teachings, the researcher moving from Cape Town to the Eastern Cape, financial constraints in continuing with the study, and health issues.

3.6 Ethical considerations of the study

To ensure ethical standards are maintained, personal information such as the names of individual respondents was not included in the questionnaires. The collection of data was conducted upon approval from the management of the HEI residences where the study was conducted. An informed consent form was given to first-year students to inform them of the study, and for them to indicate their willingness to participate in the study by accepting a questionnaire. The study was undertaken following approval from the CPUT Faculty of Business and Management Sciences’ Ethics Committee (see Appendix A). Participation in this study was purely voluntary and participants were allowed to withdraw at any time without suffering any prejudice. Participants

were assured that all information would remain confidential, and they were guaranteed of anonymity.

3.7 Chapter summary

This chapter discussed the methodology applied in this investigation. The chapter provided an overview of the research methodology, which was followed by the research process. The research process discussed the formation of the research problem, the reviewed literature, the research aims, objectives and research questions, the selection of the research approach and research design, the selection of data collection techniques, the selection of subjects (population) and sampling, as well as the processing of data. Also stated were the limitations of the study and the ethical considerations of the study.

CHAPTER 4

INTERPRETATION OF RESULTS

4.1 Introduction

This chapter interprets the results of the data gathered from the questionnaires administered to first-year students in the residences of two HEIs in the Cape Town Metropole area. This study sought to:

- Investigate the food consumption patterns of first-year students living at residence facilities of HEIs in the Cape Town Metropole;
- Identify the factors that cause a change in consumption patterns of first-year students living at residence facilities of HEIs in the Cape Town Metropole; and
- Recommend a balanced diet for healthy living at residence facilities of HEIs based on the findings.

The analysis of results starts with presenting the univariate analysis of demographics to understand the sample. This is followed by a univariate analysis of food availability, food access and frequency of consumption. Furthermore, a summary of statistics in relation to food diversity is presented. The chapter illustrates the patterns of food consumption in a graphical format. The graphical medians of food patterns are followed by logistic regression analysis. The regression first looks at what factors predict a change in food patterns and what factors determine food diversity. Food consumption pattern issues raised by the results will be accordingly addressed in the interpretation of results section. The section will first present the interpretation of results from the demographical perspectives.

4.2 Profile of the respondents

This study surveyed 150 respondents (students) from two HEIs in the Cape Town Metropole area. The socio-demographic characteristics of respondents are depicted in Table 4.1, which represents the univariate analysis of gender, age, ethnicity, and monthly allowance of the study sample.

Table 4.1: Demographics of respondents (N=150)

Item		Frequency	Percent
Gender	Male	55	36.7
	Female	95	63.3
	Total	150	100.0
Age	18-21 years	74	49.3
	22-25 years	67	44.7
	26-29 years	6	4.0
	30 and above	3	2.0
	Total	150	100.0
Ethnicity	Black	129	86.0
	White	9	6.0
	Indian	3	2.0
	Coloured	8	5.3
	Other	1	.7
	Total	150	100.0
Monthly food allowance			
Allowance	<R500	5	3.3
	R501-R1000	35	23.3
	R1001-R1500	93	62.0
	R1501-R2000	12	8.0
	>R2001	5	3.3
	Total	150	100.0

Females dominated the study as they made up 63% of the sample. The majority of this study's sample was 25 years old (45%) and younger (49%). Black Africans were the majority of respondents in this study's sample (86%). This sample showed that they mostly (62%) receive an allowance of between R1 001 and R1 500.

4.3 Food availability, access, and frequency of consumption

Alakaam et al. (2015:9) indicate that once students gain their independence, they are likely to adopt eating patterns that are not limited to time (meal any time of the day or night), they consume less varied foods, especially fruits and vegetables. The students in such environments depend more on fast foods with big portions, and as a result, skip other meals of the day such as breakfast. This is mainly attributed to factors that influence the food consumption patterns upon arrival at the

residence facilities of HEIs. The dietary habits of human beings are often influenced by a variety of factors that include people's standing within society, the economy, religion, culture, and the way these factors interact (Kim et al., 2015:190). The consumption of food by students at HEIs is influenced by an array of factors such as the availability of food products for students, affordability, culture and background of the students, and lifestyle adopted by students upon arrival at an HEI (Neff et al., 2009:285). Food availability, food access and frequency of consumption were then explored, and the results are presented in Tables 4.2 and 4.3 below.

Table 4.2: Availability, access, and frequency of food consumption

Do you have funding?		**Frequency**	**Percent**
Funding	Yes	73	48.7
	No	77	51.3
	Total	150	100.0
How often do you buy food?		**Frequency**	**Percent**
Frequency In purchase	Every day	14	9.3
	Once a week	9	6.0
	Twice a week	11	7.3
	Once a month	80	53.3
	Twice a month	36	24.0
	Total	150	100.0
Where do you buy most of your food?		Frequency	Percent
Purchase Place	Spaza	6	4.0
	Supermarket	113	75.3
	Restaurant	7	4.7
	Fresh produce market	23	15.3
	Other Specify	1	.7
	Total	150	100.0
How many meals do you eat a day?		**Frequency**	**Percent**
Frequency in Consumption	One	3	2.0
	Two	32	21.3
	Three	79	52.7
	Four	36	24.0
	Total	150	100.0

The results show that majority of the student have no funding (51%). From this sample group, the students purchased food once a month (53%) this is aligned with Kim et al. (2015:190) that dietary habits are dependent on people's standing within society, the economy, and the way these factors interact. When this group receives their allowance, they purchase mainly from supermarkets (74%) and encouragingly have three meals per day (53%). These results show that majority of this study's sample lacks access to food items because this group can only purchase food once a month (53%) and encouragingly, some twice a month (24%). This may be mostly the period when they receive their allowance/funding. It is also apparent that almost half of this study's sample receives financial aid funding (49%).

4.4 Food consumption places, times for meals and changes in food patterns

This section depicts results in which first-year students consume their food including the times of the day when meals are taken. Furthermore, possible eating patterns since the independence of staying alone in the HEI residential facilities.

Table 4.3: Food consumption places, times of the day for meals and changes in food patterns

Place of food consumption	**Frequency**	**Percent**
Residence	103	68.7
Class	6	4.0
Cafeteria	9	6.0
Off-Campus	26	17.3
On-the-Run	6	4.0
Total	150	100.0
Frequency of meals per day	**Frequency**	**Percent**
06:00-09:00	26	17.3
09:01-12:00	46	30.7
12:01-15:00	53	35.3
15:01-18:00	15	10.0
18:01-21:00	9	6.0
Total	149	99.3
System	1	.7
Total	150	100.00
Food patterns changes	**Frequency**	**Percent**
Yes	101	67.3

No	47	31.3
3	1	.7
Total	149	99.3
System	1	.7
Total	150	100.0

Seemingly, most of the students eat their food in residence (68.7%); eating is spread across time frames with most (35.6%) eating during lunch time 12h00-15h00, followed by those who eat breakfast (30.9%). Most (67.3%) respondents perceive their eating habits to have changed since they started staying at the residence facility.

4.5 Meals mostly consumed by first-year students

Freeland-Graves and Nitzke (2013) articulate that food consumption patterns are based on culture, norms, values, and the race of that particular community. This is given credence by the complexity of culture in relation to differences in societies in terms of knowledge, beliefs, morals, and customs in relation to food, eating and nutrition (Madiba, 2006). Furthermore, Fieldhouse (2013:25) indicates that culture is the strongest determinant of food choices within a particular society. Scaglioni et al. (2018:711) added that food choices often enable reflection of the societies in terms of dietary history, at the same time it determines the quality and acceptability of the food consumed within the community. Savage et al. (2017:24) refer that the cultural values, norms, and race surrounding the campus may lead to a particular food and eating habits of members of a particular community because there are hardly any inborn taste preferences at birth, but rather the development of certain likes and dislikes for certain types of food as people are socialised into specific cultural cuisines. Also, different cultures bring in different taste preferences in food due to social and cultural upbringing. Demeritt (2020) emphasises that mealtime habits and nutrition emanate from the cultural background of people, although, cost, convenience and snacking are similar, thereby suggesting that societal products will be dependent on the types of foods offered by the area. The students' change in lifestyles was found to be among the factors that lead to newly-adopted eating patterns while away from home. Table 4.4 reveals results from the sample of the most-consumed foods by first-year students in the Cape Town Metropole area. In measuring the total meals consumed by first-year students, the number of total frequencies and percentages of cases under observation goes beyond 150 (sample size) and 100% as the analysis considers multiple responses (students were allowed to choose from a variety of food items they consume).

Table 4.4: Mostly consumed foods by 1st-year students in the Cape Town Metropole area

Food Item	**1-2 times a day**		**2-3 Times a week**		**4-5 Times a week**		**1-2 Times a month**	
Food Item	Freq.	Total sample	Freq.	Total sample	Freq.	Total sample	Freq.	Total sample
Banana	69	46	28	18.67	30	20	22	14.67
Brown bread	64	42.67	34	22.67	22	14.67	30	20
Full cream milk	59	39.33	36	24	36	24	19	12.67
Cornflakes	59	39.33	49	32.67	19	12.67	22	14.67
Processed foods e.g. potato chips	57	38	37	24.67	26	17.33	29	19.33
Biscuits	57	38	49	32.67	24	16	20	13.33
Sweets and Chocolates	56	37.33	40	26.67	37	24.67	16	10.67
Cold meat (polony, viennas)	53	35.33	33	22	35	23.33	29	19.33
Powdered milk	51	34	29	19.33	42	28	28	18.67
White meat (chicken, pork fish)	49	32.67	58	38.67	28	18.67	15	10
Deep fried foods, e.g. french fries	49	32.67	41	27.33	25	16.67	34	22.67
Fast foods	49	32.67	47	31.33	23	15.33	30	20
Carbonated sugary drinks e.g. Colas	49	32.67	54	36	21	14	25	16.67
Potatoes	48	32	49	32.67	33	22	19	12.67
Rice	45	30	54	36	31	20.67	20	13.33
Bread rolls	44	29.33	44	29.33	31	20.67	31	20.67
Buns	43	28.67	46	30.67	19	12.67	42	28
Weetbix	40	26.67	49	32.67	28	18.67	33	22
Boiled	39	26	58	38.67	29	19.33	24	16
Yoghurt	38	25.33	55	36.67	36	24	21	14
Fried	38	25.33	52	34.67	36	24	24	16
Oats	38	25.33	47	31.33	23	15.33	42	28
Scrambled	35	23.33	45	30	35	23.33	34	22.67
Whole-wheat bread	35	23.33	34	22.67	28	18.67	53	35.33
Peanuts	33	22	31	20.67	26	17.33	59	39.33
Maize meal porridge	33	22	51	34	18	12	47	31.33
Carrots	32	21.33	56	37.33	47	31.33	14	9.33
Evaporated milk	32	21.33	14	9.33	9	6	95	63.33
Maize meal pap	31	20.67	46	30.67	33	22	40	26.67
Rusk	31	20.67	38	25.33	13	8.67	68	45.33
Cheese	30	20	45	30	38	25.33	37	24.67

Scones	30	20	26	17.33	29	19.33	65	43.33
Pasta	29	19.33	57	38	33	22	31	20.67
Pastries e.g. cakes and pizza	29	19.33	49	32.67	24	16	47	31.33
Sour milk	29	19.33	45	30	20	13.33	56	37.33
Strawberry	28	18.67	23	15.33	34	22.67	65	43.33
Pumpkin	28	18.67	57	38	25	16.67	40	26.67
Ice Cream	27	18	52	34.67	31	20.67	40	26.67
Grapes	26	17.33	37	24.67	45	30	41	27.33
Spinach	25	16.67	43	28.67	36	24	46	30.67
Macaroni	24	16	63	42	32	21.33	31	20.67
Bran flake	24	16	39	26	29	19.33	56	37.33
Butternut	23	15.33	57	38	34	22.67	36	24
Mango	23	15.33	28	18.67	31	20.67	68	45.33
Poached	23	15.33	24	16	24	16	79	52.67
Red meat (beef, lamb, mutton, goat meat)	22	14.67	56	37.33	17	11.33	55	36.67
Peach	21	14	44	29.33	33	22	52	34.67
Custard	20	13.33	38	25.33	35	23.33	57	38
Sugar dried beans	20	13.33	20	13.33	18	12	91	60.67
Baked beans	19	12.67	46	30.67	44	29.33	41	27.33
Spaghetti	17	11.33	56	37.33	31	20.67	44	29.33
Maize Rice	17	11.33	31	20.67	31	20.67	70	46.67
Low fat milk(pasteurized)	16	10.67	33	22	26	17.33	75	50
Rice Krispies	16	10.67	41	27.33	20	13.33	73	48.67
Dried meat (biltong)	16	10.67	16	10.67	18	12	100	66.67
Omelette	16	10.67	41	27.33	14	9.33	79	52.67
Sweet potatoes	15	10	37	24.67	32	21.33	65	43.33
Dumpling	15	10	35	23.33	24	16	76	50.67
Peas	14	9.33	46	30.67	44	29.33	45	30
Watermelon	14	9.33	20	13.33	29	19.33	86	57.33
Samp	12	8	24	16	25	16.67	89	59.33
Low fat milk (unpasteurized)	12	8	24	16	24	16	90	60
Total	2036	1357.33	2557	1704.67	1773	1182	2911	1940.67
Cochran's chi2(61) Prob >	560.3433 0.0000		280.9551 0.0000		173.4605 0.0000		1024.682 0.0000	

Food items of food items were cross-tabulated to monitor if there is an association between the types of food patterns one eats and the frequency of such food items. Therefore, Cochran's chi2 measures an association of having a probability of below 0.05 implying a statistical significance. The various foods are grouped into seven groups and the frequency of consumption of various foods. Table 4.4 above reveals the results sorted in descending order. The food items consumed by at least a third of respondents, 1 to 2 times a day (most-consumed foods) are in descending order: banana (46%), brown bread (43%), full cream milk (39%), cornflakes (39%), biscuits (38%), cold meat (Polony, Vienna's, 35%), powdered milk (34), processed foods such as potato chips 38%), potatoes (32%) and carbonated sugary drinks (33%); then again potatoes (33%), rice (36%), bread rolls (29%), buns (31%), Weetabix (33%), boiled egg (39%), yoghurt (37%), fried foods (35%), oats (32%), scrambled eggs (30%), carrots (37%) and maize meal pap (34%) are consumed 2-3 times per week. Items such as cheese (25%), evaporated milk (63%), rusks (45%), scones (43%), strawberries (43%), mango (45%), poached eggs (53%), dried sugar beans (61%), dried meat (67%), dumplings (51%), omelette (53%), samp (59%), watermelon (57%) and sweet potatoes (43%) are consumed 1 to 2 times a month. This suggests that the least-consumed foods (1 to 2 times a month) are mostly regarded as luxuries by students. Food items that are much easier to make (such as eggs, bread, cereal) are the most-consumed items. This could be due to accessibility and affordability. These established food item groups are statistically significant with 0.0000 significance on the probability of food items consumed by students. The section that follows discusses results of food consumption and patterns by their diversity scores.

4.6 Food diversity scores

Ronquest-Ross et al. (2015:1) observed that food consumption in South Africa is affected by food availability, accessibility, and choice. Ronquest-Ross et al. explain that dietary patterns or food intake choices are influenced by factors such as geography, seasons of the year, education levels, demographics, disposable income, government and other support services, urbanisation, globalisation, marketing, religion, culture, ethnicity, social networks, time, and the consumer. Ronquest–Ross et al. observe that since 1994, certain changes occurred in South Africa, which dramatically affected food consumption patterns, and are continuing to grow due to shifts in food availability, accessibility, and choices. These changes include the growth of supermarkets, rising urbanisation, and growing capital incomes. The authors go further and state that the demand for high-value foods such as dairy, meat, fresh fruit, vegetables, processed, packaged, and prepared food have doubled and therefore it is of the utmost importance that consumers are aware of what they are consuming. The study computed total diversity scores for the whole list of foods (diversity) and each of the seven groups. The scores are summarised in Table 4.5 below.

Table 4.5: Summary statistics for total food diversity scores

Variable	Observation	Mean	Std. Dev	Min	Max
Diversity	150	143.2533	23.76512	81	209
Meat	150	9.193333	2.481331	4	16
Eggs	150	11.32	2.906415	5	20
Dairy	150	22.71333	5.283045	12	40
Cereal	150	55.34	10.57148	26	86
Legumes	150	8.413333	2.544072	2	16
Fruit and Vege	150	20.66667	5.315126	7	36
Junk Food	150	15.60667	4.242477	0	24

The categories were recorded to reflect the order in frequency of consuming food items. The total score is that higher scores mean more frequent consumption of such food items. As such, most foods that are mostly consumed by students are cereals, dairy, fruit and vegetables as well as eggs.

4.6.1 Graphical medians of diversity scores by demographics

Alakaam et al. (2015) report that the availability of food refers to the consistent accessibility of food within close proximity of a person's area of residence. Furthermore, Bridle-Fitzpatrick (2015:205) states that the availability or lack thereof of food introduces a host of challenges as many students from outside the university's geographical location find it difficult to get food ingredients considered to be traditional and familiar to them. In addition, Madiba (2006:11) and El Ansari et al. (2012:30) expanded that the influence of food on consumption patterns is further compounded by the student's ability to afford the type of food that can be both nutritious and filling at the same time. This section illustrates food patterns diversity scores of first-year students in the Cape Town Metropole area. The information revealed in Figures 4.1 to 4.9 following is unique to this study and cannot be generalised, nor are there sources to support/dispute the findings.

Mapping of food patterns was done by graphing the (optionally weighted) medians of each variable according to the values of the listed recoded items. Figure 4.1 presents the weighted medians of diversity score by a set of demographics.

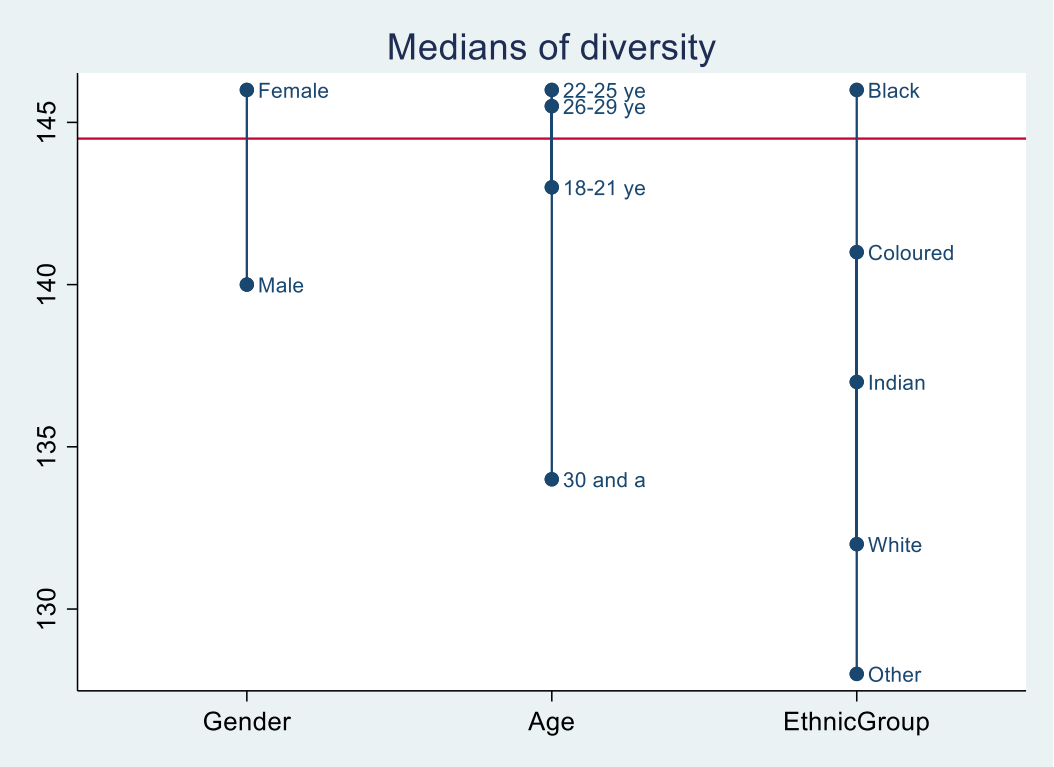

Figure 4.1: Medians of diversity by demographics

It can be observed that females and older students (22 to 25, and 26 to 29) as well as Black Africans have higher frequency consumption of the listed 62 food items, as they fall above the median line.

4.6.2 Graphical medians of diversity scores by affordability

This section illustrates the weighted medians of diversity scores by affordability. The results are represented in Figure 4.2 below

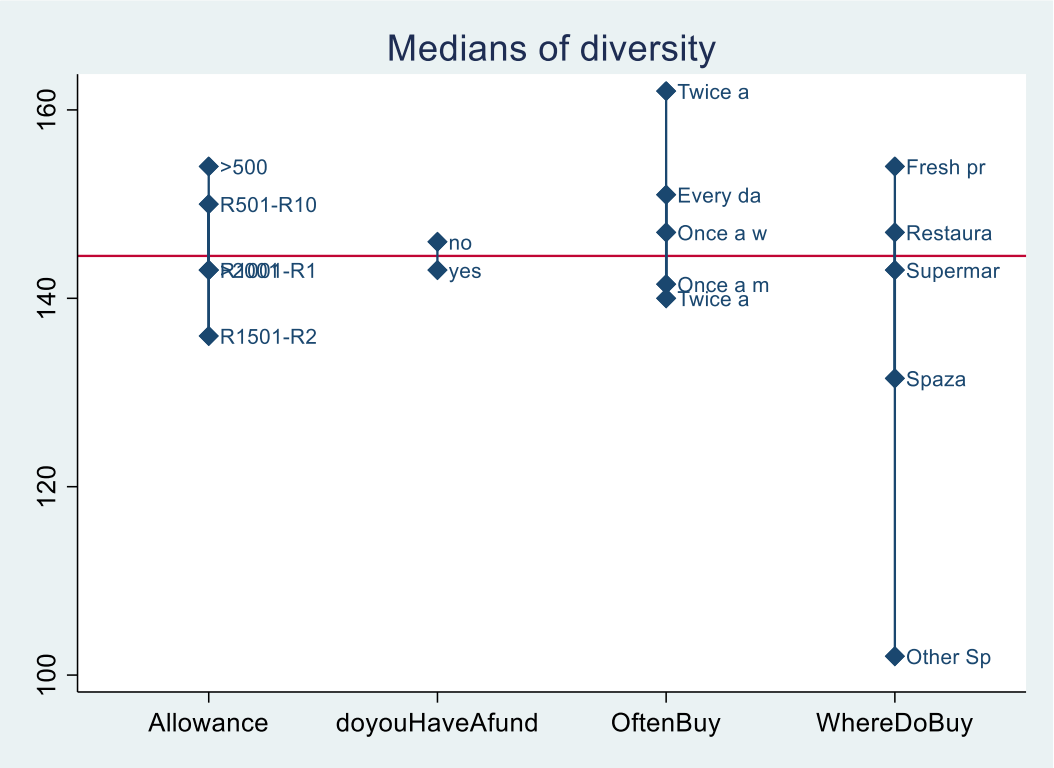

Figure 4.2: Medians of diversity by affordability

Figure 4.2 show that those with lower income (sic strangely so), those with no funding, those who purchase food frequently, and those who purchase food from fresh produce markets and restaurants have greater access to multiple food items (more diverse diet) than their counterparts.

4.6.3 Graphical medians of diversity scores by accessibility

This section depicts medians of diversity scores by accessibility.

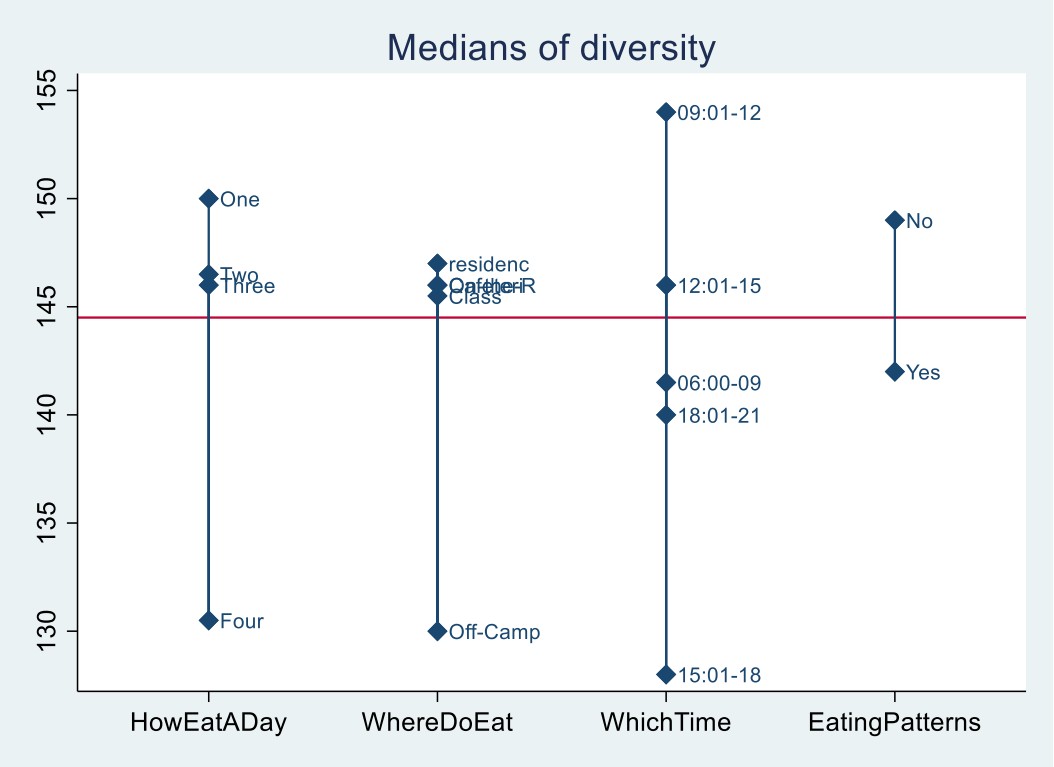

Figure 4.3: Medians of diversity by eating patterns

Figure 4.3 shows that those who eat a few meals a day, those who do not eat off-campus, those who eat during mid-morning and lunchtime, and those who confirm their eating patterns never changed after moving into residence at campus, have higher diversity scores. They consume the majority of the foods more frequently than their counterparts.

4.6.4 Food consumption scores of panel 1

Analysis was then done by sub-group (food groups 1 to 7) given seven panels. Under each panel the analysis variables are grouped into three- the demographics, availability and accessibility characteristics as analysed above. Hereunder, the food consumption scores of panel 1 are discussed.

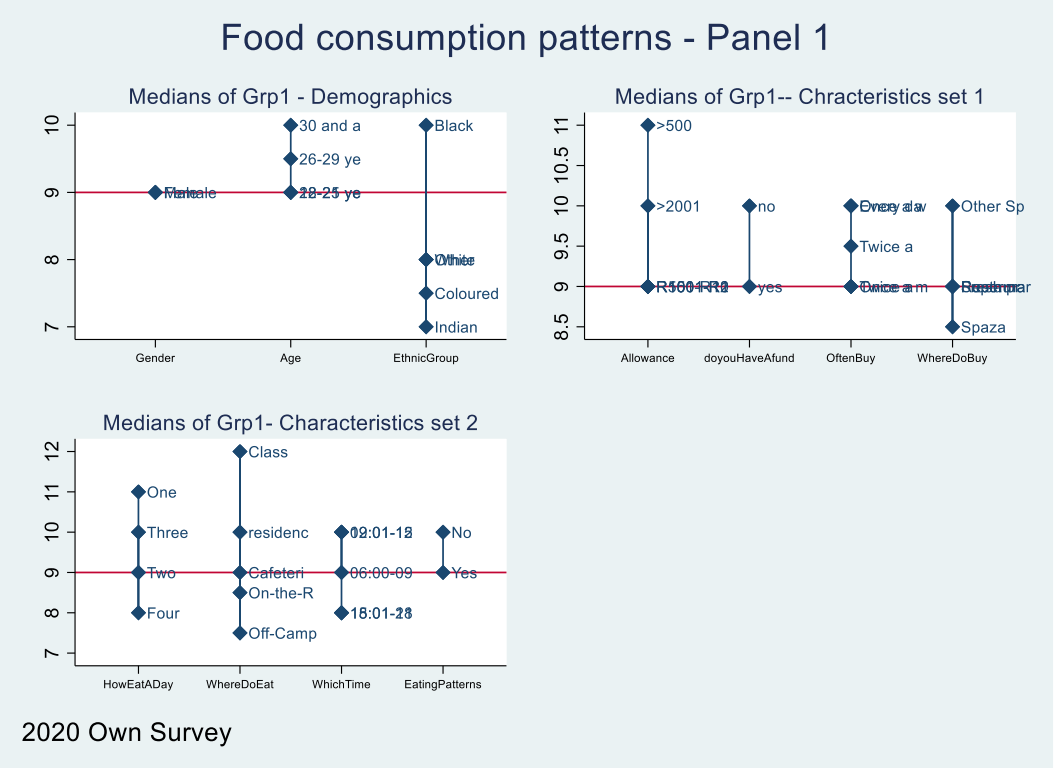

Figure 4.4: Panel 1 (Group 1 foods)

In Panel 1 (group 1 foods), access is not affected by gender, the age (30 years and above) access to more of such foods, and so is the case for Black Africans. On the other hand, surprisingly, those with the least allowance (<R500), and those with no funds have greater access to these food groups than their peers. In addition, a higher frequency of purchasing food and buying from other sources is associated with higher access to food items. Lastly, paradoxically, these foods are accessed mainly by those who eat less frequently, who eat in class and residence, who eat in the mornings, and who confirm that their eating patterns have not changed.

4.6.5 Food consumption scored of panel 2

This section discusses food consumption scores for panel 2.

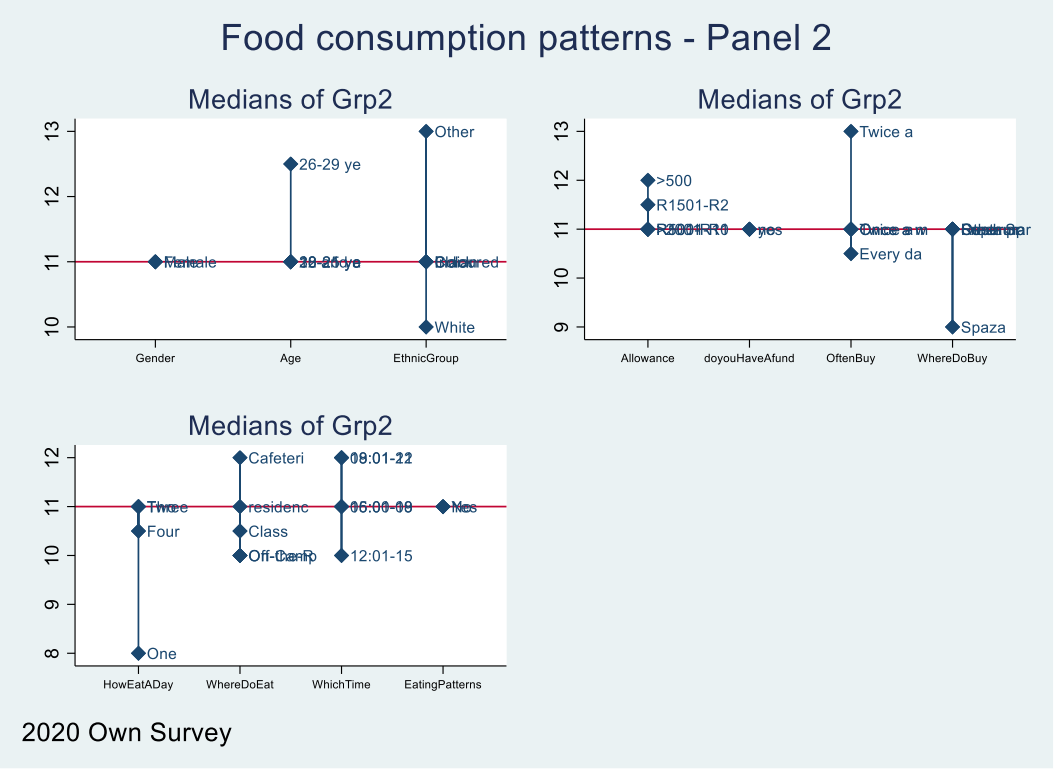

Figure 4.5: Panel 2 (Group 2 foods)

In panel 2 (group 2 foods), it was observed that access to food is not affected by gender, mature students (26 to 29), or ethnicity. Those with the least allowance (<R500 and R1501 to R2000) purchase food from most types of markets other than from the spaza shops twice a week.

4.6.6 Food consumption scores of panel 3

Hereunder, food consumption scores of panel 3 are discussed.

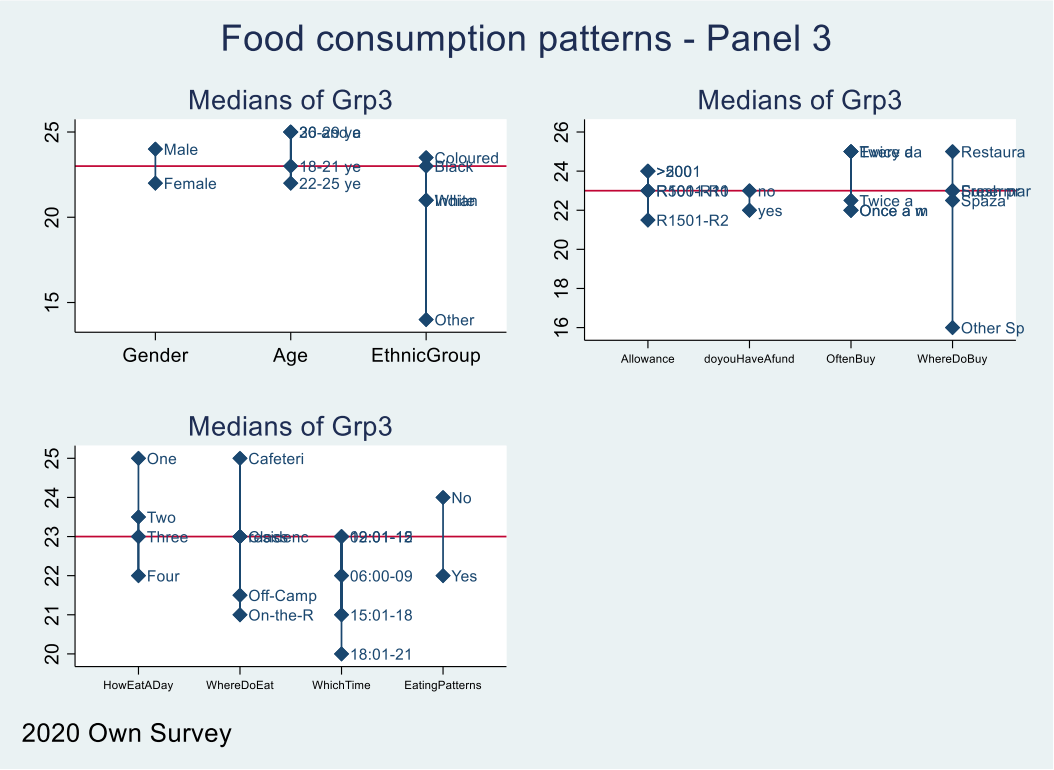

Figure 4.6: Panel 3 (Group 3 foods)

Panel 3 (group 3 foods) shows that access is greatly affected by gender as male students access more of these foods than females. Here it is observed that the older students, mostly Coloureds and with the most allowance (>R2001), purchase food every day and mostly from restaurants. This group eats once to twice a day mostly at cafeterias and does not seem to perceive that their eating patterns to have changed.

4.6.7 Food consumption scores of panel 4

Food consumption scores of panel 4 are discussed hereunder.

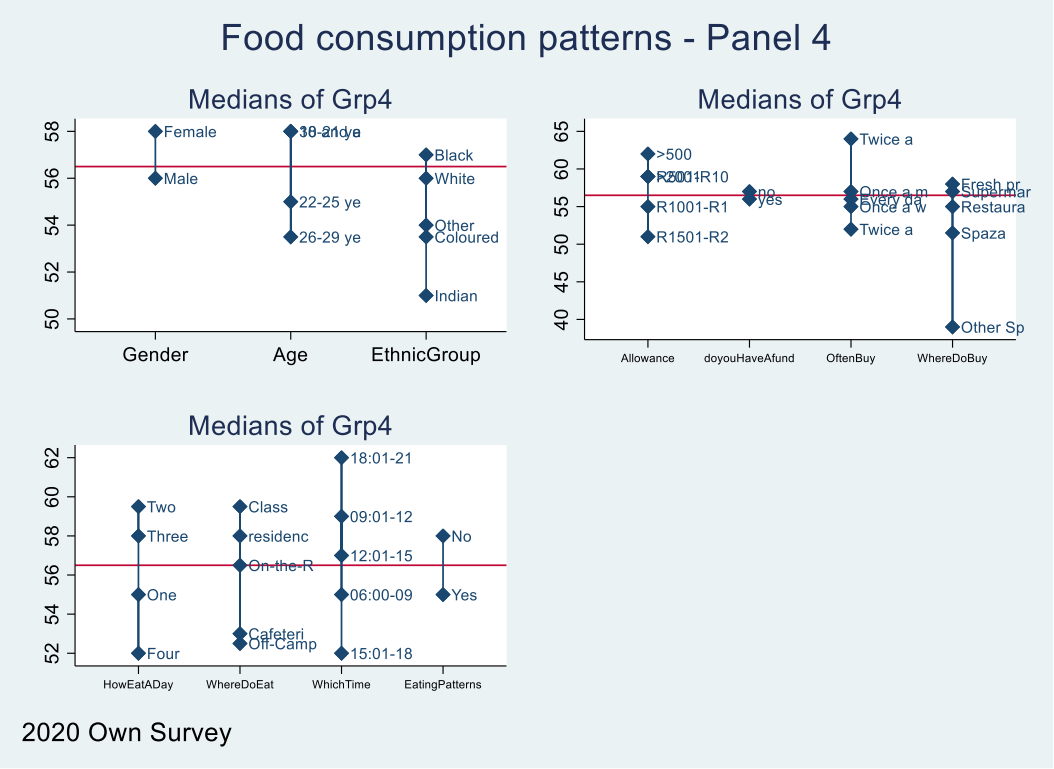

Figure 4.7: Panel 4 (Group 4 foods)

Seemingly, panel 4 (group 4 foods) foods are mostly consumed by Black, older (30+), females. This group receives a monthly allowance >R500, as a result, purchase food twice a week mostly from fresh produce markets. This group eats twice to three times a day in class and at residential facilities. The group confirms that their eating patterns have not changed since they transitioned into living on their own at residential facilities.

4.6.8 Food consumption scores of panel 5

This section discusses the food consumption scores of panel 5.

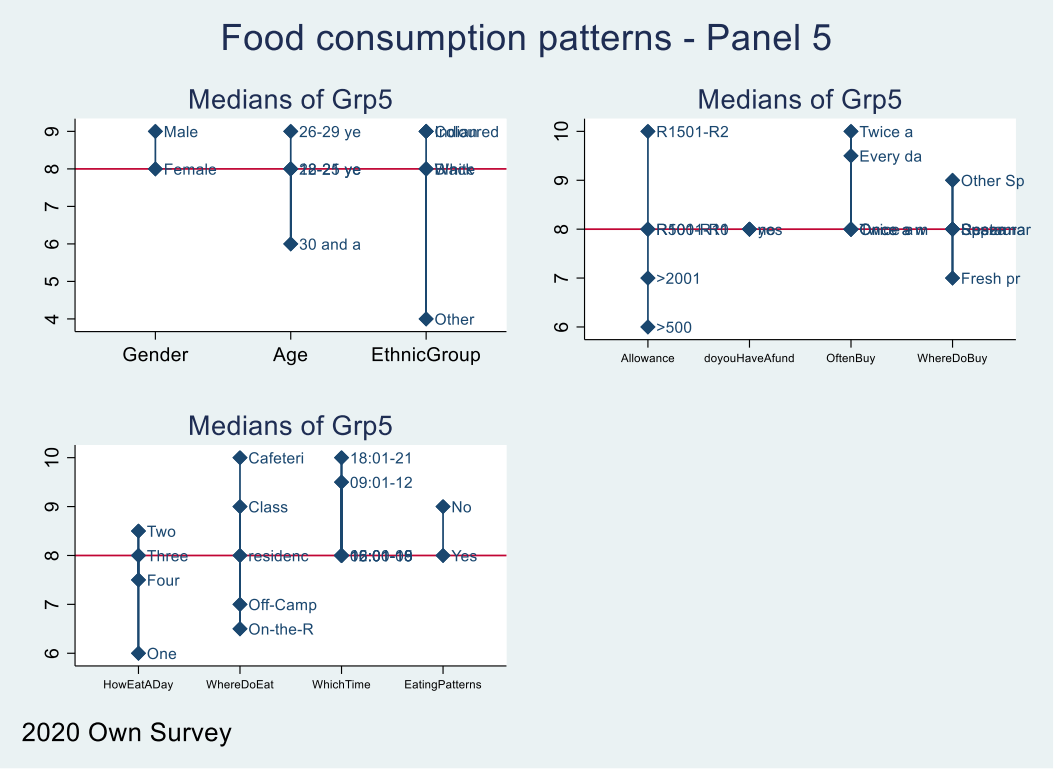

Figure 4.7: Panel 5 (Group 5 foods)

Panel 5 shows the dominance of male students in these kinds of foods. This group is mostly between the ages of 26 to 29 years, Coloured, with an allowance of R1501-R2000 per month. This group purchases food twice a week, but at times daily, from other than spazas (cafeteria), they mostly eat in class and cafeterias twice a day, and no change in eating patterns was recorded.

4.6.9 Food consumption scores of panel 6

Food consumption scores of panel 6 are discussed hereunder.

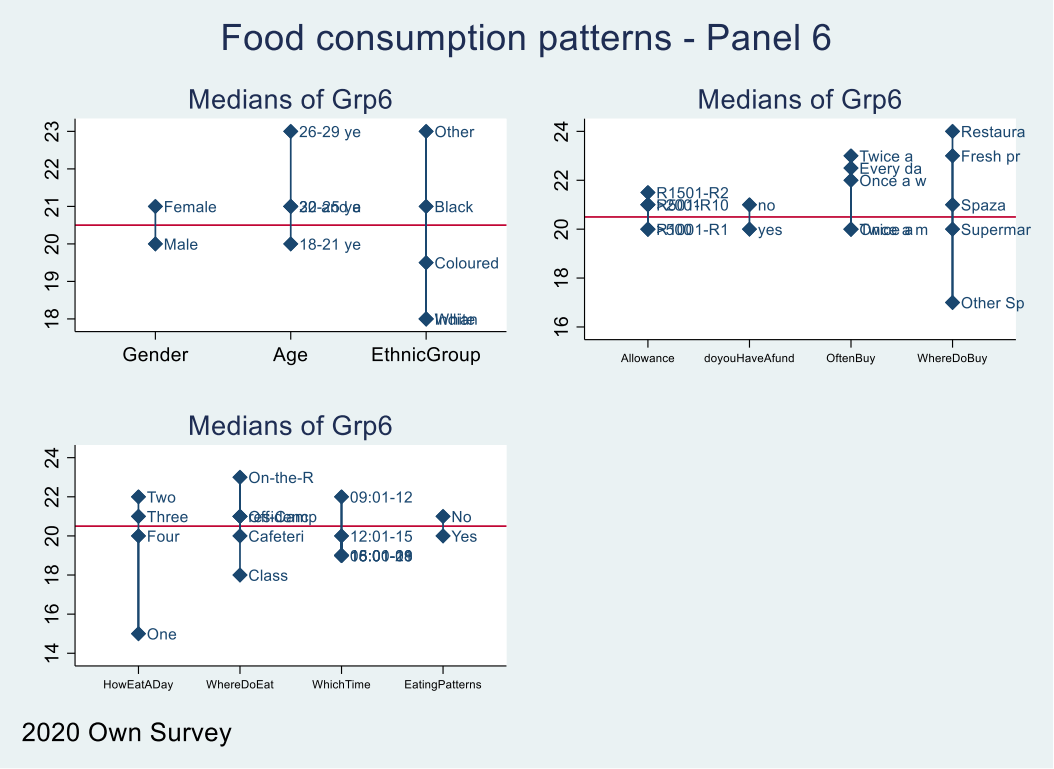

Figure 4.8: Panel 6 (Group 6 foods)

Medians of consumption in panel 6 (group 6 foods) show that mature (26 to 29 years) females dominated this category. This group purchases food from restaurants and fresh produce markets mostly twice a week. The group receives a monthly allowance of R1501-R2000. They eat two to three times per day mostly on the road between 09:00 and 12:00 and do not perceive their eating patterns to have changed.

4.6.10 Food consumption scores of panel 7

This section discusses food consumption scores of panel 7.

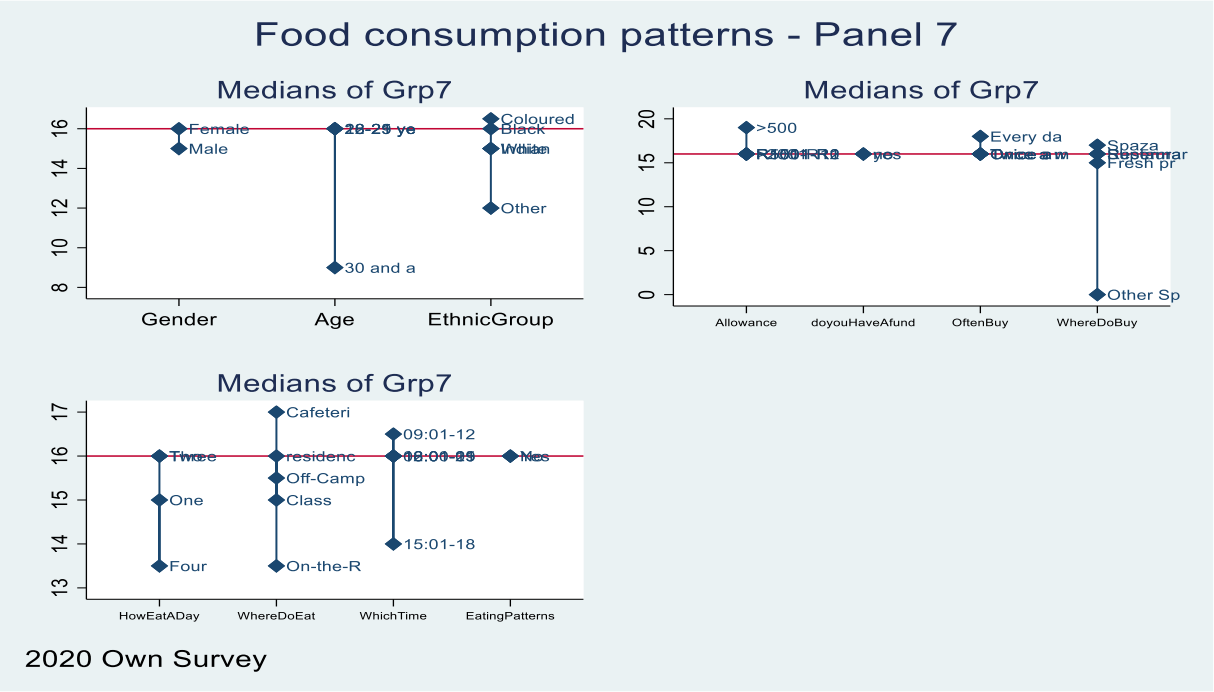

Figure 4.9: Panel 7 (Group 7 foods)

Panel 7 (group 7 foods) is mostly dominated by females between the ages of 20 to 25 years, mostly Coloured, with an allowance of >R500. This group purchases food from spaza shops mostly every day, or two to three times a day. They mostly consume their foods from cafeterias and residential facilities between 09:00 to 12:00 and are unsure if their eating patterns have changed or not.

4.7 Food consumption patterns regression analysis

Claasen et al. (2016) observed that the food environment in South Africa changed drastically from the 1990s. The change in the food environment has been inspired by traders, foreign direct investment, and transnational food and beverage industries, including supermarket retailers and

fast-food chains. The food environmental changes resulted in the availability of non-healthy but affordable food items in the country (Claasen et al., 2016:1).

This study conducted a regression analysis to assess the factors that explain (i) change of eating patterns and (ii) diversity of food consumed. The change in eating patterns was recorded to have no change (equal to 0), while the diversity of foods was recorded to have a change (equal to 1). From there, food diversity was computed in such a way that five categories emerged; these were recorded as the least diversity to the highly diversified consumption profile. The tables below (Tables 4.6 and 4.7) present these two dependent variables, which were estimated using ordered logistic regression given the ordinal nature of the two dependent variables. An individual needs to have at least six of the seven food groups consumed within a week to be considered diversified, having more food items from each list (at least two) within one week makes one most diversified; and the least diversified individual is one who has less than three of the seven food items within a week, and the scaled slide in-between.

Table 4.6: Change in eating patterns

Do you consider your eating pattern to have changed (pattern) after moving to the university		
Item	**Freq.**	**Percent**
No	2,914	31.76
Yes	6,262	68.24
Total	9,176	100.00
Diversity categories		
Item	**Freq.**	**Percent**
least diversified	744	8.00
Category 2	3,286	35.33
Category 3	4,030	43.33
Category 4	1,178	12.67
Most diversified	62	0.67
Total	9,300	100.00

The relationship between food environments and diet was studied by Larson and Story (2009) focusing on the periods between 1999 and 2009. In their study, they observed that there is a strong correlation between social, physical, and macro environments on food choices. Larson and Story (2009:59) acknowledged that many studies identified close relationships between food

environments and food choices. Even so, their study concluded that most studies regarding food consumption patterns had methodological limitations that lead to questioning their credibility on guiding environmental interventions and policies**.** Claasen et al*.* (2016:6) supported that future research on food environments needs to address the study design and require multilevel investigations that include diverse subgroups such as age, gender, and socio-economic status. Therefore, a regression model analysis was performed to assess the diverse subgroups in their food consumption and patterns. Table 4.7 below presents the first regression results. The model is sound given the pseudo-R-square of nearly 32% and log-ratio that is statistically significant at a 95% confidence interval.

Table 4.7: Food consumption pattern regression analysis

Ordered logistic regression Number of observations = 150						
LR chi2(33) = 3651.62						
Prob > chi2 = 0.0000						
Log likelihood = -3909.3967 Pseudo R2 = 0.3184						
Dep Var: pattern	Odds Ratio	Std. Err.	Z	P>z	[95% Conf. Interval]	
Gender						
2. Female	1.157801	.0763762	2.22	0.026	1.01738	1.317603
Age						
2. 22-25 years	1.52921	.1058482	6.14	0.000	1.335208	1.751399
3. 26-29 years	.2221852	.0431268	-7.75	0.000	.1518778	.3250395
4. 30 and above	.0064724	.0018867	-17.29	0.000	.0036554	.0114602
Ethnic Group						
2. White	.4728793	.0618824	-5.72	0.000	.3658976	.6111406
3. Indian	2.630642	.6024818	4.22	0.000	1.679251	4.12105
4. Coloured	14.08582	2.49292	14.95	0.000	9.957171	19.92639
5. Other	2.55e+09	7.18e+12	0.01	0.994	0	.
Allowance						
2. R501-R1000	.1570289	.0265874	-10.93	0.000	.112683	.2188271
3. R1001-R1500	.2041792	.0343917	-9.43	0.000	.1467696	.2840449
4. R1501-R2000	.0538169	.0137985	-11.40	0.000	.0325592	.0889536
5. >2001	.0474025	.0127598	-11.33	0.000	.0279688	.0803393
Availability of funding						
2. no	1.411413	.1213204	4.01	0.000	1.19258	1.6704
Frequency in purchasing food						

2. Once a week	3.203576	4.31438	7.70	0.000	2.28712	44.87258
3. Twice a week	3.082885	.6226895	5.57	0.000	2.075053	4.580209
4. Once a month	.0433986	.0084773	-16.06	0.000	.0295941	.0636422
5. Twice a month	.0703699	.0130332	-14.33	0.000	.0489482	.1011667
Places of purchase						
2. Supermarket	337.2952	89.42037	21.96	0.000	200.6079	567.1166
3. Restaurant	1.05e+11	7.05e+13	0.04	0.970	0	.
4. Fresh produce market	380.5071	113.7003	19.88	0.000	211.8425	683.4589
Frequency of food consumption per day						
2. Two	2.62e+08	3.88e+08	13.08	0.000	1.44e+07	4.78e+09
3. Three	3.80e+08	5.66e+08	13.25	0.000	2.04e+07	7.06e+09
4. Four	1.07e+07	1.54e+07	11.28	0.000	644946.1	1.79e+08
Physical locations of food consumption						
2. Class	.4361675	.0856962	-4.22	0.000	.2967653	.6410522
3. Cafeteria	.0230138	.0042515	-20.42	0.000	.0160229	.0330549
4. Off-Campus	.0185722	.0031556	-23.46	0.000	.0133117	.0259115
5. On-the-Run	.0651845	.0118541	-15.01	0.000	.0456404	.0930979
Time of meals per day						
2. 09:01-12:00	5.957711	.6538322	16.26	0.000	4.804673	7.387458
3. 12:01-15:00	2.772775	.2629129	10.76	0.000	2.302524	3.339066
4. 15:01-18:00	.0140989	.0027996	-21.46	0.000	.0095535	.020807
5. 18:01-21:00	6.229026	.9984917	11.41	0.000	4.549623	8.528347
fitted	1.37e+22	2.67e+22	26.05	0.000	2.95e+20	6.33e+23
Diversity category	.8337215	.0636925	-2.38	0.017	.717783	.9683868
Category 1	22.77352	1.572073			19.69231	25.85473

It is important to note that the first category under each factor explanatory is taken as the reference category, therefore does not appear on the list; the marginal effects are seen later. The results show that being female compared to being male, the odds of pattern changing (Yes) versus not changing (No) are 1.16 times greater, given that all the other variables in the model are held constant. This means females are more likely to have a change in eating patterns than male students. The older the student, the less likely one has eating pattern changes as the odds ratio associated with higher age groups decrease (except for the 22- to 25-year-old category).

All other ethnic groups, except whites, have higher odds of having eating pattern changes (compared to Black Africans). The odds are much higher with Coloured categories where they are more than 14 times more likely to have pattern changes compared to Blacks. The higher the income category, the lower the odds of having an eating pattern change (all odds ratios are less than 1). An individual with no funding is 1.411 odds higher of having pattern changes than those with funding. Also, those who buy once or twice a week have higher odds of pattern changes compared to those buying daily; and those who purchase monthly, have the least likelihood of eating pattern changing.

4.8 Effects of eating patterns (delta-method)

According to Steyn et al. (2014), the South African population commonly consumes street foods and fast foods; with 33.5% consuming street food and 35% consuming fast food at least once a week. However, socio-economic status seems to be one of the major influencing factors that play a role in fast food and street food consumption. Steyn et al. (2014) gave reference to a national representative cross-sectional survey that established similarities amongst fast food consumption patterns of South Africans, with 21.4% of Black, 26.8% of Coloureds, 30.1% of Indian, and 28.3% of White South Africans consuming fast foods twice or three times per month. Claasen et al. (2016:9) note that street food is commonly bought by young people who normally do not cook; being 45.3% Black South Africans, 22.4% Coloureds, 15.2% Indian and 9.6% White South Africans. Seemingly, fruits and carbonated drinks are the most frequently consumed street food among all ethnic groups. Steyn et al. (2014:8) explicated those vendors in the city areas are convenient specifically for students who had little time to prepare a meal. People who have difficulty consuming regular meals at home often substituted home-cooked meals for ready-to-eat street foods that are easily accessible and affordable.

Table 4.8 depicts the marginal effects of eating pattern change using a Delta method of comparison. According to Ramirez-Villegas and Jarvis (2010:3), the Delta method is a simple downscaling method based on the sum of interpolated anomalies to high-resolution surfaces. The method assumes that changes in the food patterns are only relevant at course scales and that relationships between variables are maintained in the future.

Table 4.8: Marginal effects of eating patterns (Delta-method)

	Margin	Std. Err. Z	P>z	[95% Conf.	Interval]
Gender					
1. Male	0.626	.0082014 76.35	0.000	0.610	0.642
2. Female	0.714	.0055749 128.12	0.000	0.703	0.725
Age					
1. 18-21 years	0.680	.0066807 101.77	0.000	0.667	0.693
2. 22-25 years	0.728	.006896 105.53	0.000	0.714	0.741
3. 26-29 years	0.445	.0269126 16.53	0.000	0.392	0.498
4. 30 and above	0.243	.0297995 8.16	0.000	0.185	0.302
Ethnic Group					
1. Black	0.664	.0049367 134.53	0.000	0.654	0.674
2. White	0.680	.019113 35.58	0.000	0.642	0.717
3. Indian	0.760	.0283635 26.80	0.000	0.705	0.816
4. Coloured	0.843	.0159117 52.97	0.000	0.812	0.874
5. Other	1.000	7.82e-06 1.3e+05	0.000	1.000	1.000
Allowance					
1. >500	0.786	.0206943 37.99	0.000	0.746	0.827
2. R501-R1000	0.632	.0101067 62.55	0.000	0.612	0.652
3. R1001-R1500	0.650	.0064463 100.84	0.000	0.637	0.663
4. R1501-R2000	0.890	.0094248 94.45	0.000	0.872	0.909
5. >2001	0.799	.0234403 34.10	0.000	0.753	0.845
Availability of funding					
1. yes	0.783	.0060502 129.48	0.000	0.772	0.795
2. no	0.581	.0074902 77.55	0.000	0.566	0.596
Frequency in food purchase					
1. Every day	0.383	.0187409 20.42	0.000	0.346	0.419
2. Once a week	0.929	.0103978 89.31	0.000	0.908	0.949
3. Twice a week	0.770	.0177594 43.34	0.000	0.735	0.805
4. Once a month	0.695	.0061204 113.51	0.000	0.683	0.707
5. Twice a month	0.681	.0098197 69.34	0.000	0.662	0.700
Types of markets used to purchase food products					
1. Spaza	0.791	.0202629 39.01	0.000	0.751	0.830
2. Supermarket	0.684	.0051474 132.82	0.000	0.674	0.694
3. Restaurant	1.000	2.72e-06 3.7e+05	0.000	1.000	1.000

Fresh produce market	0.527	.0140511 37.47	0.000	0.499	0.554
Frequency in food consumption					
1. One	0.247	.0296621 8.31	0.000	0.188	0.305
2. Two	0.729	.0101864 71.56	0.000	0.709	0.749
3. Three	0.674	.006599 102.18	0.000	0.661	0.687
4. Four	0.697	.0095558 72.93	0.000	0.678	0.716
Physical location of food consumption					
1. Residence	0.717	.0052252 137.19	0.000	0.707	0.727
2. Class	0.316	.0249845 12.63	0.000	0.267	0.365
3. Cafeteria	0.425	.026365 16.12	0.000	0.373	0.477
4. Off-Campus	0.679	.0114845 59.16	0.000	0.657	0.702
5. On-the-Run	0.662	.0233961 28.28	0.000	0.616	0.708
Times of the day for meals					
1. 06:00-09:00	0.671	.0115743 57.98	0.000	0.648	0.694
2. 09:01-12:00	0.674	.0086089 78.31	0.000	0.657	0.691
3. 12:01-15:00	0.753	.0072196 104.25	0.000	0.738	0.767
4. 15:01-18:00	0.504	.0167158 30.13	0.000	0.471	0.536
5. 18:01-21:00	0.603	.0209904 28.71	0.000	0.561	0.644

Table 4.8 shows the marginal effects derived from the regression above. The margins show the probabilities of each category explaining a change in eating patterns. In that regard, we can be able to compare which category has the greatest influence on pattern change. The probability of male students changing pattern is 62.6%, compared to females at 71.4%; while the probability under age categories is higher for 22 to 25 years olds (72.8%) followed by 19 to 21-year-olds (68%), then 26 to 29 years (44.5%) and 30 and above (24.3%).

4.9 Diversity of food consumption regression analysis

The regression results below show the factors that explain the diversity of food eaten by each student. The identified factors explain nearly 12% of the variation.

Table 4.9: Diversity of food consumption by each student

Dep Var: Diversity Category	Odds Ratio	Std. Err.	Z	P>z	[95% Conf. Interval]	
Gender						
2. Female	0.851	0.041	-3.310	0.001	0.774	0.936
Age						
2. 22-25 years	0.793	0.038	-4.830	0.000	0.722	0.871
3. 26-29 years	1.889	0.209	5.730	0.000	1.520	2.347
4. 30 and above	0.072	0.014	-13.140	0.000	0.048	0.106
Ethnic Group						
2. White	0.744	0.071	-3.090	0.002	0.616	0.897
3. Indian	0.488	0.076	-4.600	0.000	0.359	0.662
4. Coloured	0.377	0.038	-9.780	0.000	0.310	0.459
5. Other	0.226	0.070	-4.810	0.000	0.123	0.414
Allowance						
2. R501-R1000	0.390	0.047	-7.800	0.000	0.308	0.494
3. R1001-R1500	0.341	0.040	-9.130	0.000	0.271	0.430
4. R1501-R2000	0.182	0.027	-11.630	0.000	0.136	0.242
5. >2001	0.457	0.080	-4.460	0.000	0.324	0.645
Availability of funding						
2. no	1.605	0.086	8.870	0.000	1.446	1.782
Frequency in purchasing food						
2. Once a week	0.783	0.109	-1.750	0.079	0.595	1.029
3. Twice a week	1.847	0.224	5.060	0.000	1.457	2.343
4. Once a month	0.262	0.026	-13.690	0.000	0.216	0.317
5. Twice a month	0.341	0.035	-10.380	0.000	0.278	0.418
Types of markets used to purchase food						
2. Supermarket	4.538	0.593	11.580	0.000	3.513	5.862
3. Restaurant	8.615	1.449	12.800	0.000	6.195	11.981
Fresh produce market	7.617	1.040	14.870	0.000	5.829	9.954
Frequency of meals in a day						
2. Two	4.141	0.721	8.160	0.000	2.944	5.824
3. Three	5.131	0.895	9.380	0.000	3.646	7.221
4. Four	1.576	0.281	2.560	0.011	1.112	2.235
Physical location when consuming food						

2. Class	2.422	0.351	6.110	0.000	1.824	3.216
3. Cafeteria	0.861	0.086	-1.490	0.136	0.707	1.048
4. Off-Campus	0.333	0.020	-17.980	0.000	0.295	0.375
5. On-the-Run	0.542	0.075	-4.400	0.000	0.412	0.712
Times of the day for meal consumption						
2. 09:01-12:00	1.682	0.116	7.560	0.000	1.470	1.924
3. 12:01-15:00	1.051	0.067	0.770	0.439	0.927	1.191
4. 15:01-18:00	0.611	0.055	-5.520	0.000	0.513	0.728
5. 18:01-21:00	2.531	0.287	8.180	0.000	2.026	3.161
Eating Patterns						
2. No	1.349	0.065	6.210	0.000	1.227	1.482
Category 1	-2.176	0.240			-2.646	-1.705
Category 2	0.569	0.241			0.098	1.041
Category 3	3.101	0.240			2.630	3.572
Category 4	6.342	0.270			5.812	6.872

Females are less likely to have higher level diversity compared to males, all other factors held constant.

4.10 Margins of diversity of food consumption regression

Table 4.10 below shows the margins based on the above regression.

Food diversity has been categorised into 5 (from least diverse =1 to most diverse=5. The margins are percentages/ proportions. For the last one, one can say that those who have eating pattern changes have 5% (0.05) chances of being under the least diverse category, 41% chances of being in category 2 of diversity; 46% being in category 3, 8% of being in category 4 and 0% of being in the most diverse category. This means those who said yes, their eating patterns have changed are highly likely to have a moderately diversified diet (2 = -3 diverse categories where there are higher proportions). On the other hand, those who said no eating pattern changes are likely to be in category 3 of diversity (0.50), followed by category 2 (0.35).

Table 4.10: Margins of diversity of food consumption regression

	Margin	Std. Err.	Z	P>z	Margin	Std. Err.	Z	P>z	Margin	Std. Err.	Z	P>z	Margin	Std. Err.	z	P>z	Margin	Std. Err.	z	P>z
Allowance																				
>500	0.02	0.00	8.40	0.00	0.19	0.02	11.23	0.00	0.56	0.01	87.84	0.00	0.22	0.02	11.62	0.00	0.01	0.00	6.05	0.00
R501-R1000	0.04	0.00	16.06	0.00	0.36	0.01	33.47	0.00	0.49	0.01	53.82	0.00	0.10	0.01	19.51	0.00	0.00	0.00	7.35	0.00
R1001-R1500	0.05	0.00	20.96	0.00	0.39	0.01	55.67	0.00	0.47	0.01	70.06	0.00	0.09	0.00	26.97	0.00	0.00	0.00	7.69	0.00
R1501-R2000	0.09	0.01	11.23	0.00	0.51	0.02	32.90	0.00	0.35	0.02	20.15	0.00	0.05	0.00	10.91	0.00	0.00	0.00	6.33	0.00
>2001	0.04	0.00	7.43	0.00	0.33	0.03	12.65	0.00	0.51	0.02	29.14	0.00	0.11	0.01	8.43	0.00	0.01	0.00	5.44	0.00
Availability of funding																				
Yes	0.06	0.00	20.77	0.00	0.43	0.01	53.68	0.00	0.43	0.01	57.30	0.00	0.07	0.00	23.70	0.00	0.00	0.00	7.58	0.00
No	0.04	0.00	19.05	0.00	0.34	0.01	45.74	0.00	0.51	0.01	73.66	0.00	0.11	0.00	26.55	0.00	0.01	0.00	7.66	0.00
Frequency of food purchase																				
Every day	0.02	0.00	10.26	0.00	0.21	0.01	14.75	0.00	0.56	0.01	87.66	0.00	0.20	0.01	14.09	0.00	0.01	0.00	6.64	0.00
Once a week	0.02	0.00	8.69	0.00	0.25	0.02	13.24	0.00	0.55	0.01	64.96	0.00	0.16	0.01	11.04	0.00	0.01	0.00	6.06	0.00
Twice a week	0.01	0.00	9.98	0.00	0.13	0.01	13.00	0.00	0.53	0.01	50.47	0.00	0.31	0.02	17.18	0.00	0.02	0.00	6.83	0.00
Once a month	0.07	0.00	21.62	0.00	0.46	0.01	63.40	0.00	0.40	0.01	58.53	0.00	0.06	0.00	24.15	0.00	0.00	0.00	7.56	0.00
Twice a month	0.05	0.00	16.76	0.00	0.41	0.01	37.65	0.00	0.45	0.01	45.55	0.00	0.08	0.00	18.90	0.00	0.00	0.00	7.32	0.00
Types of markets used for purchasing food																				
Spaza	0.19	0.02	9.64	0.00	0.59	0.01	77.36	0.00	0.19	0.02	10.44	0.00	0.02	0.00	7.82	0.00	0.00	0.00	5.50	0.00
Supermarket	0.05	0.00	22.16	0.00	0.40	0.01	61.04	0.00	0.46	0.01	74.27	0.00	0.09	0.00	28.45	0.00	0.00	0.00	7.72	0.00
Restaurant	0.03	0.00	8.46	0.00	0.27	0.02	12.96	0.00	0.54	0.01	51.95	0.00	0.15	0.01	10.47	0.00	0.01	0.00	5.97	0.00
Fresh produce market	0.03	0.00	14.43	0.00	0.29	0.01	26.85	0.00	0.53	0.01	67.88	0.00	0.14	0.01	19.42	0.00	0.01	0.00	7.31	0.00

Frequency of food consumption per day																				
One	0.15	0.02	6.85	0.00	0.58	0.01	41.94	0.00	0.24	0.03	8.35	0.00	0.03	0.00	5.98	0.00	0.00	0.00	4.71	0.00
Two	0.04	0.00	15.37	0.00	0.36	0.01	31.44	0.00	0.50	0.01	54.01	0.00	0.10	0.01	18.66	0.00	0.00	0.00	7.28	0.00
Three	0.03	0.00	19.41	0.00	0.31	0.01	47.70	0.00	0.52	0.01	80.86	0.00	0.12	0.00	29.29	0.00	0.01	0.00	7.73	0.00
Four	0.10	0.01	18.70	0.00	0.53	0.01	57.23	0.00	0.32	0.01	32.39	0.00	0.04	0.00	17.33	0.00	0.00	0.00	7.25	0.00
Physical location when consuming food																				
Residence	0.04	0.00	20.56	0.00	0.35	0.01	56.15	0.00	0.50	0.01	80.18	0.00	0.11	0.00	29.83	0.00	0.00	0.00	7.75	0.00
Class	0.02	0.00	6.89	0.00	0.19	0.02	9.08	0.00	0.56	0.01	82.45	0.00	0.22	0.02	9.34	0.00	0.01	0.00	5.36	0.00
Cafeteria	0.04	0.00	10.23	0.00	0.38	0.02	19.37	0.00	0.48	0.02	30.84	0.00	0.09	0.01	11.47	0.00	0.00	0.00	6.33	0.00
Off-Campus	0.11	0.01	18.38	0.00	0.55	0.01	57.48	0.00	0.31	0.01	29.19	0.00	0.04	0.00	16.33	0.00	0.00	0.00	7.18	0.00
On-the-Run	0.07	0.01	7.67	0.00	0.47	0.03	18.29	0.00	0.40	0.03	15.41	0.00	0.06	0.01	7.73	0.00	0.00	0.00	5.39	0.00
Times of the day for meals																				
06:00-09:00	0.06	0.00	16.24	0.00	0.42	0.01	37.78	0.00	0.44	0.01	43.40	0.00	0.08	0.00	18.08	0.00	0.00	0.00	7.26	0.00
09:01-12:00	0.03	0.00	17.55	0.00	0.32	0.01	36.52	0.00	0.52	0.01	70.65	0.00	0.12	0.01	23.87	0.00	0.01	0.00	7.58	0.00
12:01-15:00	0.05	0.00	19.35	0.00	0.41	0.01	50.18	0.00	0.45	0.01	59.19	0.00	0.08	0.00	23.28	0.00	0.00	0.00	7.54	0.00
15:01-18:00	0.09	0.01	13.82	0.00	0.51	0.01	39.73	0.00	0.35	0.01	24.47	0.00	0.05	0.00	13.34	0.00	0.00	0.00	6.82	0.00
18:01-21:00	0.02	0.00	9.21	0.00	0.24	0.02	13.84	0.00	0.55	0.01	71.50	0.00	0.17	0.01	11.95	0.00	0.01	0.00	6.26	0.00
Change in eating patterns																				
Yes	0.05	0.00	22.27	0.00	0.41	0.01	60.09	0.00	0.46	0.01	71.29	0.00	0.08	0.00	27.83	0.00	0.00	0.00	7.71	0.00
No	0.04	0.00	17.97	0.00	0.35	0.01	41.60	0.00	0.50	0.01	68.40	0.00	0.11	0.00	24.34	0.00	0.00	0.00	7.57	0.00

4.11 Chapter summary

This chapter discussed the results obtained from the first-year students at HEI residential facilities in the Cape Town Metropole area. The results showed that demographics play a major role in the change in consumption patterns of first-year students at two HEIs in the Cape Town Metropole area. Univariate analysis of the demographics was conducted on the results followed by the food consumption and accessibility including the most consumed foods by first-year students at residential facilities of HEIs. The analysis further included the graphical presentation of medians of diversity scores by demographics, affordability, and accessibility. The analysis included the food consumption scores grouped by food choice categories; these are labelled as panels from 1 to 7. A regression analysis was further conducted from the results to determine the strength of the obtained data and to understand the relationships between the food consumption variables. The margins of the diversity of food consumption patterns were further conducted on the regression analysis. From there, conclusions were drawn. The following Chapter (Chapter 5) provides discussions and concludes this research. The chapter further provides recommendations and possible future research.

CHAPTER 5

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

The objectives that were set out for this study are answered in this chapter. This Chapter provides a synopsis of the research findings making use of the study objectives as directives in making inferences about the results. The Chapter provides recommendations based on the study findings, and provides opportunities for further research, and draws conclusions on the study. The following section offers an overview of the study findings.

5.2 Discussions of research findings

Transitioning from staying at home where catering is usually attended to independence in the type of food to consume can be challenging for first-year students. The challenge may be aggravated by several factors including limited funds, busy study timetables, lack of facilities such as stoves, ovens, or microwaves to prepare food, and fridges to store perishable food items as well as inflexible lecture timetables that provide limited breaks for food intake. Therefore, university students are often confronted with altering their dietary patterns to suit the weekly lecture timetables. This study adopted a quantitative research approach in investigating the food-eating patterns of first-year university students in Cape Town in a close-ended questioning format. The questionnaire was divided into three sections. The first section collected demographic information, the second section investigated availability, access, and frequency of food consumption; while the third section provided food diversity lists that show categories of food that were likely to be consumed by first-year students in residences at HEIs in the Cape Town Metropole area. This study's results presented in Chapter 4 are discussed next. The questions were presented in a categorical manner format for easy management and interpretation. The following section discusses the demographical features of the study sample (150 students).

5.2.1 Study demographics

The results show the dominance of females (63%) in this study. The studied group was mostly 25 years (45%) and younger (49%). Black Africans were the majority of respondents in this study's sample (86%). The results show that most (62%) of respondents receive a monthly allowance of between R1001 and R1 500. Those who have no funding (51%) buy food once a month (53.3%) this is aligned with when they receive allowances; purchasing is mainly from the supermarket and encouragingly have three

meals per day (53%). With regards to gender, this study's results are similar to Tam et al. (2017) who conducted at study with university students in Australia who were mostly dominated by female students between the ages of 18 and 24 years. Even so, this study's results differ from Tam et al. (2017) with regards to places of food consumption by university students. Tam et al. found that most of their students purchased food on campus, while the results from this study found that a majority of the sample mostly consumed food at the place of residence (69%). Food consumption of these students is spread "across the table" with most (36%) eating during lunch time 12h00 to 15h00, followed by those who eat breakfast (31%). Yahia et al. (2016) assessed weight status, dietary habits, physical activity, dietary beliefs, and nutrition knowledge among university students at the Central Michigan University (in America) and found a difference in gender eating patterns and changes including a variance in weight and health body weight. Therefore, the differences in gender specifications about dietary preferences and choices in consumption appears to be a common occurrence. These results, however, suggest that affordability plays a critical role in the dietary habits of the South African tertiary students as such most meals are consumed in residences presumably after lectures. Also, it is not impossible that students may have a meal in the morning (31% eat breakfast) and would then have another meal (12:00 to 15:00) in the afternoon after lectures.

5.2.2 Food consumption patterns of first-year students in the Cape Town Metropole (objective 1)

It appears that 31% of this study's sample eat breakfast and 69% of this group consumes food in their residences. This result suggests that this study's respondents mostly purchase food once a month mostly from supermarkets. and surprisingly so also eat three meals a day. This result is in line with Ronquest–Ross et al. (2015) who observed that growth in supermarkets greatly impacted the food consumption patterns in South Africa since 1994 and the paradigm shift of food availability, accessibility, and choices. Surprisingly, this group eats three meals a day, this intake is aligned with the recommended dietary requirement from the World Health Organisation (2015) of eating three meals a day for healthier living. This study results suggest that the majority of the students' eating patterns have changed (67.8%) and that food is mostly consumed between 12:00 and 15:00. The food items mostly consumed by at least a third of respondents, 1 to 2 times a day, are bananas (46%), brown bread (43%), full cream milk (39%), cornflakes (39%), biscuits (38%), cold meat (Polony, Vienna's, 35%), powdered milk (34%), processed foods such as potato chips (38%), potatoes (32%) and carbonated sugary drinks (33%). These results suggest a paradigm shift from Labadarios et al. (2011), who found that the most-consumed food groups for South Africans aged 16 years and

older are cereals/roots, meat/fish, dairy, and vegetables other than vitamin A-rich vegetables, while eggs, legumes, and vitamin A-rich fruit and vegetables were least consumed in this group. These results share some level of similarities with regard to cereals and dairy products being mostly consumed by the young age groups in the country. These results however differ with regards to meat, vegetables, eggs and A-rich fruit and vegetable being least consumed. In this study's sample, the results show that eggs, bread, banana, milk biscuits, cold meats, and carbonated drinks are the most consumed foods for this group. Then again potatoes (33%), rice (36%), bread rolls (29%), buns (31%), Weetabix (33%), boiled egg (39%), yoghurt (37%), fried foods (35%), oats (32%), scrambled eggs (30%), carrots (37%) and maize meal pap (34%) are consumed 2 to 3 times per week.

These results are aligned with studies such as El Ansari et al. (2012:30) that the food consumption of students is influenced by the availability and affordability of nutritious and filling food groups. This is further supported by Gerbens-Leenes et al. (2010:2) and Legwegoh and Riley (2014:258) that students are often left with few food choices, and as a result, they would settle for what is affordable (such as wheat, rice and potatoes) therefore consuming more carbohydrates and inadequate nutritional effects required for healthy living. Items such as cheese (25%), evaporated milk (63%), rusks (45%), scones (43%), strawberries (43%), mango (45%), poached eggs (53%), dried sugar beans (61%), dried meat (67%), dumplings (51%), omelette (53%, samp (59%), watermelon (57%) and sweet potatoes (43%) are consumed 1 to 2 times a month. According to Schütte and Ciarlante (1998), the cultural background of individuals lays a foundation for one's product consumption as it fundamentally determines the kinds of products that are consumed by society. This inference is supported in this study as the results suggest that this study's sample food choices are influenced by cultural differences. As the results show that South African staple foods, including maize pap, are consumed 2 to 3 times per week by these students. These results, therefore, suggest that the least consumed foods (1 to 2 times a month) are mostly regarded as luxuries by students. While food items that are much easier to make (such as eggs, bread, and cereal) are mostly consumed items, this could be due to the accessibility and affordability of these foods. These results are similar to those of Ronquest-Ross et al. (2015) who observed that food consumption in South Africa is affected by food availability, accessibility, pricing, and choice.

5.2.3 Causal factors for food consumption changes of first-year university students (objective 2)

Interestingly, the study observed that those with lower incomes, those with no funding, those who purchase food frequently, and those who purchase food from fresh produce markets and restaurants have greater access to multiple food items (more diverse diet) than their counterparts. The study found that those with few meals a day, those who do not eat off-campus, those who eat during mid-morning and lunchtime, and those who confirm their eating patterns never changed when moving into residence at campus have higher diversity scores. They consume the majority of the foods more frequently than their counterparts. Furthermore, the study found that the older the student, the less likely one has eating pattern changes as the odds ratio associated with higher age groups decrease (except for the 22 to 25-year-old category). All ethnicity groups, except whites, have higher odds ratios of having eating pattern changes when compared to Black Africans. The odds are much higher with Coloured categories where they are more than 14 times more likely to have eating-pattern changes compared to Blacks.

The higher the income category, the lower the odds of having an eating pattern change (all odds ratios are less than 1). An individual with no funding is 1.411 odds higher of having pattern changes than those with funding. Those who buy once or twice a week have higher odds of pattern changes compared to buying daily, and those who purchase monthly have the least likelihood of eating pattern changes. The results show that being female compared to being male, the odds of pattern changing (Yes) versus not changing (No) are 1.16 times greater, given that all the other variables in the model are held constant. This means females are more likely to change their eating patterns than male students. The older the student, the less likely one has eating pattern changes as the odds ratio associated with higher age groups decrease (except for the 22 to 25-year-old category). All other ethnic groups, except whites, have higher odds of having eating pattern changes when compared to Black Africans. The odds are much higher with Coloured categories where they are more than 14 times more likely to have pattern changes compared to Blacks. The higher the income category, the lower the odds of having eating pattern changes (all odds ratios are less than 1). An individual with no funding is 1.411 odds higher of having pattern changes than those with funding. Those who buy once or twice a week have higher odds of pattern change compared to those buying daily, and those who purchase monthly have the least likelihood of eating patterns changing.

The probability of male students' changing pattern is 62.6%, compared to females at 71.4%, while the probability underage categories is higher for 22 to 25 years olds (72.8%) followed by 19 to 21-year-olds (68%), then 26 to 29 years (44.5%) and 30 and above (24.3%). The probability of male students changing their eating patterns is 62.6%, lower when compared to females at 71.4%. Therefore, females are less likely to have a higher level of diversity compared to males even though they are more likely to have changes in their eating patterns. Ronquest-Ross et al. (2015:1) explained that dietary patterns or food intake choices are influenced by factors such as geography, seasons of the year, education levels, demographics, disposable income, government and other support services, urbanisation, globalisation, marketing, religion, culture, ethnicity, social networks, time, and the consumer. Ronquest–Ross et al. (2015) observed that since 1994 certain changes occurred in South Africa, which dramatically affected food consumption patterns and are continuing to grow due to shifts in food availability, accessibility, and choices. These changes include the growth of supermarkets, rising urbanisation, and growing capital incomes. The authors go further and state that the demand for high-value foods such as dairy, meat, fresh fruit, vegetables, processed, packaged, and prepared food has doubled.

5.2.4 Measures to encourage healthy food consumption in first-year students

Educating first-year students on different kinds of food groups and food consumption patterns is important for understanding nutrition and promoting healthier food purchases (Videon & Manning, 2013:376). Vardanjani et al. (2015:53) indicate that non-communicable diseases are formed in childhood and remain constant to adulthood based on behavioural and biological risk factors. These risk factors include obesity, dyslipidaemia, and high blood pressure which later in life leads to the emergence of non-communicable diseases. All these authors add that most of the risk factors that lead to non-communicable diseases are controllable and preventable from childhood. According to Vardanjani et al. (2015:54), junk foods contain high sugar and fat which forces the setting for affliction with chronic diseases (obesity, diabetes, and cancer later in life). Therefore, the university environment needs to consider catering to lifelong dietary plans for the students. Universities are regarded by societies as knowledge fountains; therefore, they should ensure that healthy eating habits are part of the university culture to promote healthy living in universities.

However, it appears that most of the cafeterias in universities are operated on a contract basis, where the shops are rented by a person from outside the university. Such arrangements may be aggravated by the skills shortages in the hospitality industry with regard to chefs (Cooper, 2012). As such, most of the hospitality businesses (hotels and restaurants) contract catering to adjust to the scarce skills (Cooper, 2012). Florack et al. (2013:114) indicate that internal cues, such as fulfilment or eating pleasures, are the driving forces behind the decision of what and how much to eat. Florack et al. (2013:114) articulate that dietary decisions may be motivated by internal cues that include ambience, package, size, plate shape, previous exposure to food-related cues, and consumption by other people. Therefore, social modelling of food intake influences the decision about dietary habits, and individuals follow the social eating guidelines regardless of if they feel hungry or dietary restraints or obese. Florack et al. (2013:114-115) state that when inner restraints on eating are vague and concrete rules of eating are missing one can adapt to the behaviour of others. Tam et al. (2017) mention that the World Health Organisation (WHO) suggested that though an intake of various fruits and vegetables reduces the risks of developing NCDs, this dietary intake may also help to ensure an adequate daily intake, and congestion of dietary fibre in one's body system. Therefore, university cafeterias irrespective of the management (contract or university-operated) need to conform to healthy eating habits by aligning the menu with healthy dietary options. The availability of healthy food choices will enable students to draw inferences about healthy eating habits. This will create a culture of healthy living in the university environment. Puoane et al. (2006:92) conceptualised that food is a cultural symbol and eating is a symbolic act through which people communicate, perpetuate-, and develop their knowledge, beliefs, feelings, and practices towards life.

Vardanjani et al. (2015: 54) say that teachers, school authorities and peers play a crucial role in children's choices in food and eating habits. A schooling environment is a suitable place for health education, the children need sufficient knowledge, skills, attitudes, and values for promoting their health. Even though this study's results show that a majority of this sample eats at residences, the eating at a residence may be due to financial constraints of purchasing food at the university cafeteria as the results suggest that a majority of this sample has a R1001.00 to R1500.00 allowance once a month, hence food purchases are at supermarkets and food is mostly consumed at residence. Therefore, suggesting that those that have a higher allowance of above R1500.00 to R2000.00 and R2001.00 and above purchase food at the university cafeterias. This result, therefore, suggests that the students with lower incomes, given an opportunity, may also purchase food at the cafeteria, only that situation does not allow it. Also, it is important to note that

9% of this sample purchases food from the university cafeteria and 6% eat on the go and another 6% eat in class. These figures equate to 21% of students eating in a university setting in this group and it is therefore important to have environments that are conducive for students to make health-related choices when eating at the university, are available.

5.2.5 A balanced dietary approach for first-year students (objective 3)

Alakaam et al. (2015:9) suggest that dietary habits for students usually change upon gaining independence from home environments and are therefore confronted with choosing easier and much more unconventional ways of eating. The results of this 2019 to 2022 study agree with Alakaam et al. (2015) that suggest that students opt for much easier food options, as the results show that the most consumed food in a day by students is brown bread (42.67%), full cream milk (39.33%), cornflakes (39.33%), sweets and chocolates (37.33%), cold meats (35.33%), deep fried food (32.67%), fast foods (32.67%), carbonated sugary drinks (32.67%), potatoes (32%) and rice (30%). Alakaam et al. (2015) suggested variances in food consumption at home versus university stay, which is illustrated in Table 5.1 below.

Table 5.1: Dietary habits at home versus. dietary habits at university

Dietary patterns	Home	University
Eating patterns	Mainly traditional food	Mainly fast food
	Simple and basic	Convenience food
	Commensal eating	Eating alone most of the time
Meals	Home cooked meal	Simple preparation food
	Specific mealtime	Unstructured meal periods
	Eating meals with three courses	Consuming more meals
	Small food portion size	
	Consuming breakfast daily	Large food portion sizes
		Skipping breakfast / light breakfast
	No late-night meal available	Late night meal available
	More varied	Less varied
	Less meat	More fast food and meat
	Fresh fruits and vegetables	Less fresh fruits and vegetables
		Consuming snacking and desserts
		Drinking coffee
	Drinking water	

Source: Alakaam et al. (2015:9)

This study's results support the variables identified by Alakaam et al (2015) regarding the eating patterns and food consumption of university students. The results agree with Alakaam et al. (2015) that students eat simple foods to prepare (eggs, dairy, cereals, rice, potatoes, and fried foods among others). Sugary intake and snacks are also suggested by these results. This group also consumes more fast food and less varied foods in a week. Therefore, this study's findings suggest similarities in the eating patterns of students with variables identified by Alakaam et al. (2015). However, this study disagrees with the statement that this group consumes more meals at residence than at home. This is suggested by the results that a majority of this study's sample consumes three meals a day. This can be aggravated by the affordability factor as this group receives at least R1 001.00 to R1500.00 allowance per month.

Hence, it is paramount that university facilities provide an environment that will motivate students to a healthy dietary intake by providing meals that are nutritious and filling at the same time.

5.3 Recommendations

The study found that the food consumption patterns of most (68%) first-year students at residential facilities in the Cape Town Metropole area have changed since their independence to self-catering. The food consumption patterns that are adopted by these first-year students are mostly based on convenience and affordability. This is evident in the kinds of food that are mostly consumed (bananas, brown bread, milk, cornflakes, cold meats, potato chips, biscuits, and carbonated sugary drinks) including their frequency of consumption in a week (1-2 times a day). The study found that, even though this group mostly consumed food based on convenience, 2 to 3 times a week they consumed staple foods (such as rice, Weetabix, yoghurt, oats, and maize meal pap). It appeared that those that receive funding more than once a month have a variant of food items while those with no funding purchase food once a month purely on the basis that this is when they receive funds. As such, this group consumes their food in the morning, afternoon, and evenings. The study also found that those with higher income are most likely not affected by a dietary change in their eating habits and thus those with funding were less likely to have higher pattern changes compared to those without funding. Also, whites have higher odds of having pattern changes when compared to black Africans. The study further found that the probability of male students' changing dietary patterns is lower (63%) when compared to females (71%). This result, however, cannot bring irrefutable findings as females dominated the study, hence the males are likely to have lower chances of dietary changes

when compared to females. From the aforementioned results and findings, this study, therefore, recommends the following:

- Food affordability and convenience are the main drivers to change in food patterns of first-year year university students. Therefore, it is important that universities provide a culture of farming within their institutions. Thereby, creating farming spaces for university students to participate in, especially the Black students who are the majority in the country and who are most likely to be affected by food security at HEIs. However, the issue of racial participation in these activities needs to be eliminated and rather allow all students with an interest in farming, participation in universities.
- Farming and agricultural activities need not be limited to agriculture students but rather open to all students with an interest in farming around the campus. This will enable students to perceive food security as an important factor in our society. Thereby, creating a culture of farming back in South African society. Students who participate in farming activities will most likely transfer these skills to their local areas upon completion.
- The earning of income from the farming activities around the campus will enable agricultural activities to be fashionable to younger generations. At the same time, this will curb the issue of dependency on funding to have a decent living at residential facilities. Therefore, students will have an opportunity of earning an extra income from farming activities that enables more access to food variants at universities.
- The access to participating in agricultural activities on the campus will enable entrepreneurial access to students and accessibility including food security for students at universities without heavily being dependent on supermarkets upon receipt of funding.
- The creation of farming activities in HEIs will also create access to more nutritious food variants such as vegetables and fruits at affordable pricing, thereby curbing the issue of accessing food once a month but rather having access to a variety of foods at minimal costs.
- This study suggests that first-year students refrain from carbonated sugary drinks, snacks, and fast and fried foods. Thereby, substituting the overuse of fast foods and fried chips and rather use vegetable fries (sweet potatoes instead of potatoes) as an option in cafeterias for those that consume food from these spaces. Therefore, the campaign towards healthy dietary habits in universities will curb unhealthy dietary habits among university students.

- Nutrition education to be added as part of the first-year student's orientation.
- Food gardens to be introduced to all university residences, and students educated about the use of these.

5.3.1 Opportunities for further research

The research explored the food consumption patterns of first-year students living at the residence facilities of HEIs in the Cape Town Metropole area and found that the dietary habits of this group have changed since their independence to own catering. The dietary change in food consumption is based on food access (affordability) and convenience. This research found that the first-year students in these HEIs mostly consume foods that are sugary and unhealthy (fried potato chips, snacks) all in an effort of quick and easy foods. Further research can structurally model a healthy eating diet for first-year university students; this can create an opportunity for students to be aware of the health implications of unhealthy eating habits later in adulthood. The model should illustrate the implications of unhealthy dietary intakes including communicable diseases inherited with such habits. Future research can also check for differences or similarities in first year eating patterns in different universities in South Africa and beyond. Comparative studies between and among nations can also be conducted to find how cultural differences may impact the dietary habits of first-year university students.

5.3.2 Contribution to the body of knowledge

It is perceived that education levels of people heighten awareness about dietary habits that are destructive in nature and being knowledgeable about healthy dietary habits will lead to healthy food consumption in individuals. However, the societal changes that include industrialisation increase labour markets, leaving no time to focus on one's healthy dietary habits. Throughout the world, health-related issues have increased at an alarming rate leading to shorter life expectancies for the current population. Therefore, it is assumed that transitioning from the home setup where meals are catered for may be challenging for first-year students at HEIs. Subsequently, the dietary habits adopted during this transition in life would lead to future choices of meals in adulthood. Hence, negative food choices will have a ripple effect on one's health (obesity, diabetes, and high blood pressure) in the future. This study makes an important contribution to the literature by adding a South African view to the understanding of the dietary habits of first-year university students. The novelty of this study is using first-year students who are the most vulnerable group to changes in dietary patterns as they become responsible for their own meals for the first time in their lives (moving away from home). Claasen et al. (2016:6) identified that food environment research needs to focus on the study design with

multilevel investigations which includes diverse subgroups such as age, gender, and socio-economic status. Hence, the study closed this gap and performed a regression model analysis to assess the diverse subgroups in food consumption and patterns of first-year HEI students in Cape Town.

5.4 Study conclusions

The study found that a majority of first-year students with no funding buy food once a month; purchase their food items mainly from supermarkets, and encouragingly, have three meals per day. Seemingly, most first-year students eat their food in residence; eating is spread across the time spectrum with most eating during lunch time 12h00 to15h00, followed by those who eat breakfast. This study confirmed that the majority of the students staying at a university residence have changed their eating patterns. The food items consumed by at least a third of the sample 1 to 2 times a day (most-consumed foods) are in order bananas, brown bread, full cream milk, cornflakes, processed foods such as potato chips, biscuits, sweets, chocolates, cold meat (Polony, Viennas) and powdered milk. In a day, brown bread, full cream milk, cornflakes, sweets and chocolates, cold meats, deep-fried food, fast foods, carbonated sugary drinks, potatoes and rice were found to be the most-consumed foods by first-year students at residential facilities in the Cape Town Metropole area. Seemingly, most of these foods are consumed 2 to 3 times per week. This chapter (Chapter 5) concluded this research. It provided an overview of the research findings, provided recommendations and suggested opportunities for further research.

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APPENDICES

APPENDIX A: EXAMPLE OF GATEKEEPERS' PERMISSION LETTER

MEMO

TO: The CPUT Head of Residence: Chris Williams

FROM: Miss Sibusiso S. Macozoma, Cape Peninsula University (MTech student)

DATE: 15 April 2018

SUBJECT: Permission letter for conducting research in school residences on first-year students.

I hereby tender my request for permission letter to conduct a research using a survey questionnaire for first-year student who live in school residences towards my Mtech: Tourism and Hospitality Management degree.

Research topic:

"Selected Food Consumption patterns of First-year students at two higher Education institution's residence facilities. A case of Cape Peninsula University of Technology and College of Cape Town".

Responses will contribute towards the research carried out by myself for the Research Dissertation in Master of Tourism and Hospitality in Cape Peninsula University of technology.

Kindly note that all information is for purely Academic Research

The specific objectives of the study are:

- To identify the factors that cause a change in the food consumption patterns of first-year students upon arrival at residence facilities of institutions of higher learning.
- To ascertain the effects of the change in food consumption patterns on the students' ability to cope with the demands of the new environment they find themselves in.
- To devise measures that can be put in place to encourage healthy dietary habits among students living at residence facilities of institutions of higher learning

I trust that my request will receive your favourable response.

Thanking you in advance.

Regards

Ms. Sibusiso Sibonisiwe Macozoma

Faculty of Business and Management Science: Department of Tourism and Events Management

Signature …….. (Head of Residence)

APPENDIX B: LETTER OF INFORMED CONSENT

Statement of Informed Consent

Patterns of first-year students at higher education institutions residences.

My name is Sibusiso Macozoma and I am a student at Cape Peninsula University Technology, studying towards a Master's degree in Tourism and Hospitality Management. The topic of my research is residences: Food consumption

1. Your participation in this project is voluntary; you will not be paid for your participation. You may withdraw from the study at any time without penalty or harm of any type. If you decline to participate in, or choose to not complete the questionnaire, the researcher will not inform anyone of your decision, and no foreseeable negative consequences will result.

2. Completing this questionnaire will require approximately 15 minutes of your time. There are no known risks associated with completing the questionnaire. If, however, you feel uncomfortable in any way during this process, you may decline to answer any question, or not complete the questionnaire.

3. The researcher will not identify you by name in any report using information obtained from your questionnaire your confidentiality as a participant in this study will remain secure. Subsequent uses of data generated by this questionnaire will protect the anonymity of all individuals.

4. This research effort and questionnaire have been reviewed and approved by the Faculty of Business and Management Sciences Ethical Review Committee of the CPUT, which functions as the Institutional Review Board for ethical research at CPUT. For research-related problems or questions regarding ethical research practices, please contact Dr Nyathela at nyathelat@cput.ac.za. For a copy of the results of this study, please contact Sibusiso Macozoma at cell Number 072 036 3284.

NOTE: By completing and submitting this questionnaire, you are indicating that you understand the statements above, and consent to participate in this study. **Please do not put your name on the questionnaire** or your signature to acknowledge that you understand the information presented above it is not required.

Thank you. Date …….....

APPENDIX C: QUESTIONNAIRE

Code ……..

FOOD CONSUMPTION PATTERNS OF FIRST-YEAR STUDENTS AT HIGHER EDUCATION INSTITUTION RESIDENCES

SECTION A: DEMOGRAPHIC INFORMATION

Please answer questions in the spaces provided below by marking with an X.

1. Gender

1	2
Male	Female

2. Age

1	2	3	4
18 – 21 years	22 – 25 years	26 – 29 years	30 and above

3. Indicate your ethnic group

1	Black	
2	White	
3	Indian	
4	Coloured	
5	Other	

4. What is your monthly food allowance?

1	2	3	4	5
> R500	R501- R1000	R1001- R1500	R1501- R2000	>R2001

If any other amount, please specify ……

5. Source of the monthly allowance

1	Family	
2	Part-time employment	
3	Bursary/ NSFAS	
4	Coloured	
5	Other please specify	

SECTION B: AVAILABILITY, ACCESS AND FREQUENCY OF FOOD CONSUMPTION

6. How often do you buy food?

1	2	3	4	5	6
Every day	Once a week	Twice a week	Once a month	Twice a month	Other specify ……

7. Where do you buy most of your food?

1	2	3	4	5
1. Spaza	2. Supermarket	3. Restaurant	4. Fresh produce market	5. Other specify ……

8. How many meals do you eat a day?

1	2	3	4
One	Two	Three	Four

Also find out where do they eat these meals and which time of the day (remember you are investigating consumption patterns

9. Where do you eat the meals in the day?

1	2	3	4	5	6
Residence	Class	Cafeteria	Off-campus	On-the-run	Other, specify

10. Which time of the day do you eat your meals?

1	2	3	4	5	6
06:00-09:00	09:01-12:00	12:01-15:00	15:01-18:00	18:01-21:00	21:01-00:00

11. Do you consider your eating patterns to have changed since you started staying at the residence facility of the University/College?

1	2
Yes	No

SECTION C: FOOD DIVERSITY TABLE ACCORDING TO THE SOUTH AFRICAN DIETARY GUIDELINE

Please indicate the frequency of consumption of the food items indicated in the table below. Mark the appropriate box with an (**X**.

Food type	**Frequency**			
	1	**2**	**3**	**4**
	1-2 times a day	2- 3 times a week	4- 5 times a week	1 - 2 times a month
Group 1: Flesh foods (meat, poultry, fish) diversity				
White meat (Chicken/pork/fish)				
Red meat (beef/lamb/mutton/goat meat)				
Dried meat (biltong)				
Cold meat (polony/viennas)				
Other:				
Group 2: Eggs diversity				
Boiled				
Fried				
Poached				
Scrambled				
Omelette				
Group 3: Diary products diversity				
Evaporated milk				
Sour milk				
Powdered milk				
Full cream milk				

Low fat milk (pasteurized)				
Low fat milk (unpasteurized)				
Cheese				
Custard				
Ice cream				
Yoghurt				
Other:				

Food type	Frequency			
	1	2	3	4
	1-2 times a day	2- 3 times a week	4- 5 times a week	1 - 2 times a month
Group 4: Cereals, roots and tubers diversity				
Rice				
Maize meal porridge				
Maize meal Pap				
Macaroni				
Pasta				
Spaghetti				
Maize rice				
Samp				
Whole-wheat bread				
Buns				
Bread rolls				
Brown bread				
Dumpling				
Scones				
Rusks				
Biscuits				
Corn flakes				
Wheat bix				
Rice Krispies				
Bran flakes				
Oats				
Butternuts				
Potatoes				
Sweet potatoes				

Other:				
Group 5: Legumes and nuts				
Dried sugar beans				
Peas				
Baked beans				
Peanuts				
Other:				
Group 6: Fruits and vegetables diversity				
Pumpkin				
Carrots				
Spinach				
Strawberries				
Grapes				
Peach				
Mango				
Bananas				
Watermelon				

Food type	Frequency			
	1	2	3	4
	1-2 times a day	2- 3 times a week	4- 5 times a week	1 - 2 times a month
Group 7: Miscellaneous junk foods				
Deep fried foods, eg. French fries				
Carbonated sugary drinks, eg. Colas				
Pastries, eg. Cakes and pizza				
Processed foods, eg. Potato chips				
Sweets and chocolates				
Fast foods				

THANK YOU FOR YOUR TIME

APPENDIX D: ETHICS APPROVAL

P.O. Box 1906 • Bellville 7535 South Africa •Tel: +27 21 4603291 • Email: fbmsethics@cput.ac.za
Symphony Road Bellville 7535

Office of the Chairperson Research Ethics Committee	Faculty: BUSINESS AND MANAGEMENT SCIENCES

At a meeting of the Faculty's Research Ethics Committee on **16 October 2018**, Ethics **Provisional Approval** was granted to **Sibusiso S Macozoma (208184600)** for research activities of **M Tech: Tourism & Hospitality** at Cape Peninsula University of Technology.

Title of dissertation/thesis/project:	FOOD CONSUPTIONPATTERNS OF FIRST YEAR STUDENTS AT HIGHER EDUCATIONAL INSTITUTION'S RESIDENCE Lead Researcher/Supervisor: Prof J P Spencer

Comments:

Decision: Provisionally Approved

Signed: Chairperson: Research Ethics Committee	**18 October 2018** **Date**

APPENDIX E: LETTER FROM GRAMMARIAN

22 Krag Street
Napier
7270
Overberg
Western Cape

30 October 2022

LANGUAGE & TECHNICAL EDIT

Cheryl M. Thomson

FOOD CONSUMPTION PATTERNS OF FIRST-YEAR STUDENTS AT HIGHER EDUCATIONAL INSTITUTION'S RESIDENCES

Supervisors: Dr T Nyathela-Sunday and Prof J Spencer

This is to confirm that I, Cheryl Thomson, executed the language and technical edit of the above-titled Master's dissertation of **SIBUSISO SIBONISIWE MACOZOMA,** student number **208184600**, at the CAPE PENINSULA UNIVERSITY OF TECHNOLOGY in preparation for submission of this dissertation for assessment.

Yours sincerely,

CHERYL M. THOMSON

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Cell: 0826859545