LIFESTYLE PRACTICES ASSOCIATED WITH ANTHROPOMETRIC STATUS AMONG STUDENTS AT THE UNIVERSITY OF VENDA

BY

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Declaration

I Mokoena Khutso (11617433), hereby declare that the dissertation for the Master of Public Health degree at the University of Venda hereby submitted by me, has not been submitted previously for a degree at this or any other University, that is my own work in design and in execution, and that all reference material contained therein has been duly acknowledged.

Signature Mokoena.   Date 01-12-2020

Dedication

This mini-dissertation is dedicated to the following people:

- To my parents, Davey Mokoena and Melinah Mashego, for their support, love, prayers and encouragement throughout this study.

- To my daughter, Alwande Keabetswe Mokoena, for growing up into a wonderful 5year old daughter in spite of being far away from her for months working on this project and I pray you to follow your mother's footstep.

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Abstract

Lifestyle is how human beings choose to live their daily live. University is a critical period for young adults since they are responsible for their daily eating's. Unhealthy nutritional practices, insufficient physical activity, tobacco use and alcohol intake have been linked with an increase in the prevalence of underweight, obesity and overweight. The purpose of the study was to describe lifestyle practices associated with anthropometric status among students at the University of Venda. A quantitative approach using cross-sectional design was adopted. A total sample of 363 participants was used in the study. Data was collected using self-reported questionnaire and anthropometric measurement were taken. Data was analysed and correlation tests were done using statistical package for social sciences version 25.0 and presented in table forms and figures. The findings show that 57.3% of the participants were females and 42.4% were males. More than half of the participants (52.9%) eat meals, three times daily. They frequently snack fruits (27.5%) and potato chips (19.3%). The findings revelaled low intake of fruits and vegetables with 36.6% weekly. About 70% consumed fast food weekly. The findings also revealed that 30% of the participants had outstanding nutritional knowledge. The findings revealed that only 38.8 % of the participants engage in physical activities. Most played activities were soccer, aerobics and athletics. Majority of the participants (85%) had outstanding physical activity knowledge. About (44.4%) of the participants practiced good lifestyle habits. There was low intake of alcohol and tobacco. The findings revealed that 21.8% of the participants were overweight and 7.5 % were obese. Most university students had poor eating habits, although majority of the students had outstanding nutritional knowledge. Students did not engage in physical activities, while they had outstanding physical activity knowledge. There has been a decrease in the prevalence of underweight and increase in prevalance of obesity. There was a positive association on frequency of meals per day and waist-hip circumference (P-value =0.042*). In addition, associations were observed between consumption of soft drinks (0.048*), consumption of processed (0.023*), eating outside home (0.021*) and waist-hip circumference. The results indicate that adequate sleep and body mass index are statistically significantly (P-value= 0.029*). Moreover, associations were observed between adequate sleep and waist-hip circumference(P-value= 0.002*).

Keywords: nutrition knowledge, nutrition practice, physical activity knowledge, physical activity practices, university students.

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University of Venda

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List of Acronyms and Abbreviation

ACSM	American College of Sport Medicine
BMI	Body Mass Index
CVD	Cardiovascular diseases
FBDGs	Food Based Dietary Guidlines
IPOQ	International Physica Activity Questionnairem
KG	Kilogram
M^2	Meters Square
NCDs	Non-Communicable Diseases
NIAAA	National Institute on Alcohol Abuse and Alcoholism
OECD	Organisation for Economic , Cooperation and Development
PA	Physical Activity
SA	South Africa
SPSS	Statistical Package for Social Sciences
UNIVEN	University of Venda
USA	United States of America
WC	Waist Circumference
WHO	World Health Organization
WHR	Waist Hip Ratio

Symbols

<
Less than

>
Greater than

Chapter one: Introduction

1.1. Background of the study

Lifestyle is the way human beings choose to live their day lives which may be related to social, occupational or environmental factors (Chakma & Gupta, 2017). WHO (2013) reported that 60% of an individual's health-related quality of life depends on his/her lifestyle. Furthermore, WHO (2018) reported that the leading cause of global death today is largely lifestyle-related diseases. Adequate dietary habits, regular physical activities and exercises are important components of a healthy lifestyle that are associated with the decrease risk of chronic and non-communicable diseases such as type 2 diabetes, hypertension and some cancers (Chakma & Gupta, 2017; WHO, 2018: Mengesha, Roba, Ayele & Bayene, 2019; Al-Ghabban, 2013). Pandey, Katiam, Souza, Vishal, Acharya and Guruprasad (2017) and Muzi and Zheni (2016) reported that unhealthy lifestyle behaviors particular poor dietary practices, physical inactivity, stress and smoking are the major risk factors for conditions like overweight, obesity and non-communicable disease. Although, most individuals understood the importance of physical activity and healthy eating, many are unable to change their unhealthy behaviors to reduce weight and improve chronic conditions (Chakma & Gupta, 2017).

WHO (2018) estimated that 19.5% of the adult population globally were obese in 2015. Biadgilign, Mgutshini, Haile, Gebremichael, Moges and Tilahun (2017) estimated that in 2010, 3.4 Million deaths were due to obesity. If the prevalence of obesity trends persists, evidence shows that over 20% of the world population will be obese by 2030 (Hruby & Hu, 2014). Agyemang, Boatemaa, Frempong and Aikins (2015) reported that the prevalence of obesity is also increasing in Southern Africa. Smith and Smith (2016) reported that obesity and overweight rates in South Africa were increasing rapidly, with almost 70% of women and 40% of men were either obese or overweight. Motadi, Veldsman, Mohlala and Mabapa (2018) reported that obesity rates were more prevalent in females (19%) than males (1.5 %) among adults in Mopani district of Limpopo Province.

Young adults are at the risk of developing obesity especially when transitioning to university life as they become more responsible for their daily eating and lifestyle. Tapera, Merapelo, Tumoyagae, Moswa, Erick, Letsholo and Mbongwe (2017) reported that university students are at a high risk of being physical inactive, and increase in stress level which may lead in the adoption of unhealthy eating habits which might trigger an increase in obesity rates. Pengpid and Peltzer (2013) reported that first entering students are the most vulnerable to weight gain over the period their studies. Furthermore, Almutari, Alonazi, Vinluan, Almigbal, Batais,

Alodhayin, Alsadhan, Tumala, Moussa, Aboshaigah and Alhogail (2018) reported that during this period of life, university and college students are more prone to engage in risky health behaviors known to negatively affect their well-being such as physical inactivity, stress and poor dietary practices. Yun, Ahmad and Quee (2018) reported that most university students had poor eating habits, even though majority of students had a good nutritional knowledge. Apart from poor dietary habits, poor exercising, bad time management, an increase in stress from school work-load also contributed to weight gain among university students. Peltzer, Pengpid, Samuels, Ozcan, Mantilo, Rahamefy, Wong and Gasparishvili (2014) reported that African countries such Nigeria, Egypt and South Africa were reported to have high prevalence of obesity among university students. On the other hand, Uluoz (2016) reported that obesity among university students was lowest when compared to normal population in Turkey.

Adeboye (2015) reported that obesity increases the risk of developing non-communicable diseases such hypertension, dyslipidemia, osteoarthritis, cancer and psychological issues in adulthood. Recently, WHO (2018) estimated an increased incidence of non-communicable diseases such as type 2 diabetes, hyperlipidemia, cardiovascular disease which may result in an increased risk of death because of obesity. Nutrition knowledge and physical activity are the key factors in promoting healthier behavior that is associated with the decrease of numerous chronic diseases, including coronary heart disease, stroke, type 2 diabetes, osteoporosis, depression and certain cancers (Dinger, Brittain, O'mara, Peterson, Hall, Hadley & Sharp, 2018; Dalrymple, 2013). Aziz, Aghaee, Ebrahim and Ranjbar (2011) reported that engaging in unhealthy dietary foods and insufficient nutrition knowledge leads to health problems such as cardiovascular disease, obesity and overweight. WHO (2010) reported that physical inactivity has been identified as the fourth-leading risk of mortality rates with 6% followed by obesity with 5% and 3.2 million of death world-wide are attributed to lack of physical activity.

The similar trend of underweight, overweight and obesity is observed among university and college students. Previous studies found that factors such as socio-demographic, gender, age and misconception of body weight and dietary behavior may also be associated with underweight, overweight and obesity among university students (Pengpid & Peltzer, 2013; Tapera et al., 2017). Fairbrother (2009) reported that the development of obesity among university students could be attributed to family history, genetic predisposing and race. On the other hand, Tapera et al. (2017) reported that gender, level of study, family history and alcohol were not significantly associated with prevalence of obesity among university students. Furthermore, it was further found that university students practice unhealthy dietary practices and lifestyle behaviors that should be targeted and modified in the reduction of the prevalence

of obesity among university students (Tapera et al., 2017). Therefore, this study seeks to describe lifestyle practices associated with anthropometric status among students at the University of Venda.

1.2 Problem statement

Lifestyle has long been associated with the development of many chronic diseases and non-communicable diseases (NCDs). Unhealthy lifestyle can contribute to the development of NCDs, underweight, overweight and obesity (Chakma & Gupta, 2017). The study conducted at Vhembe district shows that the prevalence of obesity and overweight among students at the University of Venda was 9.5 % obese and 20 % overweight in 2016 (Chakwudi, 2016). Through observation, the researcher saw that, there is an increase in the prevalence of obesity which might be associated with lifestyle practices among students at the University of Venda.The researcher observed that it was due to easily accessibility of fast foods within the campus and off-campus restaurants. Furthermore, despite the availability of physical activity resources at the university, there was still lack of engagement in physical activities among students at the University of Venda.

Due to limited number of studies pertaining to lifestyle practices associated with anthropometric status in Vhembe district, the researcher was motivated to undertake the study given the prevalence of obesity among students at the University of Venda. Therefore, this study seeks describe lifestyle practices associated with anthropometric status among students at the University of Venda.

1.3. Rationale

Many studies world-wide have been conducted on the prevalence of overweight and obesity, however, little is known about the lifestyle practices among students associated with obesity in South Africa, especially university students. This will add more knowledge to the previous studies about obesity and overweight at the university. To the best of my knowledge, there are no studies conducted on lifestyle practices associated with anthropometric status among students at the University of Venda, Limpopo Province. Therefore, this study seeks to describe lifestyle practices associated with anthropometric status among students at the University of Venda.

1.4 Significance of the study

Information obtained from the study might be used in planning intervention programs to improve existing intervention strategies in addressing obesity among students at the University of Venda. Due to limited number of studies in this area of research, the study may increase knowledge on lifestyle practices associated with anthropometric status among students at the University of Venda. The outcomes of the study may assist policy makers during the amendment of the policy and budget allocation of infrastructure for universities. Lastly, this study will pose as a base whereby further research in this area could build on and increase existing knowledge in surrounding village/ community.

1.5 Purpose and Objectives

This section will present the purpose and objectives of the study.

1.5.1 Purpose of the study

The purpose of the study is to describe lifestyle practices associated with anthropometric status among students at the University of Venda.

1.5.2 Specific objectives

- To determine the nutritional practices among students staying at the University of Venda residences.
- To assess the nutritional knowledge among students staying at the University of Venda residences.
- To determine the physical activity practices among students at the University of Venda residences.
- To assess physical activity knowledge among students at the University of Venda residences.
- To determine the lifestyle habits among students at the University of Venda residences.
- To assess the anthropometric status among students at University of Venda residences.
- To determine the relationship between practices and anthropometric measurements.

1.6 Definition of terms

The following terms will be defined in the study:

Lifestyle practices are defined as the components related to application of positive choices related to health such as nutritional knowledge, physical activity knowledge and their practices that enhance the quality of life. In this study, lifestyle practices include the application of nutritional knowledge, physical activity knowledge, their practices and lifestyle habits.

Nutritional knowledge refers to knowledge of concepts and processes related to nutritional and health including knowledge of diet and health, diet and disease, food representing major sources of nutrients, and dietary guidelines and recommendation (Miller and Cassady, 2015).In this study, nutritional knowledge refers to individual cognitive process regarding diet, food and nutritional information

Nutritional practice is defined as an observable actions or behavior of dietary habit and can be classified as a good dietary practices and poor dietary practices (Nana and Zema, 2018).In this study, nutritional practice is defined operational as frequency of various nutritional food consumption by students

Obesity - is defined as abnormal, or excessive fat accumulated that may impair health (WHO 2016). In this study obesity is an individual with BMI of ≥ 29.99.

Overweight- refers to body weight that is greater than what is considered normal or healthy for a certain height. (WHO, 2000).In this study overweight is an individual with BMI of ≥ 25. 00- 29.99.

Physical activity knowledge is the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decision (USDHSS, 2010 cited by Ferro-Lebros, 2014).In this study, it is defined as an individual's cognitive knowledge regarding any physical activity or movement.

Physical activity practices- is defined operational as patterns of any physical movement or activity by students.

Students refer to all students residing in the university residence both on campus and off-campus residence.

Underweight- defined underweight as body mass index of less than 18.5 kg/m2 (WHO, 2000)

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1.7 Outline of chapters

Chapter one : Introduction and background

This chapter gives a brief introduction and background to the study. The problem statement, rationale for the study, significance of the study, objectives and definition of terms are presented in this chapter.

Chapter two: Literature review

The chapter gives a well detailed account of previous studies used to motivate the study. It focuses on nutritional practices, nutritional knowledge, physical activity practices, physical activity knowledge, lifestyle habits and antropometric measurements.

Chapter three: Research methodology

This chapter outlines the research methodology used in this study. It gives a brief of study design, research setting, sampling, data collection and data analysis are presented in this chapter.

Chapter Four : Results.

The results of this study is outlined in this chapter. The results are presented in tables and graphs.

Chapter five: Discussion of the results

The research findings are discussed and compared with the existing literature related to the study. The discussion was focused on nutritional practices, nutritional knowledge, physical activity practices, physical activity knowledge, lifestyle habits , antropometric measurements and associated factors.

Chapter six: Conclusion and recommendations

This chapter provides the conclusion and recommendations of the study.

Chapter two: Literature Review

2.1. Overview

This section reviews various sources on lifestyle practices associated with anthropometric status in the developing and developed countries. It also explores the existing data-based literature on the objectives. The literature review will focus on nutritional practices, nutritional knowledge, physical activity practices, physical activity knowledge, lifestyle habits and anthropometric status.

2.2. Nutritional Practices

Steyn (2013) recommends that people from age seven year and older should enjoy variety of foods. In other words, people are encouraged to consume mixed meals by eating foods from different food groups such as fats, proteins, carbohydrates, fruits and vegetables for healthy living. Furthermore, eating variety of foods provides different type and amounts of key nutrients to the body, keeps people in good health and protects against chronic diseases (Venter, 2013). Study done recently in the United States of America shows that participants consumed variety of foods daily such as carbohydrates, fats, proteins, however, they practice unhealthy eating's (Abraham, Noriega & Shin, 2018). Lima, Souza, Balsells, Martins, Andrade, Souza, Gadelha and Damasceno (2016) reported high consumption of variety of food among participants in the University of Brazil. However, fruits and vegetables intake was low among University of Brazil students. These findings show that some of the students consume variety foods with low intake of fruits and vegetables.

Vorster (2013) recommended starchy foods (carbohydrates) to be part of the most meals, such as whole grains, cereal products, legumes and root vegetables (sweet potatoes & potatoes). In addition, these foods help to protect against the development of non-communicable disease such as heart disease, diabetes and some cancers. Mpofu, Kutame, Mutshaeni and Maliwichi (2018) reported high consumption of carbohydrates among college participants in Zimbabwe. In the same study by Mpofu et al. (2018), it was found that majority of the college students consumed white bread, rice, cereal, while few participants consumed brown bread and whole grain bread. Results from previous study show that majority of people consume starchy foods as recommended in Food Based Dietary guidelines(Mpofu et al. (2018).

Venter (2013) recommended that people who are seven years and older should eat dry beans, split beans, lentils and soya beans regular. The benefits of eating dry beans, split beans, lentils and soya beans contribute to dietary adequacy, while protecting against non-communicable

disease. Furthermore, legumes are rich and economical source of good quality proteins, slow release carbohydrates, various vitamins and minerals (Venter, 2013). Figueira, Curtain, Beck and Grafenauer (2019) reported that 47% of the participants at the University of Wollongong (Australia) consumed legumes products 2 to 3 times per week while 7% of the participants did not consume legumes products. On contrary, Mpofu et al. (2018) reported low intake of legumes among college participants in Zimbabwe with only 6% consuming legumes products once per week and 2% daily. Desipte the health benefits of legumes, it seems as if it is consumed by very few people especially in the developing countries such as Zimbabwe while nearly half of students from the University of Wollongong consume legumes weekly.

Food based dietary guidelines for South Africans recommend that people should eat plenty of vegetables and fruits daily (Naude, 2013). Furthermore, it is recommended that people should eat at least five or more servings of vegetables and fruits daily. Eating adequate amount of vegetables and fruits daily help reduce the risk associated with the development of non-communicable diseases such as cardiovascular diseases, including heart attack, stroke and protects against certain types of cancers (Naude, 2013). Desipte the health benefits of consuming vegetables and fruits, studies conducted at the University of Darussalam and University of Kerbla(Iraq) reported less than 30% of university students consume vegetables and fruits (Tok, Ahmad & Koh, 2018; Al-Ghabhan, 2018). In the study done in Tanzania and South Africa, Limpopo provinve, the results show that majority of university students did not meet the daily recommendation of vegetable and fruits consumption as less than 15% and 44% consume fruits and vegetables daily respectively (Msambichaka, Eze, Abdul, Abdulla, Klatser, Tanner, Kaushik, Geubbels & Probst-Hensch, 2018; Mpofu et al.,2018). Vegetables and fruits are available in most parts of Limpopo Province, however, very few people meet their daily recommendation, which is a cause of concern.

Milk and milk products can be consumed daily as recommended in the South African Food Based Guildlines (SAFBDGs) by Vorster, Wenhold, Wright and Wentzel-Virjoen (2013) because they provide some essential nutrients such as calcium as it prevents osteoporosis later in life. Gresser (2015) reported that only 42% of the participants at Kent University (United States) consumed milk 1 to 6 times a week and 27% of the participants consumed yoghurt 1 to 3 times a month. Mpofu et al. (2018) reported low consumption of milk among participants in Zimbabwe. In addition, 18% of the participants consumed milk daily, while only 65% of the participants consumed milk once per month (Mpofu et al., 2018).

Salt intake should be less than 5gram daily as recommended in WHO (2016). The South African Food Based Guildlines (SAFBDGs) also recommend that salt should be taken sparingly (Wentzel-Virjoen, Steny, Kettere & Charlton, 2013). Salt intake reduction helps in reducing and managing high blood pressure, coronary heart disease and hypertension which are some of public health concern (Wentzel-Virjoen, Steny, Kettere & Charlton, 2013). Kabir, Ozkaya and Ozkaya, (2016) reported that 47% of the participants consumed less than 5 gram of salt daily in London University. Magalhaes, Sanhangala, Dombele, Ulando, Capingana and Silva (2015) reported that almost all medical paticipants (97%) at the University of Agostinho Neto (Angola) had high salt intake.

 University is a critical period for young adults regarding food choices and their relationship with weight gain (Sogori, Velez-Argumedo, Gomez & Mora, 2018). Tok, Ahmad and Koh (2018) reported that college adults at the University of Darussalam are at risk of developing obesity, especially when transitioning into university life as they become responsible for their daily eating and practices. Sogori et al. (2018) reported that College or University participants in the United States tend to gain more weight than those who not attend university/college. In addition, the weight gain observed among university participants is attributed by unhealthy dietary habits, such as skipping breakfast, low intake of fish, milk, fruits and vegetables and high intake of fast food, sweets, and sugar-sweetened beverages (Huq, Mariyam, Li, Haung, Jiang, Wu, Feng & Zhou, 2018).

A healthy diet plays an important role in the human life, as it has a positive benefit to health. Huq et al. (2018) reported that unhealthy dietary habits and nutritional status have been shown to have a strong relationship with cardiovascular diseases. WHO (2019) reported that unhealthy diets (especially those that have a high content in fats, sugar and salts) are among some of the leading causes of non-communicable diseases (NCDs) including cardiovascular diseases (CVD), type 2 diabetes and certain cancers. Studies done in Sao Paulo and Iran show that inappropriate eating habits are associated with an increase in the prevalence of non-communicable diseases (NCDs) like cardiovascular disease, obesity, osteoporosis and type 2 diabetes mellitus (Lima, Souza, Balsells, Martins, Andrade, Souza, Gadelha & Damasceno, 2016; Azizi et al., 2015). WHO (2017) reported that low intake of fruits and vegetable is estimated to be the cause of about 19% of the gastrointestinal cancer, about 31% of the coronary heart disease and 11% of stroke world-wide. Healthy eating can help prevent some of the non-communicable diseases such as heart disease, cancer, diabetes, hypertension and other diseases that may be caused by unhealthy eating (Saba & Guha, 2019). Hilger, Loerbroks and Diehl (2016) and Sogori et al. (2018) reported the barrier to eating healthy among University participants in Germany and United States (US) was time

constraints, lack of healthy food at the University canteen, stress and easy access to junk food. Studies done by Oltaibi and Busuny (2015) and Abraham, Noriega and Shin (2018) reported lack of cooking skills, easy access to fast food and taste of the food preferences were the main causes of unhealthy eating behavior among participants in Saudi Arabia and USA. On the other hand, Kabir, Miah and Islam (2018) and Daliens, Clarys, Bourdeaudhuis and Deforche (2014) reported that unhealthy eating behavior among participants in Bangladesh and Europe can be influenced by variety of factors such as individual factors (cooking skills, food taste, food taboo and nutritional knowledge), societal factors (influence of peer pressure and social norms, factors related to university (campus culture and frequency examination), environmental factors (availability of cooking resources, facilities and food prices) that can determine participants eating behavior and dietary practices in Universities.

Literature review has shown an increase in unhealthy eating World-Wide. A study done in the United States of America shows that 36,6% of adults consumed fast food daily (Frayar, Hughes, Herrick & Ahluwalia, 2018). Furthermore, Fray et al. (2018) reported that an increase in consumption of fast food among adults was associated with an increase with family income. On contrary, Abraham, Noriega and Shin (2018) reported that 85.1% of the University participants rarely consume fast food daily in United States of America which is quite intereting. Onurlubas and Yulmaz (2013) reported that 97.4% of the University adults consumed fast food weekly in Turkey. According to Wen, Hao, Zhang, Liang, Li, Wang, Duan, Yang, Cao, Wang, Lu and Wang (2018), the overall percentage 35.4% of the population in China never or rarely consume fruits daily and only 9.1% of the population eat fruits 1-3 Month. Lima et al. (2016) and Tok, Ahmad and Koh (2018) reported a low consumption of fruits and vegetables daily among participants in Sao Paulo and University of Darussalam. Bernardo, Jomori, Fernandes and Proenca (2017) reported unhealthy eating habits such as frequently snacking of unhealthy snacks, sugary foods intake, soft drinks and alcohol beverages, low intake of fish, whole grains and legumes among participants in Brazil.

Morseth, Grewal, Kaasa and Henjum (2017) reported low dietary adequacy among adults in Saharawi Refuge in Algeria with Vitamin A rich dark green leafy, vegatables, nuts, seeds and eggs were the least food groups consumed. Van de berg, Okeyo, Dannhauser and Nel (2012) reported poor dietary practices among participants at the University of Fort Hare, Eastern Cape (South Africa) with low intake of fruits and vegetables, high consumption of sugary foods or sweets, high usage of fats and low intake of dairy products. Bopape, Alberts and Mbhenyane (2018) reported unhealthy dietary patterns among pregnant youth in Polokwane (Limpopo Province, South Africa). Therefore, unhealthy eating practices are rapidly increasing world-wide with the increase of the prevalence of obesity and overweight.

2.3. Nutritional Knowledge

Miller and Cassdy (2015) defined nutritional knowledge as the knowledge of concepts and processes related to nutritional and health including knowledge of diet and health, diet and disease, food representing major sources of nutrients, dietary guidelines and recommendation. Nutritional knowledge is one mmof the factors that affect nutritional status and nutritional habits of individuals, families, and societies (Labban, 2015). Abraham, Noriega and Shin (2018) reported that as individuals transition from home to college life, nutritional knowledge becomes more important aspect because food options change and dietary challenges rise among college participants. Nutrition knowledge has been shown to play an important role in influencing healthy food habits and to ensure nutrient needs throughout lifecycle are met adequately since individual needs are determined by rate of growth (Kinyua, Imungi & Kunyanga, 2013).

Huq et al. (2018) reported that lack of nutritional knowledge is one of the main cause of nutritional problems, which adversely affect dietary practices. Ozodogan, Yardimci and Ozcelik (2018) reported that nutritional knowledge may be effective in increasing the quality of life and decreasing the prevalence of some diseases such as cardiovascular diseases, non-communicable disease, decrease in underweight, overweight and obesity. In order to promote healthier eating habits, nutrition knowledge is believed to be important contributory. On the contrary, previous studies have shown that even if participants have adequate nutrition knowledge, it did not translate into good eating habits (Tok, Ahmad & Koh, 2018; Abraham, Noriega & Shin, 2018; Buxton & Davies, 2017; Kinyua, Imungi & Kunyanga, 2013).

Tok, Ahmad and Koh (2018) reported that majority of participants at the University of Darussalam had good nutritional knowledge. A study done by Buxton and Davies (2017) in the Cape Coast (Ghana) reported that about 62.7% of the nursing participants had adequate nutritional knowledge. However, Van Antwerpen, Okeyo and Dannhauser (2012) reported inadequate nutritional knowledge among participants in Eastern Cape, South Africa. A study done recently by Mamba, Napoles and Mwaka (2019) reported that learners displayed inadequate nutritional knowledge in Mamelodi (Pretoria, South Africa). Tok, Ahmad and Koh,(2018) recommended that multi-disciplinary team specializing in health promotion that includes nutrition and physical activity programmers should be provided to increase awareness among population.

2.4. Physical Activity Practices

Physical activity plays role in health promotion and disease prevention. WHO (2000) defined physical activity as a global term referring to any bodily movement produced by skeletal muscle that results in substantial increase over energy expenditure. WHO (2018) recommends that adults aged 18 to 64 years should engage in at least 150 minutes of moderate-intensity physical activity throughout the week, or do at least 75 minutes of vigorous-intensity physical activity throughout the week, or an equivalent combination of moderate-and vigorous-intensity activity. Furthermore, WHO (2018) reported that for additional health benefits, adults should increase their moderate and vigorous intensity activity, and for muscle-strengthening activities should be done involving major muscle groups on two or more days a week.

WHO (2018) reported that 23% of men and 32% of females were physically inactive globally in 2016. Furthermore, WHO (2018) reported the prevalence of physical inactive in four countries which are Kuwait (67%), American Somoa (53%), Saudi Arabia (53%) and Iraq (52%). Malamba, Keyne, Lambert, De Villers and Puoane (2016) reported the prevalence of physical inactivity in both developed and developing countries with 32% adults being physically inactive in the United States, 52.6% in Mauritania, 49% Swaziland and 45% in South Africa. WHO (2018) reported that about 40% of the South Africans are currently physical inactive. Van Biljon, Mckune, DuBose, Kolanisi and Semple (2018) reported insufficient physical activity among learners in seven school in South African Provinces namely: Gauteng, Northern cape, Kwazulu Natal, western Cape, Eastern Cape and Mpumalanga, however, prevelances were not shown.

WHO (2010) reported that about 1.9 Million of deaths globally were attributable of being physical inactivity. It was also reported that 5.8% of coronary heart disease, 7.2% of type 2 diabetes, 10.4% of breast cancer and 9.4% of colon cancer was due to physical inactivity (Mengesha, Roba, Ayele & Bayene, 2019; Ranashingheet et al., 2016). The study by Coombs, Stamatakisc and Lee (2015) and Ziari, Ziaeifar, Bozorg, Taherian, Mosule and Emad (2017) found that physical inactivity is associated with reduced life expectancy among adults, increase in obesity and overweight, multiple causes of death, chronic mortality as well as disability. Poor physical activity is reported to cause premature death globally of about 9% (Guthold, Stevens, Riley & Bull, 2018).In South Africa, 3.3% of all deaths in 2000 were attributable to physical inactivity ranking it 9th among other risk factors (Malamba et al., 2016). These findings suggest that physical inactivity is one of the leading causes of mortality globally.

Ranashinghe et al. (2016) reported that increase in physical activity could reduce the burden of diseases due to major NCDs and increasing life expectancy. WHO (2018) reported that participation in physical activity reduces the risk of coronary heart disease and stroke, diabetes and some form of cancer, helps in weight control and other psychological benefits such as reduction of problematic levels of anxiety and depression, including reducing state of anxiety, neuroticism, mild- to moderate depression, and various kind of stress. Yulia et al. (2015) and Ziari et al. (2017) reported that 30minutes of moderate –intensity physical activity 5 days per week reduces the risk of cardiovascular disease, Insomnia, colon cancer and breast cancer. Kasim, Raddadi, Mana, Khehsaim, Jelaidan, Al-Rehaily, Al-luhaybi, Abdulaziz, Kram, Aloufi, Alrehaili, Alharbi and Abduldaem (2016) reported that regular physical activity builds healthy bones, muscles, improves muscular strength and endurance, and reduces the risk of developing chronic disease.

WHO (2009) reported that an increase in physical inactivity is due to insufficient participation in physical activities during the leisure time, an increase in sedentary behavior during occupational and domestic activities, and an increase in the use of passive mode of transport has been associated with implications declined of physical activity. Cortes, Correa-Diaz, Benjumea-Arias, Valencia- Arias and Piedrahita (2017) and Ziari et al. (2017) reported that high level of physical inactivity among participants in Colombia and Iran was due to lack of time, lack of support, lack of motivation and lack of self-confidence, limited access to physical activity services and neglect benefits of physical activity. Ranashinghe et al. (2016) and Olunyika and Endozo (2019) reported that increase in physical inactivity among participants in Colombo and Philippines was lack of support and motivation for physical exercises and sport received during primary and secondary schooling.

Previous studies suggest that less than 30% of youth engage in physical activity. In China, only 19% of adolescents (21.6% boys; 17.6% girls) engaged in physical activities daily (Liu, Tang, Cao, Chen, Zhang, Zhuang, Yang & Hu, 2016). In the study done at the University of Darussalam, Sudan and Colombo reported that only 25% or less of youth engage in physical activity (Yun, Ahmad and Koh, 2013; Ranashinghe et al., 2016). Cerar, Kondrick, Ochiana and Sindik (2019) reported that majority of participants in Slovenia engaged in unorganized physical activities. Tadyanemhandu, Inyazika, Nhunzui, Chengetenai and Chibhabha (2016) reported that 50% participants engaged in physical activities very often at the University of Zimbabwe. However, Wang, Li, Zhang, Niu, Li, Li and Speakman (2017) reported physical activity participation among adults in Beijing. Amusa and Kubayi (2014) reported that

particpants at Hlungwani Secondary School in Limpopo Province had sufficient physical activity. However, physical activity engagement is still low among youth (Wang et al., 2017).

2.5. Physical activity knowledge

Physical activity knowledge is an important aspect in enhancing participants' physical activity literacy and participation. Physical activity knowledge is defined as the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decision (USDHSS, 2010 cited by Ferro-Lebros, 2014). Sufficient physical activity knowledge helps in the increase of physical activity engagement, reducing the prevalence of non-communicable diseases such as obesity, overweight and cardiovascular disease. Hanna et al. (2017) reported that improved physical activity knowledge among participants could contribute to changes in behavior that could improve the health status of the participants at Queensland University of Technology.

Abula et al. (2018) in the recent study done at United Kingdom(UK) reported that only 4.4% of participants had a correct knowledge of physical activity and participants were significantly more physically active than those who had no knowledge on physical activities. Kumara and Siriwardena (2016) reported that 58.3% of the population in Sri Lanka had poor physical activity knowledge, however, majority of the participants engaged in physical activities. Al-Geel, Moneer, Noaman and Elettar (2016) reported lack of adequate physical activity knowledge among National Cancer Institute workers in Cairo. Lwaula, Sekoni, Olamaygenu, Akannbi, Sabir and Ayankogbe (2015) reported poor physical activity knowledge among health professional workers in Nigeria. On the other hand, Ziari et al. (2017) reported a moderate physical activity knowledge among participants in Iran. Eksay (2014) reported a high physical activity knowledge among participants at the University of Nigeria. There is a need for health professionals to implement strategies that will educate the population at large, in order to reduce the burden of obesity and overweight worldwide. There is still a gap in literature review on physical activity knowledge in African countries, including South Africa. Therefore, there is a need for more research is this focus area.

2.6. Lifestyle habits

Lifestyle habits have many factors which contribute to the burden of underweight, obesity and overweight among participants in universities. However, in this section, the researcher will focus on tobacco use and alcohol intake.

2.6.1. Tobacco use

Al-Ibrahim and Gross (1990) defined tobacco use as any habitual use of the tobacco plant leaf and its products. Furthermore, the predominant use of tobacco is by smoke inhalation of

cigarettes, pipes, and cigars (Al-Ibrahim & Gross 1990). Kalawole, Agofure and Nwokolo (2018) reported that smoking is one of the most common forms of recreational substance use and a major public health problem affecting young people world-wide, resulting in premature deaths and long term cardiorespiratory and cardiovascular diseases. Domaradzaka, Barabasz, Sebolewski, Babiarz, Zadarko and Szybisty (2018) reported that obesity and smoking represent the leading preventable causes of morbidity and mortality in the United States. In addition, Mahfouz et al. (2014) reported that tobacco has long been associated with several health problems and is considered a chief preventable risk factor for six of the eight leading causes of morbidity and mortality globally.

Jamal, Philips, Gentzeke, Homa, Babb, King and Neff (2018) reported that in 2017, 14% of adults in the United States were currently smoking and 19.3% (estimated 47.4 million) adults used any tobacco products. In addition, the prevalence of tobacco use products in 2017 were cigars (3.8%), e-cigarettes (2.8%), smokeless tobacco (2.1%) and pipes 1.0% (Jamal et at. 2018). A study done in Nigeria shows that 6.6% of the adults aged 15-49 years of age smoked cigarettes, 1.7% used snuff, 0.4% smoked pipe and 0.2% chewed tobacco (Aniwada, Uleanya, Ossai, Nwobi & Anibueze, 2018). Reddy, Zuma, Shisana, Jonas, Sewpaul (2015) reported that the prevalence of tobacco use among adults in South Africa was 17.6 % with 29.2% being males and 7.3% females. Furthermore, the provinces with the highest tobacco use was Western Cape (32.9%), Northern Cape (31.2%), Free state with (27.4%) and North West and Limpopo Province had the lowest rates with (12.7% and 12.8% respectively).

Ganawi, Bashir, Alreshidi, Dirweesh, Al-Hazimi, Ahmed, Kamal and Ahmed (2016) found that the prevalence of obesity on current smokers was 24.9% and overweight was 7.4%. Furthermore, Ganwi et al. (2016) reported that prevalence of obesity and overweight was high on ex-smokers with (45.0%; 31.3%) and to those who never smoked, the prevalence of obesity was 27.6% and overweight 37.3%. In addition, obesity was most prevalent among ex-smokers. Wantanabe, Tsujino, Konno, Ito, Takashina, Sato, Isada, Ohira, Ohtsuka, Fukutom and Nakamura (2016) reported that the prevalence of obesity tends to increase with pack-years and the number of cigarettes consumed daily in the study done in Japan. Therefore, the increase in smoking increases the prevalence of overweight and obesity among participants.

2.6.2. Alcohol consumption

Alcohol consumption is defined as the drinking of beverages containing ethyl-alcohol (https://www.britannica.com/topic/alcohol-consumption,2020, access, 4 February 2020). Alcohol beverages include wine, beer and spirits. National Institute on Alcohol Abuse and Alcoholism

(2019) cited from National Survey on Drug Use and Health (NSDUH) (2018) reported that 86.3% of people aged 18 or older drank alcohol at some point in their lifetime, 70% drank in the past year and 55.3% reported that they drank in the past month, which results in a higher percentage of alcohol consumption.

Pledger, Martin and Cunning (2016) reported the prevalence of alcohol in New Zealand with 79% of adults aged 15+ years consumed alcohol in the last 12month with 84% being males and 76% females. Ritchie and Rose (2018) reported high alcohol consumption in Europe with 15 liters per person per year in Czech Republic, Lithuania and Moldova. Furthermore, Ritchie and Roser (2018) reported high consumption of alcohol in Eastern countries including German, Ireland, and Belgium between 12 and 14 liters per person per year. On the other hand, Marara, Rath, Sharma and Srinivas (2016) reported that India had low consumption of alcohol, when compared to the rest of the world because only 32% of the Indians consumed alcohol, out of which 4-13% of the populations were daily consumers. Ritchie and Roser (2020) reported the high prevalence of alcohol in African countries including Nigeria with (12.28 liters/year), Rwanda (9.10 liters/year) and Uganda (11.93 liters per year). Villios and Van Walbeek (2018) reported the highest alcohol consumption among youth from 15years and above in South Africa. Furthermore, the provinces with the highest alcohol consumption was North West (50.8%), Western Cape (44.2%), Gauteng (40.2%) and Free State with 40.9% (Villios and Van Walbeek, 2018). Maserumule, Skaal and Sithole (2019) reported high consumption of alcohol with 53.8 % of learners in Sekhukhune district, Limpopo Province. Therefore, alcohol consumption is increasing in South Africa annually, with the risk of premature death.

The National Institute on Alcohol Abuse and Alcoholism (2019) estimated that 88,000 of people (approximately 62,000 men and 26,000 women) die from alcohol related causes annually, making alcohol the third leading preventable cause in the United States with tobacco being first, poor diet and physical inactivity being second. Mekonen, Fakadu, Chane and Bitew (2017) reported that alcohol is the third leading preventable risk factor of disease and responsible for 3,3 million deaths world-wide. In 2010, alcohol misuse was the fifth leading risk factor for premature death and disability globally (NIAAA, 2019). Domaradzaka et al. (2018) reported that alcohol and tobacco use are among the main risk factors of premature death and morbidity in Europe. Morojele, Parry, Brook and Kekwaletswe (2013) estimated that 33,699 deaths were related to alcohol in South Africa.

Booranasuksakul, Singhato, Rueangsri and Prasertsri (2019) reported a relationship between alcohol consumption and the body mass index of participants in the Eastern Thailand University. Furthermore, daily alcohol consumption was associated with the increase in the

body mass index resulting in obesity and overweight (Booranasuksakul, Singhato, Rueangsri and Prasertsri, 2019). Garcia-Carretero, Moreno-Hierro, Martinez, De los Angeles-Quintero, Morales-Garcia and O'ferall-Gonzale (2019) reported that participants are highly vulnerable to alcohol consumption, due to their access to and ability to purchase it, their increased independence and occasionally due to lack of parental control. Therefore, excessive alcohol intake increases the prevalence of underweight, obesity and overweight.

2.6.3. Anthropometric status

Body Mass Index(BMI) is a simple index of weight-to-height that is commonly used to classify underweight, overweight and obesity in adults (WHO, 2000). Furthermore, BMI is calculated as a person's weight in kilograms divided by the square of the height in meters (kg/m^2) (WHO, 2000). BIM classification is as follows: <18.50kg/m^2 as underweight, 18.50-24.99 kg/m^2 as normal weight, 25.00-29.00 kg/m^2 overweight and 30.00 kg/m^2 and above as obese. Below is the table used to classify whether a person is underweight, normal weight, overweight or obese.

Table 2.1 Classification of adults according to BMI (WHO, 2000)

BMI classification	Interpretation
<18.50	Underweight
18.50-24.99	Normal weight
25.00-29.00	Overweight
30.00-34.99	Obese I
35.00-39.00	Obese II
≥ 40	Obese III

WHO (2000) defined underweight as body mass index of less than 18.5 kg/m^2 in an individual. Al-Kibria (2019) reported that over the past few years, there has been a slightly decrease in the prevalence of underweight globally. Yen, Shi, Soeng, Seng, Dy, Suy and Ngin (2018) reported that underweight is one of the non-communicable disease that causes mortality and mobility world-wide. In the study done in Thailand, it was found that the prevalence of underweight among participants in 22 countries world-wide was 10.8% in males and 17.6% in females (Peltzer et al., 2014). Pengpid and Peltzer (2015) reported the overall prevalence of underweight in Thai University was 21.3% in both males and females. Ren et al. (2015) and Yen et al. (2018) reported the prevalence of underweight was more in females compared to males with 27.5%; 17.1% in China and Cambodia. Jouna, Woodman and Balaian (2017) reported the overall prevalence of underweight was 8% among participants with 13.1% in females, 2.7 times higher compared to males in Saudi Arabia. Tapera et al., (2017) reported the overall prevalence of underweight was 9.5% among participants in Botswana. Chakwudi (2016) reported the overall prevalence of underweight was 9.7% (7.4% in males and 11.4% females in Limpopo Province, South Africa. Therefore, the previous studies show an increase in the prevalence of underweight in females compared to males.

Obesity can be defined as abnormal or excessive fat accumulated that may impair health (WHO, 2016), while overweight is excess body weight relative to the height. The body mass index for obese person is 30.00 kg/m^2 and above, while for overweight is 25.00-29.00 kg/m^2. Peltzer et al. (2014) reported the prevalence of obesity and overweight in 22 countries with 24.7% of the participants being females and 19.3% being males. Organization for Economic Cooperation and Development (OECD,2017) reported the prevalence of obesity in adults with 19.5% of adult population were obese in 2017. In addition, an average of 6% was in Korea and Japan, more than 30% in Hungary, New Zealand, Mexico and the United States (OECD, 2017). Study done in Thailand, reported the prevalence of obesity and overweight in African countries such as Egypt with (25.3%), Nigeria (10%) and (10.8%) in South Africa (Peltzer et al.,2014). In Botswana, Tapera et al. (2017) reported the overall prevalence of obesity and overweight in both males (11.9%) and 24.9% being females. Smith and Smith (2016) reported that obesity and overweight rates in South Africa were increasing rapidly, with almost 70% of women and 40% of men were either obese or overweight. Motadi, Veldsman, Mohlala and Mabapa (2018) reported that obesity rates were more prevalent in females with (19%) than males with (1.5%) among adults in Mopani district of Limpopo province. Chakwudi (2016) reported the overall prevalence of obesity and overweight was (9.5% and 20.2%) in both male and female participants in Limpopo Province, South Africa. Therefore, studies show an increase in the prevalence of obesity and overweight world-wide.

In recent years, obesity and overweight have become a pandemic health issues across the developed and developing countries and is considered as fifth leading cause of mortality worldwide (Zamsad, Banik & Ghosh, 2019). Al-Ghabban (2013); Yen et al. (2018) and Oltaibi and Busuny (2015) reported that obesity and overweight are one of the risk factors which are responsible for the cause of non-communicable diseases (NCDs) that cause mortality and morbidity world-wide. Muzi and Zheni (2016) reported that obesity in combination with an unhealthy diet lifestyle, such as smoking, alcohol, drugs and physical inactivity increase the risk of unhealthy life with chronic heart disease, diabetes, cancer and stress. Okgebu et al. (2017) reported that young adults who were obese or overweight are likely to have clustering of cardiovascular risk factors such as dyslipidemia, hypertension and type 2 diabetes mellitus, which persist from childhood.

Muzi and Zheni (2016) reported that nutritional knowledge and physical activity practices can act together in reducing underweight, obesity and overweight levels and promote a healthy active quality of life. Pol, Uo, Jael, Mergal and Carmela (2018) reported that early prevention of childhood obesity is an important strategy in curbing obesity and overweight, hence it is an important risk factor that appears at an early age to be identified as soon as possible. A

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decrease in sedentary lifestyle, decrease in unhealthy diets, increase in physical activity are among the factors that can prevent the increase in obesity and overweight among participants in the universities. Therefore, it is important that health education and health promotions strategies be implemented by health promoters in the universities in order to reduce the prevalence of underweight, obesity, overweight and prevent the risk of the prevalence on non-communicable disease. Tadyanemhandu et al. (2016) reported that encouraging participants to eat healthy and engage in recommended levels of physical activity plays a key role in reducing the long-term mobility and mortality associated with being overweight or obese leading to inactive lifestyle.

Waist-to-hip ratio is defined as the measurements of waist circumference divided by the hip circumference (WHO, 2007). Waist circumference (WC) is an accurate and simple measure of abdominal obesity as compared to waist–hip ratio (WHR) (Ahmad, Adam, Naw, Hassan & Ghazi, 2016). WHO (2007) reported that excessive fat is considered a risk factor for the degenerative disease particularly abdominal fat, and the waist-to-hip ratio is used to determine the risk in both males and females. Waist-Hip ratio classification differs in gender, below is how waist-to-hip ratio is classified according to WHO. The following tables indicate how to measure waist-hip circumference.

Table 2.2: Waist-hip ratio for females and Males (WHO, 2007)

Score	Interpretation
<0.75	Excellent
0.75-0.79	Good
0.80-0.86	Average
≥ 0.86	At Risk
Waist-hip ratio for Males	
<0.85	Excellent
0.85-0.89	Good
0.90-0.95	Average
≥ 0.95	

2.7. Summary

There has been an increase in unhealthy dietary intake among particpants world wide. Literature review shows that people are not yet fully equipped with the right nutritional knowledge in order to practice healthy eating. Studies show an increase in the prevalence of physical inactivity world wide with its consequences. There has been a decrease in the prevalence of underweight, and an increase in the prevalence of obesity and overweight world-wide. Tobacco use and alcohol intake are among the preventable risk factors that have been associated with the prevalence of underweight, obesity and overweight globally. Literature review on this study only focused on nutritional practices, nutritional knowledge, physical activity practices, physical activity knowledge, lifestyle habits and anthropometric status.

Chapter three

Research methodology

3.1. Introduction

This section discusses study design, study setting, study population, sampling method and procedure, measurement instrument, validity and reliability of the study, plan for data collection, data analysis, data collection and ethical consideration.

3.2. Study design

A cross-sectional design was used. Data was collected at one point in time as described by Polite and Beck (2012). Furthermore, the survey allows the researcher to collect data using a large number of variables and compare different variables at the same time (Polite & Beck, 2012). The researcher described lifestyle practices associated with anthropometric status among students at the University of Venda. A quantitative approach was used in the study.

3.3. Study population and setting

The section focused on study population and setting.

3.3.1 Study population

The target population was both undergraduate and postgraduate students at the University of Venda residing at the university hostels on campus as well as off-campus residence. The total population of both on campus and off-campus residences is 3,998 (University of Venda Students Affairs, 2018). The table below shows the total number of students in each residence both on campus and off-campus residence.

Table 3.1 Total number of students residing at campus residence

Residence	Female	Male	Total
Bernard Ncube	58	-	58
Carousel	-	123	123
F3	-	369	369
F4	372	-	372
F5	129	-	129
Lost City	180	180	360
Mango groove	124	-	124
Riverside	128	128	256
TOTAL	991	800	1791

Table 3.2 Total number of students residing at off- campus residence

Residence	Total Number of students
1step residence	95
Brukedo Hotel	120
Degann inn	60
Greenstone Hill	702
Hill view	38
HHHH	50
Luvhundi Construction	48
Mae Mathagu Properties	35
Maphula	34
Missopotamia	76
Mshelly Construction	41
Mubvafhi	32
Muthathe	112
Nchabeko Skills consultancy	218
Sandton Residence	251
Park view	92
West-gate Montana	203
TOTAL	2207

3.3.2 Study setting

The study was conducted at the University of Venda, which is a comprehensive rural based university, located in Thohoyandou, Vhembe district, Limpopo Province. The University has an estimated number of ±16 000 students (undergraduates and postgraduates). The university has one main campus in Thohoyandou. The campus houses all eight schools namely, Agriculture, Education, Environmental Sciences, Health sciences, Human and Social Sciences, Law, Management Sciences and Mathematics and Natural Sciences. The University draws its cultural strength from Venda, Tsonga and Northern Sotho background, however, over the years the university has accommodated all cultural background students including international students from countries such as Botswana, Ghana, Kenya, Malawi, Nigeria, Swaziland and Zimbabwe. The university has about 21 hostels which are situated both inside and outside the campus. The campus residence has both male and female residences, while off-campus residence is a mixture of both male and female students. The university has three food outlets (Cafeteria, tuck-shop and student bar) which sell fast food that are easily accessible to students. Majority of students buy food in these campus outlets and off-campus outlets using their bursaries on daily basic, which might contribute to their lifestyle practices. Therefore, the researcher conducted the study in all university residence (on campus and off campus).

3.4. Sampling

The section discussed the sample size and sampling procedure.

3.4.1 Sample Size

The researcher used Slovin's formula for sample size. The formula makes it easier to determine a reasonable and unbiased sample within a population. Slovin's formula was used when calculating sample size. The formula below shows how the same size was calculated:

n- Sample (3,998)

N-total number of participants

Margin of error (0.05)

$$n = \frac{N}{1 + N\ (e)2}$$

$$n = \frac{3{,}998}{1 + 3.998(0{,}05)2}$$

$$n = \frac{3{,}998}{1 + 3{,}998\ (0{,}05)2}$$

$$n = \frac{3{,}998}{1 + 10}$$

$$n = \frac{3{,}998}{11}$$

$$n = 363 \text{ participants}$$

3.4.2. Sampling procedure

Probability sampling adopting systematic sampling method was used in the study to select participants. The sample frame was used to select rooms that the researcher collected data. The sample population was 3998 but the sample size which is 363(3998/363) = 11, meaning every 11th room was systematically sampled for data collection. If the room is empty, the next room was sampled for data collection. If there are more than one students in the room, voluntary participation was allowed.

3.5. Inclusion and Exclusion criteria

3.5.1. Inclusion Criteria

All students residing in university residence both on-campus and off-campus residence.

3.5.2 Exclusion criteria

Students who are pregnant were excluded from the study, as it was difficult to determine their anthropometric status.

3.6. Data collection instruments

Self-reported questionnaire was used for data collection. The questionnaire was designed to capture information regarding their socio-demographic profile, nutritional practices, nutrition knowledge, physical activity practices, physical activity knowledge, lifestyle habits and anthropometric status. The questionnaire was consisting of the following seven sections:

Section A: Socio- demographic profile

This section involved residence, age, gender, ethnic group, marital status, academic level, schools, parent/ guardian occupation, source of income and student monthly allowances.

Section B: Nutritional Practices

A modified question was adopted from Food Dietary Guidelines for South Africa (2013) and Hurnstrom, Friesen, Ellery and Pike (2011). The questionnaire aimed to determine whether students practiced healthy eating in their daily routine.

Section C: Nutrition Knowledge

The questionnaire aimed to assess the basic level of nutrition knowledge of students. The modified questions was adopted from Vorster, Badham, and Venter. (2013). The researcher used 5-likert scale modified from Department of Education to measure the nutrition knowledge of students. The scale was structured as follows: 0-29% as poor knowledge, 30-39% little knowledge, 40-49% as moderate knowledge, 50-59% Adequate knowledge, 60% and above as outstanding knowledge (Council for Quality Assurance in General Further Education and Training, 2010).

Section D: Physical Activity Practices

The questionnaire was adopted and modified using the guidelines for International Physical Activity Questionnaire (IPQA, 2002), Physical Activity Guidelines for Americans (2008) and Tadyanenhandu et al. (2016). This section contained questions aimed at determining whether students engage in physical activities during their leisure time or on their daily routine.

Section E: Physical Activity Knowledge

The modified questions were adopted from Tadyanenhandu et al. (2016) and WHO (2009). The questionnaire aimed to assess the basic level of knowledge of physical activity of students The researcher used 5-likert scale modified from Department of Education to measure the physical activity knowledge of students. The scale was structured as follows: 0-29% as poor knowledge, 30-39% little knowledge, 40-49% as moderate knowledge, 50-59% adequate

knowledge, 60% and above as outstanding knowledge (Council for Quality Assurance in General Further Education and Training, 2010).

Table 3.3 Likert scale to assess knowledge(Council for Quality Assurance in General Further Education and Training, 2010).

Score	Interpretation
0-29	No knowledge
30-39	Little/elementary
40-49	Moderate
50-59	Adequate
60-69	Substantial
70 and above	Outstanding

Section F: Lifestyle Habits Adopted

This section consists of 7 lifestyle habits questions adopted and aimed at determining the lifestyle habits of students. The results were assessed using the table below:

Table 3.4: Lifestyle index (Corporate Sangala, 2000) as referred to in Potchefstroom University Manual, October 2000.

7	Very good	Following a healthy lifestyle, keep it up
5 – 6	Good	Not bad at all, but keep a close eye on self
4	Fair	Evaluate lifestyle seriously. It is important to consider some positive changes
2 – 3	Bad	Lifestyle is detrimental to health. It is important to commit self to self to serious changes
1	Very bad	Destructive lifestyle may pose serious health problems in life. Self and company will benefit by serious commitment to a healthy lifestyle.

Section G: Anthropometric Measurements

The researcher took the following anthropometric measurement: weight, height, waist and hip circumference. The anthropometric measurements were recorded in section H of the data collection instrument.

3.7 Validity and Reliability

3.7.1 Validity is the degree in which an instrument measures what is supposed to measure (Polit & Beck, 2012). Validity of instrument is important in developing and accessing of the instrument (Shafer & Zhang, 2012).

3.7.1.1 Content Validity

The researcher adapted and modified existing questionnaire after intensive literature review search on the topic. The questionnaire was given to experts in the same field of the study for validation purposes and if the questionnaire was able to cover the objectives of the study. Language ambiguity and grammatical error were corrected in the English Department. The researcher selected five students who were used for pretesting of the instruments.

3.7.1.2 Construct Validity- the questionnaire was presented to supervisors, the Department, School University Degree and the University Higher Degree Committee to ensure construct validity. Feedback was given to assist the researcher to modify the instrument.

3.7.1.3 Face validity refers to whether an instrument or test appears to measure what is supposed to measure (Lane, 2013). In this study, the questionnaire was assessed and analyzed by the researcher and the supervisors for face validity on the questionnaire in order to determine if the questionnaire was understandable to respondents and addresses the objective of the study.

3.7.1.4 Validity of the Instrument- to ensure the validity of the seca-weighing scale, a known mass of 1kg washing powder was used to determine the validity of the scale and find out if the results on the scale is still the same.

3.7.2 Reliability refers to the consistence of, accuracy and precision of the measurement of the instruments (Lane, 2013). To ensure reliability, the researcher checked the reliability of the study with the past studies to check if the information of data was reliable. Test-retest method was used to determine the reliability of instruments. The researcher ensured that the instruments used for data collection was valid, namely: the questionnaire and the seca weighing scale. To ensure the reliability of the questionnaire, the researcher gave five students a questionnaire and after a week re-administer the same questionnaire and check if there is consistency and the results of the questionnaire obtained were the same.

3.8 Pre-test of the Instrument

Pre-testing refers to criteria of techniques or activities which allow the researcher to assess survey questions or questionnaire before the actual data collection (Casper, Peytcheva & Cibeli, 2011). The researcher chose thirty students who were not part of the study to pre-test the instruments. The main aim of pre-testing was evaluating if the questionnaire was well understood by the respondents and for the researcher to familiarize herself with the instrument.

3.9 Data collection and procedure

Data was collected using self-administration questionnaire. The researcher went to student residences to administer questionnaires to participants and collect them same day. The researcher first measured the weight, height and the waist-hip circumference of the students before completing the questionnaire. The participants were requested to sign a consent form prior data collection. The purpose of the study was explained to participants. The procedure of completing the questionnaire was explained to participants. Data collection process took four weeks.

3.9.1 Procedure for Anthropometric measurements

The following procedure will be used for anthropometric measurements:

3.9.1.1. Weight

Participants were asked to remove their heavy clothes (jerseys and shoes) during weight measurement. They were asked to look straight and stand still on the scale, while the

researcher wait for the digital screen to show before reading measurement. Seca weighting scale was used to measure the weight of the participants and it was recorded to the questionnaire of the participants.

3.9.1.2. Height

Participants were asked to remove their shoes during height measurement. Participants were asked to stand still with their back to the wall and look directly forward. The back of their feet, calves, bottom, upper backs and the back of their head should be in contact with their wall. They were positioned directly underneath the drop down measuring devices. Height was measured using Stadiometer scale. Below is the table for BMI interpretation.

Table 3.5. Body Mass Index classification (WHO, 2000).

BMI classification	Interpretation
<18.50	Underweight
18.50-24.99	Normal weight
25.00-29.00	Overweight
30.00-34.99	Obese I
35.00-39.00	Obese II
≥ 40	Obese III

3.9.1.3. Waist

That is the girth at level of the noticeable waist narrowing and is located approximately half way between the costal boarder and illac crest. The researcher stood in front of the participants to correctly locate the narrowing of the waist. The measurements were taken at the end of normal expiration with the arms relaxed at the side.

3.9.1.4. Hip

That is the girth at the level of the greatest posterior protuberance, approximately at the pubis symphysis level anteriorly. The researcher stood at the side of the participants to ensure that the tape is held in a horizontal plane when the site is measured. During measurements, the participant stood erect with the feet together and without volitionally contracting the gluteal muscle.

3.9.1.5 The table below show the cut-off points for both males and females.

Table 3.6 Waist-hip ratio interpretation(WHO, 2007)

Score females	Interpretation	Score males	Excellent
<0.75	Excellent	<0.85	Excellent
0.75-0.79	Good	0.85-0.89	Good
0.80-0.86	Average	0.90-0.95	Average
≥ 0.86	At Risk	≥ 0.95	At Risk

3.10 Data analysis

Statistical analysis was performed using the Statistical Package for Social Sciences (SPSS) Version 25.0. Correlation tests were done to describe lifestyle practices associated with anthropometric status among students at the University of Venda. Level of significance was

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set at P≤ 0.05, any value equals to/ or less than 0.05 were regarded as significant (association) and any above 0.05 were regarded as no significant (no association). Tables and graphs were used to present the results of the study.

3.11. Institutional Approval

The proposal was presented at Department of Public Health, School and University higher degree's committee and ethics committee. Permission for data collection was sought first from the University of Venda Research Ethics Committee Project no: (SHS/19/12/0605) and then University Students Affairs prior data collection.

3.12. Ethical considerations

The researcher ensured that all the necessary ethical issues were followed throughout the study. The study was conducted following Helsinki declaration- ethical principles for medical research involving human subjects. Adopted by the 18th WMA General assembly, Helsinki, Finland, June 1964 and amended by the : 64thWMA general assembly, Fortaleza, Brazil, October 2013. The following ethics were considered in the study:

3.12.1. Principle of respect for human dignity

Participants had the right to self-determination and full closure. Therefore, participation in the study was voluntary basis and the researcher disclosed all information pertaining the study after data collection. Participants were treated with respect and dignity at all times.

3.11.2. Consent form

Participation in the study was voluntary. Participants who took part in the study were asked to sign a consent form prior data collection. Consent form was separated from the actual questionnaire in order to maintain participant anonymity. Participants had the right to withdraw from participation in the study at any time.

3.11.3. Confidentiality and anonymity

Confidentiality was maintained all times during the study and after the study. The anonymity was assured in the study by using codes and not names. Participants were required to use codes instead of names for confidentiality purpose.

3.11.4. Right to full disclosure

The researcher fully informed the participants regarding the study; for example, the nature, duration and purpose of the study. The participants were informed about the methods, processes and procedures for data collection, and how findings of the study will be used.

3.12. Plan for dissemination of the study

The findings and recommendations will be used at the University of Venda Library as journal and be kept at the Department of Public Health for referencing. The study findings will be presented in conferences either international or national and it will be published with DHET.

Chapter four
Results

4.1 Introduction

This chapter presents the results of the study. The aim of the study was to describe the lifestyle practices associated with anthropometric status among students at the University of Venda. The results were presented under the following sub-headings: socio-demographic information, nutritional practices, nutritional knowledge, physical activity practices, physical activity knowledge, lifestyle habits adopted and anthropometric measurements.

4.2. Socio-Demographic Information

The total sample was three hundred and sixty-three (363) university students residing in university residences inside and outside campus. Table 4.1 shows that 57.3% of participants were female and 42.4% were males. The participant's age was ranging from 18 to 42 years old. Majority of participants (88.7%) was aged 18 to 24 years, 10.7% were aged 25 to 30 years, while very few were aged 31 years and above. The commonly spoken languages were Tshivenda (42.4%), Xitsonga (21.5%), Sepedi (19.3%) and Isiswati (11.0%). Almost all participants (96.4%) were single, 2.2% were living with partners and 1.4% were married. Majority of the participants were undergraduate students and 14.3% were postgraduate students.

The participants were from different schools at the university which are School of Education (18.5), Management Sciences (17.4%), Mathematics and Natural Sciences (16.0%), Human and Social Sciences (13.5%), Environmental Sciences (12.4%), Health Sciences (10.7%), Agricultural Sciences (6.9%) and Law (4.7%).

About 60% of participants' parents/guardians were unemployed, 31.1% were employed,10.8% were either self-employed or pensioners. Majority of participants (81.0%) were using bursaries, 9.9% received allowances from parents/guardians, while 7.4% were receiving monthly allowance from both parents and bursaries and very few (1.7%) were self-employed. The mean monthly allowance was R1498.39±SD. The minimum monthly allowance amount was R500 and maximum was R3500.00.

Table 4.1. Socio-demographic information

Characteristics	N=363	Percentages
Age category:		
18-24	322	88.7
25-30	39	10.7
31-36	1	0.3
37-42	1	0.3
Gender:		
Male	155	42.7
Female	208	57.3
Ethnic group:		
Pedi	70	19.3
Venda	154	42.4
Tsonga	78	21.5
Swati	40	11.0
Ndebele	4	1.1
Shona	3	0.8
Zulu	7	1.9
Tswana	5	1.4
Sotho	2	0.6
Marital status:		
Married	5	1.4
Single	350	96.4
Living with partner	8	2.2
Academic level:		
First year	83	22.9
Second year	116	32.0
Third year	112	30.9
Honours	36	9.9
Masters	14	3.9
Doctoral	2	0.6
School:		
Agriculture	25	6.9
Education	67	18.5
Environmental science	45	12.4
Health sciences	39	10.7
Human& social sciences	49	13.5
Law	17	4.7
Management sciences	63	17.4
Maths and natural sciences	58	16.0
Parent/Guardian occupation:		
Employed	113	31.1
Unemployed	211	58.1
Self-employed	38	10.5
Pensioners	1	0.3
Source of income:		
Bursary	294	81.0
Parents	36	9.9
Self-employed	6	1.7
Both parents and Bursary	27	7.4

4.3 Nutritional Practice

Figure 4.1 illustrates that 2.2% of participants consume meals once per day, 38.3% consume twice a day, 52.9% consume three times per day, while 6.6% consume four or more meals per day.
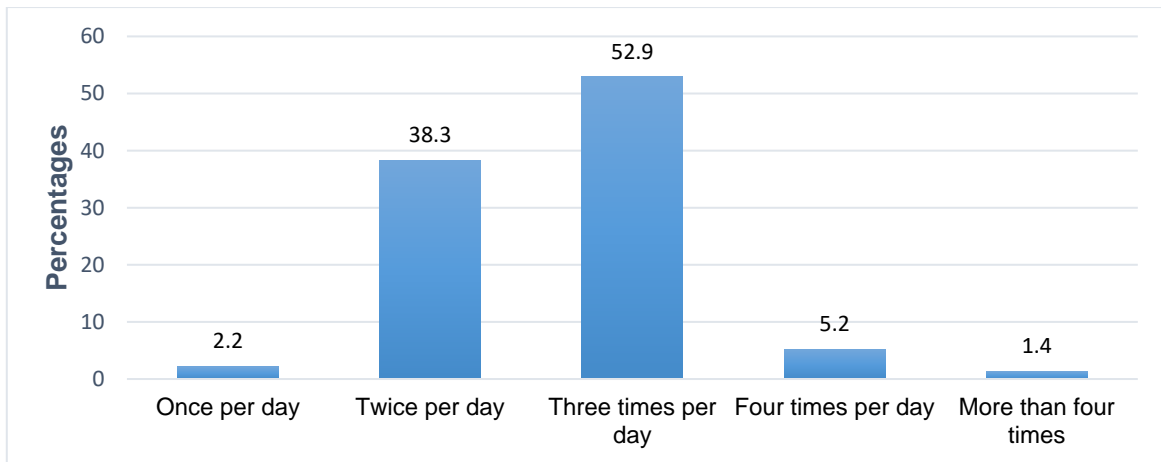
Figure 4.1: Number of meals per day

Figure 4.2 illustrates that 19.3% of the participants consume potato chips, 5% consume yogurt, 27.5% consume fruits, 1.7% consume vegetables, while 36.6% consume chips, yogurt, fruits and vegetable in between meals.
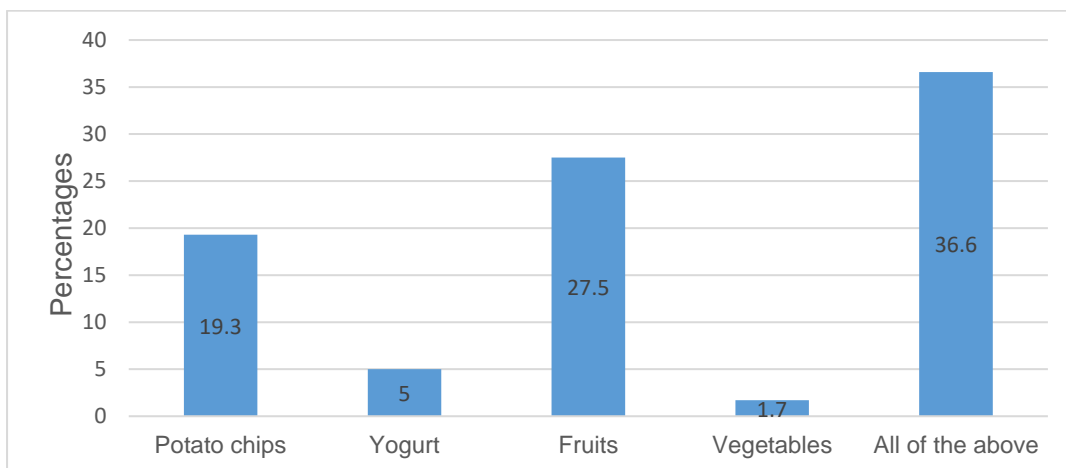
Figure 4.2: Snacks consumed between the meals

Table 4.2 shows the frequency of consuming different food items per week. Very few participants (5.5%) consume fast food daily, 42.1% eat fast food once per week, 11.6% eat fast food twice per week, 4.1 % eat fast food three times per week, 5.8% eat fast food four times or more per week, while 30.9% did not eat fast foods.

About one quarter (21.8%) of the participants consume fruits and vegetables daily, 20.7% consume fruits and vegetables once per week, 14.9% consume fruits and vegetables twice per week, 17.4% cosnsume fruits and vegetables three times per week, 21% consume fruits and vegetables or more per week , while 3.6% did not consume fruits.

About 27.8% of the participants consume fish, chicken, eggs and lean meat daily, 11.8% of the participants consume once per week, 7.4% of the participants consume twice per week, 18.3% of the participants consume three times per week, 33.3 % of the participants consume four times or more and 1.1% in this study did not consume fish, chicken, eggs and lean meat.

Very few participants (2.5%) consume beans daily, 41% consume beans once per week, 12.7% consume beans twice per week, 3.3% consume three times, 3.6% consume beans four times or more, while 36.9%   did not consume beans. Very few participants (8.5%) consume processed food daily, 28.4% consume processed food once per week, 19.3% consume processed foods twice per week, 10.2% consume processed foods three times per week, 6.1% consume processed foods four times or more per week, while 27.5% did not consume processed foods.

Almost 20% of the participants (18.2%) consume milk, mass or yogurt daily, 25.3% consume milk, mass or yoghurt once per week, 17.4% consume milk, mass or yoghurt twice per week, 10.7% consume milk, mass or yoghurt three times per week, 14.3% consume milk, mass or yogurt four times or more per week, while 14% in this study did not consume milk/maas or yoghurt. One quarter of participants (25.9%) drink soft drinks, juice or energized drinks daily, 18.7% drink soft drinks, juice or energized drink once per week, 16.3% drink soft drinks, juice or energized drink twice per week, 14.9% drink soft drinks, juice or energized drinks three times daily, 17.6% drink soft drinks, juice or energized drink three times and more per week, while 6.9 % did not drink soft drinks, juice or energized drink.

Table 4.2: Frequency of eating different food items per week

Food intems	Daily		Once per week		Twice per week		Three times per week		Four times or more		Not at all	
	N(363)	(%)	N(363)	(%)	N(363)	(%)	N(363)	(%)	N(363)	(%)	N(363)	(%)
Frequency of eating in fast food or resutants per week	20	5.5	153	42.1	42	11.6	15	4.1	21	5.8	112	30.9
Frequency of consuming fruits and vegetables per week	79	21.8	75	20.7	54	14.9	63	17.4	79	21	13	3.6
Frequency of Fish, Chicken, Eggs, Lean meat consumed weekly	101	27.8	43	11.8	27	7.4	67	18.3	121	33.3	4	1,1
Frequency of beans consumed per week	9	2.5	149	41	25	12.7	12	3.3	13	3.6	136	36.9
Frequency of consuming processed food	31	8.5	103	28.4	70	19.3	37	10.2	22	6.1	100	27.5
Frequency of milk, mass or yoghurt	66	18.2	92	25.3	63	17.4	39	10.7	82	14.3	51	14
Frequency of drinking soft drinks, juice and energized drinks per week	94	25	68	18.7	59	16.3	54	16.3	63	17.4	25	6.9

Almost half of the participants (47.7%) indicated that they drink water sometimes after meals, 46.8% drink water after every meal, while very few participants did not drink water with meals.

4.4 Nutritional Knowledge

Table 4.3 shows that 18 % of the participants have little or no nutritional knowledge, 25% have moderate nutrition knowledge, 27% have adequate nutritional knowledge and 30 % of the participants have substantial or outstanding nutritional knowledge.

Table 4.3: Total nutritional knowledge score

Score	Interpretation	N=363	Percentages
0-29	No knowledge	12	3.0
30-39	Little/elementary	54	15
40-49	Moderate	91	25
50-59	Adequate	98	27
60-69	Substantial	58	16
70 and above	Outstanding	50	14

Majority of the participants (86.0%) had an idea of what variety of food means, while 14.0% had no idea what variety of foods means. Table 4.4 indicates that 22.3% of participants knew the number of portion size of fruits and vegetables to be eaten per day, while 77.7% did not know the number of portion size of fruit and vegetable.

Table 4.4: Number of Portions sizes of fruits and vegetables eaten daily

Portions of fruits and vegetables eaten daily	N=363	Percentage
I don't know	126	34.7
One	21	5.8
Two	51	14.0
Three	71	19.6
Four	49	13.5
Five or more	45	22.3

Majority of participants (86.4%) had no idea what is food fortification, while 15.4% knew food fortification. Table 4.5 shows that 4% of participants mentioned maize meal, 1.9% mentioned bread, 9.8% mentioned other food that use voluntary fortification, while 84.3 % could not mention the examples of fortified foods.

Table 4.5 : Examples of fortified food

Frequency of fortified food	N=363	Percentage
I don't know	306	84.3
Maize	7	1.9
Bread	16	4
Beans	10	3
Flour	6	2
Fish	4	1
Milk	5	1.3
Rice	2	0.5
Margarine	1	0.3
Cooking oil	1	0.3

About 13.8% of the participants indicated that starch should be part of most meals, 1.1% stated fats should be part of most meals, 32% stated proteins should be part of most meals, 17.1% stated protective foods should be part of most meal, whereas 36.1% mentioned all food groups should be part of most meals.

Table 4.6: One food group that should be part of most meals

One food group that should be part of most meals	N=363	Percentage
Starch	50	13.8
Fats	4	1.1
Proteins/body building	116	32
Protective(fruits and vegetables	62	17.1
All of above	131	36.1

About 29.5% of the participants reported that legumes, dry beans,split beans and soya beans can be consumed   regularly, 23.1%   reported that legumes can be consumed frequently, 43.0% reported that legumes can be consumed sometimes and 4.4% did not know how often should legumes be consumed.

More than half (54.5%) of the participants state the befinefits of legumes, dry beans, split beans and soya beans to promote healthy digestion, while 45.5% did not know the benefits of legumes, dry beans, split beans and soya beans.

Table 4.7: Frequency and healthy benefits of legumes, dry beans, split beans and soya beans.

Legumes, dry beans, split beans and soya beans be consumed	N=363	Percentage
Regularly	107	29.5
Frequently	84	23.1
Sometimes	156	43.0
None of the above	16	4.4
Healthy benefits of legumes		
Promotes healthy digestion	198	54.5
Increase lipids in the body	76	20.9
Keep eyes healthy	29	8.0
None of the above	60	16.5

About 60% of the participants (62%) mentioned that 2g of salt can be consumed daily, 13.8% indicated that 5g of salt can be consumed daily, 4.1% indicated 8g of salt can be consumed daily, while 20.1% indicated that they do not know the correct amount of salt to be consumed be per day.

Table 4.8 shows that 60.6% of participants reported that milk, mass or yoghurt can be consumed daily, 33.6% reported that milk, maas or yoghurt can be consumed weekly and 5.2% reported that milk, maas or yoghurt can be consumed monthly.

Table 4.8 : Frequency of milk, mass or yoghurt

Frequency of milk,mass and yoghurt	N=363	Percentage
Daily	220	60.6
Weekly	122	33.6
Monthly	19	5.2
None of the above	2	0.6

About 44.9% of the participants knew the correct missing word indicating that fish, chicken, lean meat and eggs can be eaten daily, while 55.2% did not know that fish, chicken , lean meat and eggs can be eaten daily.

All participants indicated that it is recommended to drink safe clean water at all times.

Table 4.9 shows 53.4% of the participants knew that sugary foods and drinks should be consumed sparingly while 46.2% did not know the correct answer.

Table 4.9 : Frequency of sugary foods and drinks in high sugar

Frequency of sugary foods and drinks in high sugar	N=363	Percentage
Frequently	62	17.1
Sparingly	194	53.4
Regularly	73	29.1
None of the above	34	9.4

Majority (66.1%)of participants knew that healthier fat is plant fat, while 33.9% did not know the type of healthier fat for human consumption.

Table 4.10: Type of fat that is healthier.

	N=363	Percentage
Fat is healthier		
Animal	70	19.3
Plant	240	66.1
Synthetic	21	5.8
None of the above	32	8.8

Table 4.11 shows that 52.3% knew that fat should be used sparingly while 47.7% did not know the correct answer.

Table 4.11: How fat should be used.

Fat should be used	N=363	Percentage
Sparingly	190	52.3
Regularly	79	21.8
Frequently	68	18.7
None of the above	26	7.2

4.5 Physical Activity practices

Table 4.12 indicates that 38.8% of participants are currently engaging in physical/ sporting activities, while 61.2% are not engaging in physical/sporting activities. Participants indicated different sports activities that they engage in such as soccer (8.8%), aerobics (7.4%) and athletics (5.5%).

Table 4.12: Currently engaging in physical /Sport activities

Currently engaging in physical activities	N=363	Percentage
Currently engaging in any physical/ sports activities		
Yes	138	38.8
No	225	61.2
Type of activity	**N=138**	**Percentage**
Athletics	20	5.5
Aerobics	27	7.4
Cricket	2	0.6
Soccer	32	8.8
Dance	15	4.1
Volley ball	8	2.2
Netball	10	2.8
Boxing	3	0.8
Rugby	5	1.4
Badminton	1	0,3
Gym	15	4.1

Table 4.13 shows that 25% of participants engaged on physical activity daily, 11% engaged on physical activity once per week, 29 % on physical activity twice per week, 21 % engaged on physical activity three times per week and 14% engaged on physical activity four times or more per week.

Table 4.13 :Frequency of engaging in physical/sport activies

Number of times engaged	N=138	Percentage
Daily	35	25
Once	15	11
Twice	40	29
Three times	29	21
Four times and more	19	14

About 50.4% of participants walk from their residence to the lecture halls, 48.2% used bus/taxi and 1.4% used private car. About 53% of the participants use private transport from their residence to mall, while 47% walked from residence to mall.

Table 4.14: Mode of transport

Mode of transport from residence to lecturer halls	N=363	Percentage
Walk	183	50.4
Bus/taxi	175	48.2
Car	5	1.4
Mode of transport from residence to lecturer malls		
Private car/bus	191	52.6
Walk	172	47.4

More than half (51%) of the participants climb stairs daily,10.2% climb stairs once per day, 7.4% climb stairs twice per day, 4.4% climb stairs three times per day, 20.1% climb stairs four times or more times per day,while 6.9% did not climb the stairs at all.

About 10.5% of the participants reported to have engaged in moderate exercises daily, 9.9% reported to have engaged once per week, 21.1% reported to have engaged twice per week, 8.3% reported to have engaged three times per week, 8.3% reported to have engaged four times or more per week, while 51% did not engage at all.

Table 4.15: Frequency of climbing stairs and engaging in moderate exercises weekly.

Frequency of stairs climbing	N=363	Percentage
Daily	185	51.0
Once per day	37	10.2
Twice per day	27	7.4
Three times per day	16	4.4
Four times and more per day	73	20.1
Not at all	25	6.9
Frequency of moderate exercises engaged weekly		
Daily	38	10.5
Once per week	36	9.9
Twice per week	44	21.1
Three times per week	30	8.3
Four times and more	30	8.3
Not at all	185	51.0

Table 4.16 shows that 10.7% of participants reported spending an hour on TV, movies, games or on internet during their leisure time daily, 24.5% reported spending two hours daily, 22.0% three hours daily, 39.7% four hours or more, while 3.0% did not spent their leisure time on TV, movies, games and internet daily.

Table 4.16: Hours spend on TV/ movies/games/internet during leisure time.

Hours spend on TV/movies/games/internet daily	N=363	Percentage
One hour	39	10.7
Two hours	89	24.5
Three hours	80	22.0
Four hours and more	144	39.7
Not at all	11	3.0

About 44.9% of the participants were regularly active in the last 3-4 weeks, while 55.1% of the participants were not active. About 51.2% of the participants were regularly active in the last 6 months, while 48.8% of the participants were not active in the last 6 months.

Table 4.17: Frequency of regular active

Regular active for the past 3-4 weeks	N=363	Percentage
Yes	163	44.9
No	200	55.1
Regular active for the past 6 months	**N=363**	**Percentage**
Yes	**186**	**51.2**
No	**177**	**48.8**

Table 4.18 indicated the reasons for not being motivated to engage in physical activities is that 73% of the participants reported lack of time due to school work load, 17% reported due to laziness, 4.5% reported due to lack of knowledge and not interested at all.

Table 4.18: Reasons for not being motivated to engaging in physical activities

Reasons for not motivated	N=86	Percentages
Lack of time due to school work load	63	73
Laziness	15	17
Lack of physical activity knowledge	4	4.5
Not interested at all	4	4.5

4.6 Physical activity knowledge

Table 4.19 shows that 1.6% of the participants have little or no physical activity knowledge, 0.8% of the participants have moderate physical activity knowledge, 2.6% of the participants have adequate physical activity knowledge, while 95% of the participants have substantial or outstanding physical activity knowledge.

Table 4.19: Total physical activity knowledge score.

Score	Interpretation	N=363	Percentages
0-29	No knowledge	3	0.8
30-39	Little/elementary	3	0.8
40-49	Moderate	3	0.8
50-59	Adequate	10	2.6
60-69	Substantial	37	10
70 and above	Outstanding	307	85

Almost all participants (93.7%) stated physical activity should be part of our daily routine, while 6.3% had no idea if physical activity should be part of our daily life. Majority of the participants (73%) correctly indicated physical activities such as walking, running, cycling, sport or planned exercises and play as part of physical activities while 27% of the participants were able to identify atleast one category examples of physical activities.

Table 4.20 : Physical activity includes

Physical activity include	N=363	Percentage
Walking, running and cycling	84	23.1
Sport or planned exercises	13	3.6
Play	1	0.3
All of the above	265	73.0

Majority of participants (79.6%) were aware that physical activity is recommended for 150min per week, while 20.4% had no idea of the recommendation. Majority of participants (79.6%) were aware that 30min physical activity is recommended for weight loss or staying fit, while 20.4% had no idea of the recommendation per day. Almost all participants (97.5%) recommended drinking safe clean water during physical activity, while 2.5 % did not recommend drinking safe clean water during physical activity. Majority participants (84.0%) were aware of the risk associated with being physical inactive, while 16% reported not to be aware of the risk. About 73.3% of the participants were able to identify all the risks associated with physical inactivity, 10.2% were able to identify only one risk, while 0.8% did not know the risk of physical inactivity.

Table 4.21: Risk associated with physical inactivity

Risk associated with physical inactivity	N=363	Percentage
Increase in anxiety and stress	6	1.7
Increase in the risk overweight and obesity	16	4.4
Increase cardiovascular disease(high cholesterol, high blood, stroke and heart attack	15	4.1
All of the above	266	73.3
None of the above	3	0.8

Almost all participants (93.7%) were aware of the benefits of engaging in physical activities, while 6.3 % reported not being aware of the benefits. Table 4.25 shows that 82.4% of the participants were able to identify all the benefits of engaging in physical activities, 12.4% were able to identify only one benefit, while 0.8% did not know the benefits of engaging in physical activities.

Table 4.22 : Benefits of engaging in physical activities

Benefits of participating in physical activities	N=363	Percentage
Helps in weight control	22	6.1
Reduce the risk obesity, diabetes, stroke and some form of cancer	15	4.1
Reduce state of anxiety, depression and stress	8	2.2
All of the above	299	82.4
None of the above	3	0.8

4.7 Lifestyle habits

Table 4.23 shows that 44.4% of the partcipants indicated to have good or very good lifestyle practice, 28% of the participants indicated to have fair lifestyle practice, 26% of the participants indicated to have bad lifestyle practice and 2.4% of the participants indicated to have very bad lifestyle practice.

Table 4.23: Total of lifestyle practices table.

Score	Interpretation	N=208	Percentages
7	Very good	27	7.4
5-6	Good	133	37
4	Fair	100	28
2-3	Bad	94	26
1	Very bad	9	2.4

About 40.8% of participants were able to accumulate150 min of moderate intensity weekly while 59.2% were unable to accumulate 150min per week. Less than third (61.7%) of participants eat breakfast daily while 38.3% did not eat breakfast daily. About 45.7% of participants engaged in moderate exercises atleast two to three times in a week while 54.3% did not engage in moderate exercise. More than half (56.7%) of participants reported to have had adequate sleep while 43.3% did not have adequate sleep. Majority of participants (87.1%) reported that they did not smoke while 12.9% reported to be smoking. Majority of participants (87.1%) reported to have consumed little or no alcohol while 12.9% reported to have consumed alcohol. More than half of participants (54.5%) monitored their moderate weight while 45.4 did not monitor their weight.

Table 4.24 Lifestyle habits questions

Lifestyle habits	Frequency(363)	Percentage
Accumulating at least 150 min of moderate –intensity physical activity per week		
Yes	148	40.8
No	215	59.2
Eating breakfast daily		
Yes	224	61.7
No	139	38.3
Moderate exercises 2-3times in a week		
Yes	166	45.7
No	197	54.4
Adequate sleep		
Yes	206	56.7
No	157	43.3
Not smoking		
Yes	317	87.1
No	46	12,9
Consuming little or no alcohol		
Yes	316	87.1
No	47	12.9
Monitoring moderate weight		
Yes	198	54.5
No	165	45.5

4.8. Anthropometric status

Table 4.25 indicated that 4% of the participants were underweight, 66.7% had normal weight, 21.8% were overweight and 7.5% were obese.

Table 4.25: Total body mass Index table.

BMI classification	Interpretation	Total (n=363)	%	Female (n=208)	%	Male (n=155)	%
<18.50	Underweight	15	4	5	2.4	10	6.5
18.50-24.99	Normal weight	242	66.7	134	64.1	108	69.7
25.00-29.00	Overweight	79	21.8	47	22.9	32	20.6
30.00-34.99	Obese I	20	5.5	18	8.6	2	1.2
35.00-39.00	Obese II	5	1.4	3	1.44	3	1.9
≥ 40	Obese III	2	0.6	2	0.96	0	0

Table 4.26 shows that 28.8% of the female participants had excellent waist to hip ratio, 44.2% had good waist to hip ratio, 19.8% average waist to hip ratio and 7.2% at risk of obesity. Majority of male participants (85%) had excellent waist to hip ratio, 14% had good waist to hip ratio and 0.6% were at risk of obesity.

Table 4.26: Waist-hip ratio for Females and males

Score	Interpretation	N=208	Percentages
<0.75	Excellent	60	28.8
0.75-0.79	Good	92	44.2
0.80-0.86	Average	41	19.8
≥ 0.86	At Risk	15	7.2
Waist-hip ratio for males			
Score	Interpretation	N=155	Percentages
<0.85	Excellent	132	85
0.85-0.89	Good	22	14
0.90-0.95	Average		
≥ 0.95	At Risk	1	0.6

4.9. Association between nutritional practice, lifestyle habits and anthropometric measurements

Table 4.27 indicates that the level of significant was set at p-value of 0.05 to determine the relationship between nutritional practices and anthropometric measurements of the participants. There were no associations observed between nutritional practices and body mass index. But, positive association was observed between nutritional practices and waist-hip circumference. The results indicate that frequency of meal per day showed there is certain relationship with waist-hip circumference (0.042*). In addition, associations were observed between consumption of soft drinks (0.048*) and waist-hip circumference , consumption of processed (0.023*) and waist-hip circumference, eating outside home (0.021*) showed that there is associations with the waist-hip circumference.

Table 4.27: Association between nutrional practices and anthropometric measurements.

Nutritional practices	BMI(P- value)	WHR(P- value)
Number of meals per day	0.164	0.042*
Frequency of eating in the fast food per week	0.913	0.021*
Frequency of consuming processed food per week	0.431	0.023*
Frequency of drinking soft drinks, juice or energized	0.634	0.048*

*Statistically significant

Table 4.28 indicates relationship between lifestyle habits and anthropometric measurements of the participants. The results indicate that adequate sleep and body mass index are statistically significantly (P-value= 0.029). Moreover, associations were observed between adequate sleep and waist-hip ratio (P-value= 0.002). However, there was no association between lifestyle habits score, body mass index and waist-hip ratio.

Table 4.28: Assocation between lifestyle habits and anthropometric measurements

Lifestyle habits	BMI(P- value)	WHR(P- value)
Accumulating 150min/week	0.341	0.992
Eating breakfast daily	0.488	0.715
Moderate exercises 2-3 day per week	0.160	0.683
Adequate sleep	0.029*	0.002*
Not smoking	0.201	0.476
Little or no alcohol	0.114	0.625
Monitoring weight	0.260	0.087

*Statistically significant

4.8 Summary

In this chapter, the results of the study were presented. Majority of participants were in the age range of 18 to 24 years. More than half of participants consumed three meals or more a day while about 40% consume meals twice or less per day. Snacks that participants reported to consume between meals were potato chips, fruits, yoghurt and vegetables. The results revealed that about one quarter of participants had adequate nutritional knowledge, 30% had outstanding nutrition knowledge while very few have very little nutrition knowledge. More than one third of the participants engaged in physical activities while majority of the participants did not engage in physical activities. Majority of participants had outstanding physical activity knowledge. About 40% of participants had good to very good lifestyle habits as they score 5 and above on life style habits questions. The results show that nearly one quarter of participants were overweight while 7.5% were obese. According to waist hip ratio, 7.2% of the female participants were at risk while majority of males had excellent waist-hip ratio.There was no relationship between nutritional practices and body weight of the participants, however, there was a relationship between nutritional practices and waist-hip circumferences. The results revealed that there was an association between adequate sleep and body mass index with waist-hip circumferences.However, there was no association between lifestyle habits score and anthropometric measurements.

Chapter Five

Discussion of Results

5.1 Introduction

The purpose of the study was to describe lifestyle practices associated with anthropometric status among students at the University of Venda. Data was collected using self-administered questionnaire which consists of the following subheadings: demographic characteristics, nutritional practice, nutritional knowledge, physical activity practices, physical activity knowledge, , lifestyle habits and anthropometric status. The results of the study were compared with findings of other studies.

5.2   Socio-Demographic Characteristics

In the present study, majority of the participants were aged 18 to 24 years. This age range was acceptable as majority of students enter university system at the age of 18 years. Similar trend was observed at the University of Kerbala (Iraq) and University of Saudi Arabia where majority of students were in the age range of 18 to 24 years (Al-Ghabhan, 2018; Al-Otaibi & Busuny, 2015). This finding shows that majority of university students were registered for first year at the age of 18 years.

More than half of participants in the current study were females. These results agree with the results of the previous studies done at University of West Indies and University of Botswana where majority of students were females (Dalrymple, 2013; Tapera et al., 2017). On contrary, the study done in Chinese University (Shanghai) and in the Eastern Turkey reported that majority of students were males (Zhang et al., 2018; Yilmaz, Calikoglu & Kosan, 2019). These findings reveal that studies vary with universities in terms of gender participation.

5.3 Nutritional practices

In the present study, more than half of the participants eat three meals while more than one third eat two meals per day. These results show that a significant number of participants skip meals which is a course of concern. Tok, Ahmad and Koh (2018) made similar observation where more than half of participants at the University of Darussalam eat three meals and one third eat less than three meals per day. In addition, Tok, Ahmad and Koh (2018) reported that 14.2% of participants eat more than three meals per day. In the current study, very few participants eat more than three meals per day. These findings show that a significant number of university participants skip meals while majority still consume at least three meals or more.

In the current study, snacks that were commonly consume were fruits (27.5%), potato chips (19.3%), while 36.6% consumed potato chips, fruits, yoghurt and vegetables. Majority of students at the University of Darussalam consume fried foods as snack (Tok, Ahmad & Koh, 2018). A similar trend was also observed in the study conducted earlier in Costal South Indian College where more than half of college participants consumed snacks (Mithra et al., 2018). These findings show that majority of university or college students consume snacks in between meals. However, the types of snacks vary from fruits, vegetables, dairy products to fried foods.

In the present study, less than half of the participants eat fast food once per week, while significant number of participants did not eat fast food. It was interesting also to observe that very few participants eat fast foods daily in the current study. On contrary, Onurlubas and Yalmaz (2013) reported that almost all participants at Trayka University eat fast food in a week, while very few did not eat fast foods. Although in the current study, a number of participants who eat fast food daily is less, almost half of the participants eat fast food twice per week. These findings show that although few participants who consumed fast food daily, there was an increase in number of those who consumed weekly in this study and previous studies. Fast food consumption has been associated with weight gain, obesity, type 2 diabetes and coronary artery disease (Bahadoran, Mirmiran and Azizi, 2015).

Naude (2013) recommends that people aged seven years and older should at least consume five or more servings of fruits and vegetables daily. Eating plenty of fruits and vegetables daily has been associated with the reduced risk of cardiovascular diseases, including heart attack and stroke and certain types of cancers (Naude,2013). In the present study, less than one quarter of the participants reported to consume fruits and vegetables daily and once per day. A similar observation was made by Tok, Ahmad and Koh (2018) where there is a low intake of fruits and vegetables consumed daily among participants and almost half of the participants did not consume fruits and vegetables at all in a week. In addition, Al-Ghabhan (2018) reported a low number of participants who consumed fruits and vegetables frequently. The findings in both the current and previous studies showed a low intake of fruits and vegetables daily among university participants. In addition, a low fruits and vegetables consumption is associated with increased risk of developing non-communicable disease and micronutrients deficiencies (Siegel, 2019).

Temple and Steyn (2013) recommend the consumption of food and drinks containing sugar sparingly. Dietary sugar intake in food or drinks increases the risk of the development of obesity, type 2 diabetes and cardiovascular diseases, leading to premature death (Temple & Steyn, 2013). In the present study, one quarter of the participants drank sugary drinks daily, and very few participants did not drink sugar drinks at all in a week. There was high percentage of participants who drank sugar drinks three times or more in a week in the present study. On contrary, Abraham, Noriega and Shin (2018) reported that majority of the participants in Bethel college (USA) rarely or never drink sugar drinks in a week, while only one quarter of the participants reported to drink sugary drinks daily. The results in the present study show that most participants did consume sugary foods and/or sugary drink. However, the amount of sugary foods/drinks was not determined.

In the present study, majority of the participants consumed processed food weekly while only one quarter of the participants did not consume processed food. Al-Otaibi and Busuny (2015) in Saudi Arabia, made a similar observation where almost half of the participants consumed fast food weekly. Abraham, Noriega and Shin (2018) found that more than half of the participants reported that they consume processed food daily. These findings show that a significant number of participants consume processed foods daily or weekly. Processed foods contain high fat which are mainly saturated fat. Therefore, high intake of processed foods has been associated with the risk of wide variety of health problems such as obesity, high blood pressure, elevated cholesterol, cancer and depression that can lead to premature death.

5.4 Nutritional knowledge

In the present study, more than one quarter of the participants had adequate nutritional knowledge, 25 % of the participants had moderate knowledge, while very few participants had little or no nutritional knowledge. A similar observation was done by Buxton and Davies (2013) at the University of Cape Coast (Ghana) where majority of the participants had an adequate nutritional knowledge. On the other hand, Abraham, Noriega and Shin (2018) reported a fair nutritional knowledge among participants in Bethel College(USA). These findings show that about 30% of university participants had adequate nutrition knowledge. Lack of knowledge among university students should be a course of concern as this may negatively influence their eating habits.

According to Vorster (2013), starchy foods (carbohydrates) should form bases of most meals. In the present study, only 13.8% of participants knew that starchy foods should form bases of most meals while majority of participants did not know which food should form the big part of the meals. These results show that majority of participants did not have adequate nutrition knowledge on which food group should form part of meals. Knowledge of food groups such fats, carbohydrates, proteins, protective (fruits and Vegetables) will enable them to make better food choices.

Naude (2013) recommends that people aged seven years and older should at least consume five or more servings of fruits and vegetables daily. In the present study, less than one quarter of participants knew that one should take five or more portions of fruits and vegetables while majority did not know the correct answer. Jezewska-Zychowics and Zieba (2016) in Poland University reported that majority of participants did not know the number of portion sizes of fruits and vegetables that can be consumed daily while a significant number of participants had adequate knowledge on portions of fruits and vegetables that can be consumed daily. These findings show that very few people know the number of portion size of fruits and vegetables that could be consumed daily.

In the present study, more than half of the particpants had knowledge that sugary foods and drinks should be consumed sparingly. Previous studies reported that participants knew that sugary food and/or drinks should be consumed sparingly (Warner & Ha, 2017; Modiba, Bhayat & Nkabule, 2017; Frederick & Obed, 2017). Bipasha, Raisa and Goon (2017) reported poor nutritional knowledge on consumption of sugary foods among participants in Bangladesh university. In addition, the previous studies and present study show that participants had adequate knowledge that sugary foods that can be consumed sparingly.

Smuts and Wolmarans (2013) recommend the consumption of fats sparingly. In the present study, more than half of the participants knew that fats should be used sparingly. In addition, when asked which type of fats should be used, majority of the participants in the present study knew the type of fat that is recommended for use which is vegetables fat. Previous studies conducted in Midwestern University and Cape Peninsula University of Technology indicated that 67.4% and 48.4% of students had knowledge on the usage of fats respecively (Yahia et al., 2016; Ranga & Venter, 2017). These studies show that some of the participants had adequate knowledge on the usage of fats as recommended by South African food based dietary guidelines. However, there is still a gap on nutritional knowledge since only about half of the participants had knowledge on fats usage in the current study.

Schonfeldt, Pretorius and Hall (2013) recommend that fish, chicken, lean meat and eggs can be eaten daily. In the present study, almost half of the participants knew that chicken, fish, meat and eggs can be consumed daily. These results show that more than half in the current study did not know that fish, chicken, meat and eggs can be eaten daily. This knowledge gap shows that nutrition professional has a responsibility to spread nutrition information to all population in South Africa. In addition, the nutrition professional may have to consider more ways of spreading information to university students as they are the future leaders and parents.

5.5 Physical activity practices

World Health Organisation (2018) recommends that adults aged 18 to 64 years should do at least 150min of moderate, intensity physical activity throughout the week, or do at least 75 minutes of vigorous-intensity. Engaging in physical activity reduces the risk of coronary heart disease and stroke, diabetes and some form of cancer, helps in weight control and other psychological benefits such as reduction of problematic levels of anxiety and depression, including reducing state of anxiety, neuroticism, mild- to moderate depression, and various kind of stress. In the present study, more than one third of the participants engaged in physical activities. Previous studies made similar observation where very few university students engage in physical activities (Yousif et al., 2019; Ranashinghe et al., 2016; Pengpid & Peltzer, 2015). The participants in the current study reported to engage in soccer (8.8%), aerobics (7.4%) and athletics (5.5%). On the contrary, Tadyanenhandu et al. (2016) reported a high engagement in physical activities among participants in the University of Zimbabwe. In addition, Tadyanehandu et al. (2016) reported that 61.1% of university participants engage in athletics, 54.6% engage in ball game and 26.3% reported going to gym. These findings show that some students in the current study and previous studies engage in various physical activity. However, most students were not involved in physical activity which may lead to increase in the prevalence of non-communicable disease as well as premature death.

Walking is recognized as a form of physical activity as it increases cardiovascular fitness, strengthen bones, reduce excess body fat, and boost muscle power and endurance. In the present study, half of the participants walked from residence to lecture halls. In the current study, the participants who do not walk to school are students who stay outside campus and transport is provided for them. A similar observation was done by Tok, Ahmad and Koh (2018) in Nigeria where majority of the participants walked to lecture halls. Despite the low level of engagement in formal physical activities among participants, the present and pervious study

show that participants walked to lecture hall daily which is highly recommended as part of physical activity.

American College of Sport Medicine (ACSM, 2013) recommends that adults should engage in at least 30minutes of moderate intensity aerobic physical activity a day and 150min per week. In the current study, few participants engaged in moderate intensity aerobic physical activity daily while half of participants did not engage in physical activity weekly. About more than one third of participants reported to have engaged in moderate intensity aerobic physical activity three to four times per week in the current study. A similar observation was done by Tok, Ahmad and Koh (2018) where more than one third of the participants engage in physical activity three to four times per day while a significant number of the participants did not engage in moderate intensity aerobic physical activity at all. Furthermore, Tok, Ahmad and Koh (2018) reported that only 3.3% of the participants engaged in moderate intensity aerobic physical activity daily. The previous study and the current study show a significant number of participants who did not engage in moderate intensity aerobic physical activity as recommended by American Collage of Sport Medicine and this may lead to increase non-communicable diseases, such as obesity and overweight among participants.

In the present study, more than one third of the participants spend more than six hours of the time on sedentary lifestyle behaviour daily on activities such as watching TV, video games or Internet. A similar observation was done by Moulin and Irwin (2017) in Canadian University where a significant number of participants reported to have spent their leisure time on sedentary behavior such as watching television, computer use and video games during their leisure time. Pengpid and Peltzer (2015) and Kurniangsih et al. (2018) in Thailand and in University of Brawijaya (Indonesia) made a similar observation where a significant number of participants spend more than six hours of sedentary behavior on their leisure time on games and internet resulting in poor academic performance. These results in the current and previous studies show an increase in sedentary lifestyle behavior among university students which may lead to an increase in obesity, overweight and increase in cardiovascular diseases.

5.6 Physical activity knowledge

In the present study, majority (85%) of the participants had an outstanding physical activity knowledge while 1.6% of participants had a little knowledge on physical activity. A similar observation was done by Eksay (2014) and Ward (2014) wherein participants have high physical activity knowledge. Ziari et al. (2017) reported that participants at the University of

Medical Sciences (Iran) had moderate physical activity knowledge These findings show that majority of the participants had physical activity knowledge.

In the present study, majority of the participants had correct knowledge on the definition of physical activity while some of participants were unsure. A similar observation was done by (Eksay, 2014; Abula et al., 2016) where majority of the participants at the University of Nigeria and in China were participants had correct physical activity knowledge regarding the definition of physical activity. In addition, both the previous study and the current study show that participants had knowledge on the definition of physical activity.

World Health Organization (2010) reported that adults aged 18 to 64 year engage in physical such as walking as part of transportation, type of work, play, games, sports or planned exercises. In the present study, majority of the participants had outstanding knowledge on the examples of physical activities. Participants in the present study were able to mention some of the examples of physical activity such as walking, cycling, running, play, sport or planned exercises. A similar observation was done by Alkhateeb et al. (2019) and Eksay (2014) that majority of the participants had high knowledge on the type of physical activities. The results in the previous and present study show that participants had outstanding knowledge of type of physical activities.

WHO (2018) recommends that adults aged 18 to 64 years should engage in at least 150min of moderate-intensity aerobic physical activity weekly. In the present study, majority of the participants knew the correct number of minutes per week which recommended for physical activity by WHO (2018). On the other hand, Abula et al. (2016) reported that very few participants from Shanghai University knew the correct number of minutes one per week where one should engage on physical activity. In the present study, majority of the participants knew that people should engage on physical activity for 30minutes per day for weight loss or fitness. In Nigeria, more than half of participants had knowledge about the time recommended for daily physical activity (Okegbu et al., 2017). These findings show that majority of university students had correct understand of recommended time for day physical activity as described by American Collage of Sport Medicine (2013).

Ranashinghe et al. (2016) and WHO (2018) reported that increasing in physical activity could reduce the burden of diseases such as coronary heart disease and stroke, diabetes and some form of cancer and help in weight control, anxiety, depression. In the present study, almost all participants had knowledge on the benefits of engaging in physical activities. A similar observation was made by Fredrikson (2018) and Eksay (2014) in Australia and Nigeria where

majority of the participants had knowledge on the benefits of physical activity. These findings show that participants had knowledge on the benefits of engaging in physical activities.

5.7 Lifestyle habits

In the present study, very few participants engage in physical activity. Majority of participants did not accumulate 150minutes moderate-intensity aerobic physical activity per week as recommended by WHO (2018) and American Collage of Sport Medicine (2013). A similar trend was observed in the study done by Ranashinghe et al. (2016) at the University of Colombo, where majority of participants did not engage in physical activities in the last five days. The physical activity level is low amongst university students which may contribute to the development of obesity.

Breakfast is referred to as the most important meal of the day and people are encouraged to eat breakfast daily (Gibney, Barr, Bellisle, Drewnowski, Fagt, Livingstone, Masset, Varela, Moreiras, Moreno, Smith & Vieux, 2019). In the present study, majority of the participants did consume breakfast daily as recommended by Gibney et al. (2018). On the contrary, Sedaat and Piley (2019) reported that half of participants from University of Kwa-Zulu Natal consumed breakfast daily. A similar trend was observed in the study done at the University of Darussalam where just below half of participants did consume breakfast daily (Tok, Ahmad & Koh, 2018). Taha and Rashed (2017) reported that the benefits of eating breakfast include intellectual capacity, concentration, attention and academic performance. Despite the benefits of consuming breakfast, some of the participants in the previous study did not consume breakfast. However, in the current study the findings show that majority consume breakfast daily.

It is recommended that adults should sleep between 7 to 8 hours daily (Watson, Badr, Balenky, Bliwise, Buxton, Buysse, DInges, Gangwisch, Grandner and Kushuda). Daily adequate sleep prevents depression, lowers weight gain, lowers the risk of heart diseases, productivity and concentration, boost immune system and keeps a healthy heart (Watson et al., 2015). In the present study, majority of the participants reported to have had adequate sleep between 7 to 8 hours of sleep. A similar observation was done by Pengpid and Peltzer (2015) in Thailand University where more than half of the participants reported to have had adequate sleep. These findings in the present and previous study show that majority of the participants had adequate sleep (Harshkowitz et al., 2015).

Smoking is associated with long term cardiorespiratory and cardiovascular diseases resulting in premature death (Sprake et al., 2018). In the present study, majority of the participants did

not smoke. A similar observation was made in the United States and in Thailand where majority of the participants reported to be non-smokers (Sprake et al., 2018; Pengpid & Peltzer, 2015). These findings show that very few participants smoke tobacco.

Alcohol consumption is associated with the increase of the prevalence of underweight, obesity, overweight and premature death globally (Mekonen et al., 2017). In the present study, very few participants reported to have consumed alcohol, while majority of the participants reported to have consumed little or no alcohol. A similar observation was done in Nigeria and in Thailand where majority of the participants reported they did not consume alcohol at all (Okegbu et al., 2017; Pengpid & Peltzer, 2015). These results show a low use of alcohol among student university.

5.8 Anthropometric measurements

In the present study, very few participants were underweight. Previous study made similar observation where very few participants were underweight while majority were of normal weight (Tapera et al., 2017; Al-Ghabhan, 2018; Yahia et al., 2016). In the current study, almost one quarter of participants were overweight (21.8%) and 7.5% were obese. These findings show that more than one quarter of participants in the present study were overweight or obese which is a cause of concern. An increase in the prevalence of underweight, overweight and obesity is associated with the risk of non-communicable diseases(NCDs) that is leading cause of mortality and morbidity world-wide (Zamsad, Banik & Ghosh, 2019; Oltaibi & Busuny, 2015; Al-Ghabban, 2013; Yen, et al., 2018).

In the present study, very few female participants were at risk. Previous study has made similar observation where very few female participants were at risk while almost half of the female participants had a good waist-hip ratio (Al-Ghabhan, 2018, Okegbu et al., 2017). In the current study, almost one quarter of the female participants had an average waist-hip ratio (19.8%) and 7.2% were at risk. These findings show that majority of the participants had a good or average waist-hip ratio. An increased in waist-hip ratio circumferences is linked to increased risk of type 2 diabetes, overweight, cardiovascular diseases and fertility (WHO, 2017).

In the present study, very few male participants were at risk. Previous study made a similar observation that very few male participants were at risk while majority of the male participants had excellent waist-hip ratio (Al-Ghabhan, 2018; Okegbu et al, 2017). In the current study, 14% of male participants had good waist-hip ratio and 0.6% were at risk. These findings show that majority of male participants had a good-waist-hip ratio which is recommended by WHO (2017).

5.9 Associations between nutritional pratices, lifestyle habits and Anthropometric measuremets.

In the present study, the results show there was no correlation (association) between nutritional practices and body mass index. On contrary, Gutierrez-Pliego, Socorro, Camarillo-Remero, Matengro-Morales and de Jesus Gerduno-Garcia(2016) in Mexico reported a positive correlation between dietary patterns and body mass index. In the present study, positive association was observed between nutritional practices and waist-hip circumference. Dzięciołowska-Baran,Mularczyk, Gawlikowska-Sroka, Michnik, and Rębacz-Maron(2017) in Poland reported slight association between eating practices and waist-hip circumference with (P=0.004). Therefore, the results show that association between nutritional practices and anthropometric measurents varies with studies in universities.

Watson et al. (2015) recommend that adults should sleep for duration of 7-8 daily. In the present study, the results indicate that adequate sleep and body mass index are statistically significantly (P-value= 0.029). A similar observation was done by Grander, Schopfer, Sands-Lincoln, Jackson and Malhota in Philadelphia where 7-8 hours of sleep was associated with the highest BMI. Moreover, in the present stuy, there was an association observed between adequate sleep and waist-hip circumference (P-value= 0.002). Zimberg, Crispim, Diniz, Dattilo, Cavagnolia, Faria, Yufik and Mello (2011) in Sau Paulo (Brazil) reported that sleep was positive correlated with waist-hip circumference of (p= 0.029). Therefore, the results show that there is a correlation between adequate sleep, body mass index and waist-hip ration, however, there was no correlation between lifestyle habits and anthropometric measurements.

Chapter Six
Conclusion and recommendations

6.1 Introduction

This chapter presents the conclusions and recommendations based on the results that were presented and discussed in the previous chapters.

6.2 Conclusion

The aim of the study was to describe lifestyle practices associated with anthropometric status among students at the University of Venda. The objectives of the study were to determine nutritional practices, assess nutritional knowledge, determine physical activity practices, assess physical activity knowledge and determine lifestyle habits and assess the anthropometric status of students at the University of Venda.

The results in this study were comparable with other studies done among university or college students. Majority of participants were in the age range of 18 to 24 years which is the appropriate age of going to tertiary institution.The language commonly spoken was Tshivenda, Sepedi and Xitsonga which are the three main languages spoken in Limpopo Province. Majority of participants were bursary holders with very few who relied on their parents for pocket money. More than half of participants consumed three meals or more a day while about 40% consume meals twice or less per day. The results in this study also show that participants consumed snacks in between meals. Snacks that participants reported to consume between meals were potato chips, fruits, yoghurt and vegetables. About 70% of participants consume fast foods as this food are more accessible to university students. However, a significant number of students did not consume fast foods. The frequency of consuming fast foods vary from daily to once a week. Participants did consume fruits and vegetables. However, less than one quarter of participants consume fruits and vegetables daily. Even though the amount of fruits and vegetables consumed per day was not determine, the results show that very few participants consume recommended daily amount of fruits and vegetable. According to South African food based dietary guidelines, fish, meats and eggs can be consumed daily. However, just about one quarter of participants consume fish, meat and eggs daily while other consume fish, meat and eggs once a week. Legumes are good source of plant protein and dietary fibre and people are encouraged to consume them

regularly. In the current study, majority of participants consume legumes on weekly basis and very few consume them daily.

The results revealed that about one quarter of participants had adequate nutritional knowledge, 30% had outstanding nutrition knowledge while very few have very little nutrition knowledge. Some of the participants have adequate nutrition knowledge while others have little to moderate nutrition knowledge.

It is important for students to engage in physical activity as it can help improve their health status. However, more than one third of the participants engaged in physical activities while majority of the participants did not engage in physical activities. Those who engage on physical activity played mostly soccer, aerobics and athletics. About 25% of participants engaged in physical activity daily. Half of the participants reported that they walk to lecture halls as they stay inside campus while those who stayed outside campus were using transport provided for them by the university. More than half of the participants spend more than six hours of sedentary lifestyle behaviour such as watching television, movies, playing video games or surfing on internet.

It was interesting to see that majority of participants had outstanding physical activity knowledge. These results could reflect knowledge that students acquire during high school as they are taught the important aspects of life in Life Orientation. The participants knew the types of physical activities one can engage as well as the recommended daily and weekly physical activity that would results in weight loss or fitness. Nearly, three quarter of participants had adequate knowledge on recommended minutes for physical activity per week. Majority of participants had outstanding knowledge on the risk associated with physical inactivity.

About 40% of participants had good to very good lifestyle habits as they score 5 and above on life style habits questions. However, very few participants could accumulate 150 minutes per week which is recommended for healthy lifestyle by WHO. Breakfast is the most important meal of the day. The results in this study show that majority of participants consume breakfast daily. More than half of participants had adequate sleep. Very few participants smoke cigarette regularly. Alcohol consumption was low as very few participants did drink alcohol. The prevalence of overweight and obesity is in line with previous studies. The results show that nearly one quarter of participants were overweight while 7.5% were obese. According to waist hip ratio, 7.2% of the female participants were at risk while majority of males had excellent waist hip ratio.

It was interesting to see that there was no relationship between nutritional practices and body weight of the participants, however, there was a relationship between nutritional practices and hip-waist circumferences. The results revealed that there was an association between adequate sleep and body mass index with (P-value=0.029*) and association between adequate sleep and waist-hip circumference, with (P-value= 0.002*). However, there was no association between lifestyle habits score and anthropometric measurements.

6.3. Recommendations

Based on the above conclusion, the following recommendations were made:

- There is a need to conduct further study to determine the cause of overweight and obesity among students staying on university residence. The study could focus on the determinants of overweight and obesity among university study.

- The University through Department of Nutrition and Centre for Biokenetics, Sports and Recreation should develop intervention programme that would focus on improving physical activity and good eating habits of university students.

- The results of the study show that participants had outstanding knowledge regarding sport/ physical activities. However, there is low participation in physical activities. Therefore, the Department of Sport at University of Venda should introduce new sporting activities which can attract participants to engage more in physical activities.

- The study also recommends that university should have food court which could give students variety of foods. In addition, some of the food outlets should serve home base cooked meals which will encourage students to eat food which provide adequate nutrients.

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Appendix A: Information Sheet

LETTER OF INFORMATION

Title of the Research Study   : Lifestyle practices associated with anthropometric status among students at the University of Venda, Limpopo Province.

Principal Investigator/s/ researcher: Ms K Mokoena, Bachelor of Science in Recreation

and Leisure studies

Co-Investigator/s/supervisor/s   : Dr L.F Mushaphi (Dr, PHD). Ms A.G Mudau (MPH)

Brief Introduction and Purpose of the Study: Lifestyle is the way human choose to live their day lives which may be related to social; occupational or environmental factors. According to WHO (2013), 60% of an individual's health-related quality of life depends on his/her lifestyle. Furthermore, it is reported that the leading cause of global death today is largely lifestyle-related diseases. This calls for health concern and further research in this area in order to prevent the risk of non-communicable disease which may lead to early death of the population. Therefore, the purpose of the study seeks to describe lifestyle practices associated with anthropometric status among students at the University of Venda, Limpopo province.

Outline of the Procedures: The researcher will self-administer the questionnaire to participants. The researcher will first measure the anthropometric status and all students residing at the university residence will be used for selection criteria and be systematically selected. The procedure for completing the questionnaire will be explained to participants before completing the questionnaire. Data collection will take approximately four weeks at the university residence both on-campus and off-campus residence. The exclusion criteria above will be students who are pregnant.

Risks or Discomforts to the Participant: There will be no risk in participating in the study.

Benefits: There will be no benefits to any participants. The study findings will be presented in conferences either international of national conferences and it will be published with DHET.

Reason/s why the Participant May Be Withdrawn from the Study: There will be no consequences for participants should they choose to withdraw from the study, participation is voluntarily.

Remuneration   : Participants will not receive any remuneration.

Costs of the Study   : Participants will not be expected to cover any costs towards the study.

Confidentiality   : Confidentiality will be maintained all times during the study and after the study. The anonymity will be assured in the study by using codes and not names. The participants will not write their names in the questionnaire for confidentiality purpose.

Research-related Injury   : The researcher will be held responsible or accountable should there be a research-related injury or adverse reaction.

Persons to Contact in the Event of Any Problems or Queries: Dr L. F. Mushaphi, Department of Nutrition, School of Health Sciences. Email: lindelani.mushaphi@univen.ac.za. Please contact the researcher (tel no. 0829635127), Email: Khutso.acolyte@gmail.com my supervisor (tel no. 015 956 8334) or the University Research Ethics Committee Secretariat on 015 962 9058. Complaints can be reported to the Director: Research and Innovation, Prof GE Ekosse on 015 962 8313 or Georges Ivo.Ekosse@univen.ac.za.

General:

Potential participants must be assured that participation is voluntary and the approximate number of participants to be included should be disclosed. A copy of the information letter should be issued to participants. The information letter and consent form must be translated and provided in the primary spoken language of the research population

Appendix B: Informed Consent

Statement of Agreement to Participate in the Research Study:

- I hereby confirm that I have been informed by the researcher, Ms. K. Mokoena), about the nature, conduct, benefits and risks of this study – Research Ethics Clearance Number:

- I have also received, read and understood the above written information (*Participant Letter of Information*) regarding the study.

- I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be anonymously processed into a study report.

- In view of the requirements of research, I agree that the data collected during this study can be processed in a computerized system by the researcher.

- I may, at any stage, without prejudice, withdraw my consent and participation in the study.

- I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.

- I understand that significant new findings developed during the course of this research which may relate to my participation, will be made available to me.

Full Name of Participant	Date	Time	Signature
I, Mokoena Khutso	…………	…………………..	……………...

(*Mokoena K)* herewith confirm that the above participant has been fully

Informed about the nature, conduct and risks of the above study.

Full Name of Researcher

Mokoena K   Date………………   Signature………………

Full Name of Witness (If applicable

……………………   Date ………………   Signature…………………..

Full Name of Legal Guardian (If applicable)

…………………   Date………………   Signature…………………….

Please note the following:

Research details must be provided in a clear, simple and culturally appropriate manner and prospective participants should be helped to arrive at an informed decision by use of appropriate language (grade 10 level- use Flesch Reading Ease Scores on Microsoft Word), selecting of a non.

-threatening environment for interaction and the availability of peer counseling (Department of Health, 2004).

If the potential participant is unable to read/illiterate, then a right thumb print is required and an impartial witness, who is literate and knows the participant e.g. parent, sibling, friend, pastor, etc. should verify in writing, duly signed that informed verbal consent was obtained (Department of Health, 2004).

If anyone makes a mistake completing this document e.g. a wrong date or spelling mistake, a new document has to be completed. The incomplete original document has to be kept in the participant's file and not thrown away, and copies thereof must be issued to the participant.

References:

Department of Health: 2004. *Ethics in Health Research: Principles, Structures and Processes*

http://www.doh.gov.za/docs/factsheets/guidelines/ethnics/

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Appendix C: Permission letter for data collection

Request Letter to conduct the study about Lifestyle practices associated with anthropometric status among students at the University of Venda, Limpopo Province

Enquires: Mokoena K

Contact: 0829635127

Date: 11 July 2019

Head of Department

Student Affairs

University of Venda

Private Bag x 5050

Thohoyandou

0950

Dear Sir/Madam

Request for a permission to conduct a study at the University of Venda residence.

I, Mokoena Khutso (Student no: 11617433) request your permission to collect data among students at University residences. I am currently a registered Master's student in Public Health. My research title: Lifestyle practices associated with anthropometric among students at the University of Venda, Limpopo Province". The main purpose of the study is to describe lifestyle practices associated with anthropometric status among students at the University of Venda, Limpopo Province. Information obtained from the study might be used in planning intervention programs to improve interventions strategies in addressing lifestyle practices associated with anthropometric status among students at the UNIVEN The researcher will ensure that there is no link between participants and their data. Data collection will take a 4weeks.

For verification purposes, attach is my proof of ethical clearance certificate

I look forward to your positive response.

Yours faithfully,

Mokoena K (Ms)

Permission approved

OFFICE OF THE HEAD: STUDENT HOUSING

2019 -07- 12

UNIVERSITY OF VENDA
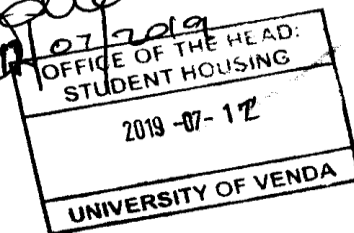
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Appendix D: Questionnaire

Participants Code ☐ ☐ ☐ ☐ ☐

Topic: Lifestyle practices associated with anthropometric status among students at the University of Venda, Limpopo Province

Date……………/……………… /……………………

Instructions: There are seven sections. Please read each questions carefully before giving an answer. Please fill in or tick(×) in the space provided below. Please do not omit any question unless it is not applicable to you. Return the questionnaire to the researcher after the completion.

SECTION A: SOCIO-DEMOGRAPHIC PROFILE

1. Name of Residence at UNIVEN………………………...
2. Date of Birth DB…………/MM……………/YY…………….
3. Age…………………
4. Gender

Male	1
Female	2

5. Ethnic Group

Pedi	1
Venda	2
Tsonga	3
Others, specify	4

6. Marital Status

Married	1
Single	2
Other specify:	3

7. Academic level

First year	1
Second year	2
Third year	3
Honors	4
Masters	5
PhD	6

8. Schools

Agriculture	1
Education	2
Environmental Science	3
Health Sciences	4
Human &Social Sciences	5
Law	6

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Management	7
Math's & Natural Sciences	8

9. Department_____

10. Parental / Guardians occupation

Employed	1
Unemployed	2
Self employed	3
Other specify:	4

11. Source of Income

Bursary	1
Parents/Guardians	2
Self employed	3

12. Student Monthly Allowance R_____

SECTION B: NUTRITIONAL PRACTICE

Please tick (X) in the appropriate column

13. How many times do you eat per day?

Once per day	1
Twice per day	2
Three times per day	3
Four times per day	4
More than 4 times a day	5

14. Do you snack between the meals?

Yes	1
No	2
Sometimes	3

15. Snacks consumed between the meals mostly

Potato chips	1
Yogurt	2
Fruits	3
Vegetables	4
All of the above	5

16. How often do you eat out per week (restaurants, fast food or chines food?

Daily	1
Once per week	2

Twice per week	3
Three times a per week	4
Four times per week	5
More than four times	6
Not at all	7

17. How many times do you eat fruits and vegetables per week.?

Daily	1
Once per week	2
Twice per week	3
Three times a per week	4
Four times per week	5
More than four times per week	6
Not at all	7

18. How often do you eat fish, chicken, eggs, lean meat per week?

Daily	1
Once per week	2
Twice per week	3
Three times a per week	4
Four times per week	5
More than four times per week	6
Not at all	7

19. How often do you eat beans per week?

Daily	1
Once per week	2
Twice per week	3
Three times a per week	4
Four times per week	5
More than four times per week	6
Not at all	7

20. How often do you eat processed food (sausage, bacon, ham, canned meat etc) in a week?

Daily	1
Once per week	2
Twice per week	3
Three times a per week	4
Four times per week	5
More than four times	6
Not at all	7

21. How often do you eat mass, milk and yogurt in a week?

Daily	1
Once per week	2
Twice per week	3
Three times a per week	4
Four times per week	5
More than four times	6
Not at all	7

22. How often do you drink soft drinks, Juice & energized drinks in a week?

Daily	1
Once per week	2
Twice per week	3
Three times a per week	4
Four times and more per week	5
Not at all	7

23. Do you drink water after every meal?

Yes	1
No	2
Sometimes	3

SECTION C: NUTRITIONAL KNOWLEDGE

Please fill in the missing space

24. What does variety of foods mean?

_____

_____

25. Daily, how many portions of fruits and vegetables can be eaten:

26. What is food fortification:

_____

27. Give example of two food products that are fortified:

_____

Choose one of the most correct answer.

28. Indicate one food group that should be part of most meals?

Fats	1	
Proteins / body building	2	
Starch / Carbohydrates	3	
Protective (fruits and vegetables)	4	
All of the above	5	

29. Legumes, dry beans, split peas, lentils and soya, how often can those be consumed?

Regularly	1	
Frequently	2	
Sometimes	3	
None of the above	4	

30. Choose one most correct health benefit of legumes (peas, beans, soya and lentils):

Promotes healthy digestion	1	
Increase lipids in the body	2	
Keep eyes healthy	3	
None of the above	4	

31. What amount of salt can be consumed daily?

2g	1	
5g	2	
8g	3	
None of the above	4	

32. How often should milk / maas or yoghurt be consumed: __

Daily	1	
Monthly	2	
Weekly	3	
None of the above	4	

Choose one of the most correct answer and fill the gap

33. Fish, chicken, lean meats and _____can be consumed daily.

Eggs	1	
Beans	2	
Nuts	3	
All of the above	4	

34. Drink clean safe _____ daily.

Tea	1	
Water	2	
Alcohol	3	
None of the above	4	

35. Sugar, foods and drinks high in sugar should be consumed _____.

Frequently	1	
Sparingly	2	
Regularly	3	
None of the above	4	

36. _____ fat is healthier.

Animal	1	
Plant	2	
Synthetic	3	
None of the above	4	

37. Fat should be used _____.

Frequently	1	
Sparingly	2	
Regularly	3	
None of the above	4	

SECTION E: PHYSICAL ACTIVITY PRACTICE

Please tick(×) *in the appropriate block*

45. Are you currently engaging in any sport/physical activity?

Yes	1	No	2

46. If yes, which type of activity?

Athletics	1
Aerobics	2
Cricket	3
Soccer	4
Karate	5
Dance	6
Volleyball	7
Netball	8
Basketball	9
Other specific:	10

47. If yes, how often do you engage per week?

Daily	1
Once per week	2
Twice per week	3
Three times a per week	4
Four times and more per week	5

48. What mode of transport do you use from residence to class?

Car	1
Bicycle	2
Walk	3
Bus/taxi	4

49. What mode of transport do you use from residence to the Mall/ shopping Centre?

Taxi/ private	1
Bicycle	2
Walking	3

50. How many times do you climb the stairs a day?

Daily	1
Once per day	2
Twice per day	3
Three times a day	4
Four times and more a day	5
Not at all	6

51. How many times do you engage in floor exercises per week (stretching, bending, sit-ups and sit-downs in a week?

Daily	1
Once per week	2
twice per week	3
Three times per week	4
Four times and more per week	5
Not at all	6

52. How many hours do you spend watching movies/relax during your leisure time in a day?

One hour	1
Two hours	2
Three hours	3
Four hours	4
More than four hours	5
Not at all	6

53. Have you been regularly active for the past 3-4 weeks?

Yes	1	No	2

54. Have you been regularly active for the past 6 months?

Yes	1	No	2

55. Do you plan to become physically active in the next 6 months?

Yes	1	No	2

SECTION F: PHYSICAL ACTIVITY KNOWLEDGE

Please tick in the appropriate block and fill gaps where appropriate.

56. Physical activities should be part of everyone's daily life.

True	1
False	2
Unsure	3

57. Physical activity includes the following

Walking , running and cycling	1
Sport or planned exercises	2
Games	3
Play	4
All above	5
None of the above	6

58. Physical activity is defined as movement produced by the muscles that increase heart rate and energy expenditure

True	1
False	2
Unsure	3

59. Physical activity for adult is recommended for at least 150 min of moderate-intensive in a week?

True	1	False	2

60. Are you aware of the benefits of participating in physical activities?

Yes	1	No	2

61. If yes, please tick the right answer.

Helps in weight control	1
Reduce obesity, diabetes, stroke and form of cancer	2
Reduce state of anxiety, depression and stress	3
All above	4
None of the above	5

62. Drinking clean water is recommended during any physical activity?

True	1	False	2

63. Physical activity is recommended at least 30 min a day for weight loss and staying fit.

True	1
False	2
Unsure	3

64. Are you aware of the risk of being physical inactive?

Yes	1	No	2

65. If yes, please tick the right answer

Increase in anxiety and stress	1
Increase in overweight and obesity	2
Increase cardiovascular diseases(high cholesterol, high, blood pressure, stroke and heart attack	3
All above	4
None of the above	5

66. Physical activity can be done to improve cardiorespiratory and muscular fitness, bone health, reduce risks of non-communicable disease and depression

True	1
False	2
Unsure	3

67. Do you feel motivated to engage in physical activity/ exercises?

Yes	1	No	2

68. If No please tick the reason why?

Lack of time due to school work load	1
laziness	2
Lack of physical activity knowledge	3
Not interested at all	4

69. SECTION G: Lifestyle habits adopted

Indicate YES, or NO

1	Are you currently accumulating at least 150 min of moderate intensity physical activity per week	
2.	Eating breakfast daily	
3	Engaging in moderate exercise 2-3 times a week	
4	Getting adequate sleep (7-8 hours for night)	
5	Not smoking	
6	Consuming little or no alcohol	
7	Monitoring a moderate weight	

SECTION H: Anthropometric Measurements

	Reading 1	Reading 2	Average
70. Weight(kg)			
71. Height (cm)			
72. Waist ratio			
73. Hip ratio			

74.BMI of Participant ----------------

End of questionnaire
THANK YOU FOR YOUR TIME

Appendix E: Ethics clearance letter.

NAME OF RESEARCHER/INVESTIGATOR:

Ms K Mokoena

Student No:
11617433

PROJECT TITLE: **Lifestyle practises associated with anthropometric status among students at the University of Venda.**

PROJECT NO: **SHS/19/PH/12/0605**

SUPERVISORS/ CO-RESEARCHERS/ CO-INVESTIGATORS

NAME	INSTITUTION & DEPARTMENT	ROLE
Dr LF Mushaphi	University of Venda	Supervisor
Mrs AG Mudau	University of Venda	Co - Supervisor
Ms K Mokoena	University of Venda	Investigator – Student

ISSUED BY:
UNIVERSITY OF VENDA, RESEARCH ETHICS COMMITTEE

Date Considered: May 2019
Decision by Ethical Clearance Committee Granted
Signature of Chairperson of the Committee: ....
Name of the Chairperson of the Committee: Senior Prof. O.E. Ekosse

UNIVERSITY OF VENDA
DIRECTOR
RESEARCH AND INNOVATION
2019 -05- 1 4
Private Bag, X5050
Thohoyandou 0950

University of Venda
PRIVATE BAG X5050, THOHOYANDOU, 0950, LIMPOPO PROVINCE, SOUTH AFRICA
TELEPHONE (015) 962 8504/8313 FAX (015) 962 9060
"A quality driven financially sustainable, rural-based Comprehensive University"

Appendix F: UHDC approval letter.

UNIVERSITY OF VENDA

OFFICE OF THE DEPUTY VICE-CHANCELLOR: ACADEMIC

TO   :   MR/MS K. MOKOENA

            SCHOOL OF HEALTH SCIENCES

FROM: PROF J.E CRAFFORD

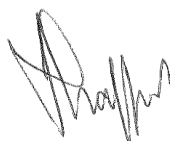   DEPUTY VICE-CHANCELLOR: ACADEMIC

DATE :   20 MARCH 2019

DECISIONS TAKEN BY UHDC OF 20th MARCH 2019

Application for approval of Masters research proposal in Health Sciences: **K. Mokoena (11617433)**

Topic: "Lifestyle Practices Associated with Anthropometric Status Among Students at the University of Venda, Limpopo Province

Supervisor   UNIVEN   Dr. L.F Mushaphi
Co-Supervisor   UNIVEN   Ms. A.G Mudau

UHDC approved Masters proposal

PROF J.E CRAFFORD
DEPUTY VICE-CHANCELLOR: ACADEMIC

Appendix G : Proof-reading letter.

P.O BOX 663

THOLONGWE

0734

20 March 2020

Dear Sir/Madam

This serves to confirm that I proof-read and edited dissertation entitled "Lifestyle Practices Associated with Anthropometric Status Among Students at the University of Venda" by Mokoena Khutso (11617433).

I have also suggested few amendments, provided the changes I recommended are effected to the text, the language is of an acceptable standard.

Please don't hesitate to contact me for any enquiry.

Regards

Dr. Hlaviso Motlhaka (BEDSPF-UL, BA Hons-UL, MA-IUP: USA, PhD-WITS, PGDiP-SUN)

Cell number: 079-721-0620/078-196-4459

Email address: hlavisomhlanga@yahoo.com