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WESTERN CAPE

# Relationship between knowledge, perceptions, attitudes, and behaviours of undergraduate university students regarding physical activity

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DECLARATION

I hereby declare that "***Relationship between knowledge, perceptions, attitudes, and behaviours of undergraduate university students regarding physical activity***" is my own work, that it has not been submitted for any degree or examination in any other university, and that all the sources I have used or quoted have been indicated and acknowledged by complete references.

Full name: Nonhle Amanda Patience Qwabe Date: 18 December 2022

Signed: 

# DEDICATION

This was dedicated to my parents, Thandazile Lynnette Mkhombe and Paulos Sifiso Qwabe, thank you for your unconditional love and support. To my late grandmother Sibongile Agnes Mkhombe, thank you for believing in me, and always making me feel that I can accomplish anything I set my mind on.

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## LIST OF SCIENTIFIC ABBREVIATIONS

BMI = body mass index

FITT = frequency, intensity, time, type

PA = physical activity

PIA = physical inactivity

## LIST OF ACRONYMS

HBM = Health Belief Model



## UNITS OF MEASUREMENT

min = minutes

METS = metabolic equivalents

df = degrees of freedom

hr = hour

## STATISTICAL UNITS

% = percentage

p = significance level

| | | |
|---|---|---|
| SD | = | standard deviation |
| $\bar{x}$ | = | mean |
| H | = | Kruskal-Wallis H |
| $\chi^2$ | = | Chi-Square |
| r | = | correlation coefficient |

# ABSTRACT

**Introduction:** The lack of physical activity is a major public health concern affecting many university students worldwide. Physical inactivity increases the risk of many negative health conditions, including obesity, coronary heart disease, type 2 diabetes, and breast and colon cancers.

**Aim:** The aim of the study is to determine the relationship between the knowledge, perceptions, attitudes, and behaviours of undergraduate university students regarding physical activity.

**Methods:** This study used a quantitative, cross-sectional, descriptive and correlational design. A total of 177 undergraduate students were conveniently recruited to participate in the study, males and females aged 18 years and older, in the Faculty of Community and Health Sciences (CHS) at a university in the Western Cape. A researcher-validated questionnaire was used to collect participant sociodemographic information, such as age and gender, as well as information on the the participants' knowledge, perceptions, attitudes, and behaviours regarding physical activity. The research data was analysed using the statistical analysis programme SPSS (Statistical Package for the Social Sciences) version 28.0. Descriptive statistics using frequencies, and inferential statistical analysis, using independent samples t-test and Pearson's correlation were performed. The Chi square test was used to determine the association between categorical variables, such as age-group, gender, and year-level with the students' knowledge, perceptions, attitudes and behaviours of physical activity. The statistical level of significance was set at $p < 0.05$.

**Results:** The results showed that students had fair knowledge (67.23%), good perceptions (98.31%) and good attitudes (94.92%) about PA. Students participated in regular PA and met the recommended PA guidelines for moderate-to-vigorous PA in healthy adults. A total of 81.36% of students participated in light-intensity PA, 87% in moderate-intensity PA, and 88.7% in vigorous-intensity PA. Significant differences were found in students' perceptions of PA based on gender ($H = 8.424$, $p = 0.015$), and students' attitudes of PA based on gender ($H = 19.790$, $p < 0.001$). A significant positive moderate relationship was observed between students' perceptions and their attitudes of PA ($r = 0.66$, $p < 0.001$). There were significant associations between students' perceptions of PA and age ($\chi^2 = 10.53$, $p = 0.05$), and students' attitudes and gender ($\chi^2 = 6.89$, $p = 0.03$)

**Conclusion:** Undergraduate students had fair knowledge, good perceptions and good attitudes about PA. Most of the students engaged in regular PA and met the minimum PA recommendations for healthy adults. There were significant differences in students' perceptions of PA and students' attitudes about PA based on gender. There was no significant relationship between students' knowledge about PA and their PA behaviours. Students attitudes were associated with gender, and students vigorous-intensity PA participation was also associated with gender. Furthermore, students' perceptions were associated with age, and students' vigorous-intensity PA participation was also associated with age. There is a need to educate students, particularly those in the health sciences, about the importance of PA, as many of them will become future leaders and practitioners in the area of PA, and need to set good examples to clients and patients in the workplace.



**Key words:** Knowledge, perceptions, attitudes, behaviours, physical activity

# CHAPTER ONE: INTRODUCTION

## 1.1.Introduction

Knowledge of physical activity (PA) is important for encouraging regular PA participation across all age-groups (Banjilka & Badjan, 2019). According to a survey, 62.7% of participants thought their doctors had not given them enough information regarding PA (Pienaar et al., 2004). The lack of information about PA could possibly translate into the high prevalence of physical inactivity for many individuals, which is a major public health burden worldwide (Banjilka & Badjan, 2019; Ramya et al., 2017). Several studies provide overwhelming evidence that physical inactivity (PIA) accelerates aging and dysfunction of the body, thereby, precipitating premature deterioration in human health (Alsulami et al., 2018; Bauman et al., 2012; Booth et al., 2011). Increased information about the impact of PA on health could assist in ultimately improving PA participation and overall wellness, which would enhance health and quality of life (Hiew et al., 2015; Riebie et al., 2016). Insufficient and improper knowledge of PA translates into poor or negative perceptions and attitudes about PA, which encourages poor PA behaviours (Pickens, 2005).



Although the benefits of regular PA are well known, such as weight control, stress reduction, and the management of numerous chronic diseases, the prevalence of physical inactivity in the general population is still unacceptably high (Banjilka & Badjan, 2019). In order to change behaviour, advanced new information must be provided. A method of changing individuals' perceptions and attitudes is through supplying new and improved information, and the changed perceptions and attitudes will eventually translate into changed behaviours (Pickens, 2005).

However, various studies have conflicting views on the impact of individuals knowledge regarding PA and the influence thereof on their PA behaviours (Banjilka & Badjan, 2019; bin Mohamed Roshdin et al., 2016; Muraf et al., 2018). Several studies have examined individuals' knowledge of PA and their PA behaviours, however, only a few studies indicated a significant relationship between knowledge of PA and PA behaviours (bin Mohamed Roshdin et al., 2016; Keating et al., 2010; Ward, 2014).

Over the years, there has been a steady decline in PA participation from students, as they transition from high school to university (Martins et al., 2019). Since health science students will eventually work as healthcare professionals and serve as role models for future patients and clients, it is crucial that they are aware of the PA recommendations and the advantages thereof (Alderman et al., 2020; Blake et al., 2017; Ramezankhani et al., 2013). According to a recent study, insufficient PA training on PA guidelines made medical students feel incompetent and low on confidence, when using their knowledge in the job (Adedokun et al., 2021). As a result, it is important to examine how students behave when it comes to PA (Awadalla et al., 2014; Muraf et al., 2018; Ramezankhani et al., 2013).



Students with good PA behaviours will generally translate into a healthy lifestyle, especially when they enter the workplace and in later life (Blake et al., 2017). In order for students to have good PA behaviour, sufficient information must be provided to them, which will impact their perceptions positively and generate a good attitude in the long-term that, ultimately, will trigger better PA participation and behaviours (Pickens, 2005).

Physical inactivity coupled with an uncontrolled diet results in pathological changes that are linked to diabetes, obesity and, inter alia, hypertension that increase the risk of developing various heart diseases (bin Mohamed Roshdin et al., 2016). Therefore, it is important to provide sufficient knowledge to students in order to change their perceptions and attitudes. The change in attitude will, hopefully, have a positive impact on their PA participation and, in future, possibly reduce the prevalence of PIA.

### 1.2.Statement of the Problem

Due to the various recreational and sports facilities provided to students at tertiary level, the university system offers students the opportunities to improve their PA participation (Blake et al., 2017). However, many students in university frequently lack the knowledge and/or behaviours to make efficient use of the facilities are these institutions, especially since they lack a solid background in physical education, health promotion, and the importance of being physically active (Goje et al., 2014).



Sufficient knowledge on PA can encourage students to engage in regular PA (Banjilka & Badjan, 2019; Hiew et al., 2015). Good perceptions on PA are a result of a good education and support system on the importance and benefits of PA (Niedenthal et al., 2005; Pickens, 2005). Good perceptions of PA encourage good feelings toward PA, which often translates into good actions, such as engaging in regular PA and promoting PA participation (Niedenthal et al., 2005; Pickens, 2005). There is a link between students' knowledge, perceptions and attitudes, and their PA behaviours (Banjilka & Badjan, 2019; Chevance et al., 2019; Hiew et al., 2015; Pickens, 2005).

Although much research has been conducted on the importance of PA for decreasing morbidity, premature mortality and improving the overall quality of life, the prevalence of PIA has continued to rise globally, especially in recent years (Banjilka & Badjan, 2019; Ramya et al., 2017). There are contrasting perspectives on the relationship between knowledge and PA participation (Ward, 2014). Very little research has been conducted that investigates the link between knowledge, perceptions, attitudes and behaviours regarding PA (Muraf et al., 2018; Ward, 2014; Xu et al., 2017).

The lack of knowledge regarding PA hampers PA awareness and participation among students (Ramezankhani et al., 2013). Inadequate education about PA given to health science students at university will not only encourage poor PA behaviours among students, but also produce ill-equipped health care practitioners for the future (Blake et al., 2017; Ramezankhani et al., 2013). According to a study by Shirley et al. (2010), adding brief PA education sessions as standard treatment was a good method of encouraging patients to participate in PA. Health science students are future role models and have a responsibility of promoting healthy lifestyles, not only to the general public, but also amongst their colleagues (Blake et al., 2017; Ramezankhani et al., 2013).



The present study, therefore, is important and timely in addressing the challenges of physical activity in university students, and will help to highlight the knowledge, perceptions, and attitudes of undergraduate students regarding PA, and how these factors influence their behaviours. This study, hopefully, will also highlight the need for corrective intervention strategies, such as educational and lifestyle programmes to address the impact of insufficient

knowledge, poor perceptions and attitudes that negatively impact PA participation amongst university students.

### 1.3.Aim of the Study

The aim of the study is to determine the relationship between the knowledge, perceptions, attitudes, and behaviours of undergraduate university students regarding PA.

### 1.4.Objectives of the Study

The study has the following objectives:

- To determine the knowledge, perceptions, attitudes, and behaviours of undergraduate students in the Faculty of Community and Health Sciences at a university in the Western Cape regarding PA.
- To assess the differences in students' knowledge, perceptions, attitudes, and behaviours regarding PA based on gender, academic programme and year-level.
- To determine the relationship between students' knowledge, perceptions, attitudes, and behaviours regarding physical activity.
- To examine the association between sociodemographic factors and students' knowledge, perceptions, attitudes, and behaviours regarding PA.



### 1.5.Hypotheses of the Study

The hypotheses of the study are the following:

- Undergraduate students have good knowledge, perceptions, and attitudes, but poor behaviours regarding PA.
- Undergraduate students' knowledge, perceptions, attitudes, and behaviours regarding PA will be associated with selected sociodemographic factors, such as age and gender.
- There will be an inverse relationship between students' knowledge and their behaviours regarding PA.

### 1.6.Significance of the Study

Ramezankhani et al. (2013) concluded that health practitioners provide the ideal model of a healthy lifestyle, and set an example of proper behaviour for the general population. Healthcare professionals with low levels of physical activity, have increased health risks that may negatively influence their health promotion practises with patients (Blake et al., 2017). Poor knowledge, perceptions and attitudes about being physically active may be a barrier to adopting good physical activity behaviours among healthcare practitioners (Muraf et al., 2018).



Health practitioners who are not well-informed about PA are, therefore, unable to confidently advise and promote PA among their patients, because of their limited knowledge (Adedokun et al., 2021; Alderman et al., 2020; Aweto et al., 2013). According to Adedokun et al. (2021), students had insufficient knowledge on PA testing, exercise prescription, and exercise physiology, as well as being generally unaware of the global recommendations on PA, which placed them at a disadvantage when discussing PA with their patients. Furthermore, students felt ill-equipped to apply their PA knowledge in the workplace (Adedokun et al., 2021). Similar findings were reported by Alderman et al. (2020), who stated that only 3.6% of

practitioners claimed to have received information on the advantages of PA for cancer victims, and that only 25.2% got further education to assist them encourage PA participation in their patients. Furthermore, Aweto et al. (2013) reported that practitioners had received good knowledge and information on PA promotion for patients but, despite this, they did not advise their clients to engage in regular PA.

A few studies have investigated the knowledge of PA recommendations among university students (Adedokun et al., 2021; Martins et al., 2019; McCarthy & Warne, 2022). Undergraduate students in the Faculty of Community and Health Sciences will be future health practitioners and, therefore, investigating their current knowledge, perceptions, attitudes and behaviours regarding PA is justified (Awadalla et al., 2014; Muraf et al., 2018; Ramezankhani et al., 2013). As future practitioners, they should be well-informed about PA and how to promote PA for the public, before going into the workplace (Blake et al., 2017).



In our knowledge this is the first South African study to look at knowledge, perceptions, attitudes and PA behaviours of university students in one study. The findings of the present study will highlight the knowledge, perceptions, attitudes and behaviours of students regarding PA. The findings, where applicable, will be used for corrective interventions, such as educational and lifestyle programmes that will help increase PA participation through improved knowledge. The present study will, hopefully, encourage students to expand their knowledge, as future health practitioners, not only in assisting their patients and clients, but also to enable them to be an example to society by making personal lifestyle adjustments to improve their own health. The present study will hopefully motivate students to be more

active and also serve as source of information for subsequent studies to build on the gaps and recommendations from the present study.

## 1.7.Delimitations of the Study

### 1.7.1. Inclusion Criteria

The present study included undergraduate students from the Faculty of Community and Health Sciences (CHS) at the University of the Western Cape. The study included full-time CHS students, both males and females, aged 18 years and older.

### 1.7.2. Exclusion Criteria

The study excluded all undergraduate and postgraduate students from the other faculties, other than the Faculty of CHS, as well as all the postgraduate students from all the faculties at the University of the Western Cape.



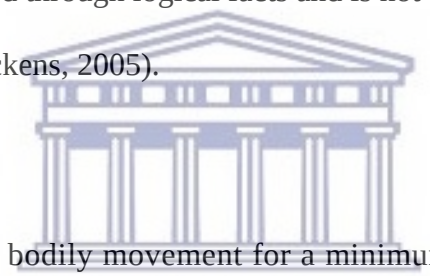
## 1.8.Definitions of Terms

**Attitude** is defined as a settled way of thinking or feeling about something (Pickens, 2005). Attitude is a particular mental state or a tendency to act in a particular way due to both an individual's experience and temperament (Banjilka & Badjan, 2019; Pickens, 2005). An attitude influences behaviour, due to personal experience and character (Jagadeesan et al., 2017; Pickens, 2005). An attitude is formed through learning and observing others, and through personal experiences with people and situations (Jagadeesan et al., 2017; Pickens, 2005).

**Behaviour** is a routine way of practically doing something common or habitual (Hiew et al., 2015).

**Knowledge** is defined as information, facts, and skills acquired through experience or education, and reflects an awareness or familiarity gained by experience of a fact or situation (Hiew et al., 2015).

**Perception** is defined as a way in which something is understood, viewed and/or interpreted (Pickens, 2005). It is formulated through logical facts and is not based on emotions or feelings (Okop et al., 2016; Pickens, 2005).



**Physical activity** is defined as bodily movement for a minimum duration of thirty minutes of moderate-intensity aerobic activity for at least five days per week or twenty minutes of vigorous-intensity aerobic activity for at least three days per week or a combination of moderate- and vigorous-intensity aerobic activity for three-to-five days per week (Riebie et al., 2016).

# CHAPTER TWO: LITERATURE REVIEW

## 2.1. Introduction

This literature review will discuss the knowledge, perceptions, attitudes and behaviours of students regarding PA. It will also highlight possible differences, relationships and associations among demographic characteristics and PA.

A lack of knowledge regarding the importance of PA often translates into poor perceptions of PA, and these poor perceptions generate poor attitudes which, in turn, give rise to poor PA behaviours (Adedokun et al., 2021; Pickens, 2005; Ramezankhani et al., 2013). Physical inactivity is a major health problem, affecting both developed and developing countries worldwide (Banjilka & Badjan, 2019). Physical inactivity is associated with obesity and is considered a major modifiable risk factor for developing chronic disease (Ramya et al., 2017). The lack of PA participation is said to be attributed to insufficient knowledge on the benefits of PA, especially on PA and quality of life (Pickens, 2005). Regular PA participation and proper weight management are associated with a reduced risk of developing chronic disease, premature mortality, and the prevention of weight gain or obesity (Riebie et al., 2016). The high prevalence of PIA is thought to be attributed to the poor knowledge and attitudes of individuals (bin Mohamed Roshbin et al., 2016). Healthcare workers play a huge role in endorsing PA to patients and clients (Blake et al., 2017; Ramezankhani et al., 2013). Health science undergraduate university students are recognized as future health care workers. Reflecting on their knowledge regarding PA can influence their behaviours towards recognizing potential areas of health burden for improvement. This will help in promoting PA to patients and clients, as well as improve regular PA participation for themselves (Awadalla

et al., 2014; bin Mohamed Roshdin et al., 2016; Muraf et al., 2018; Ramezankhani et al., 2013).

### 2.2. University Students' Knowledge of Physical Activity

Knowledge plays a key role in promoting regular PA participation (Banjilka & Badjan, 2019). Knowledge of PA is a collection of information received from structured learning and/or through repetitive reinforcement, so much so that this learned information or lack thereof contributes to PA participation (Banjilka & Badjan, 2019; Hiew et al., 2015). The scarcity of appropriate knowledge regarding the importance and advantage of PA could possibly translate into poor perceptions, which develop into poor attitudes and poor PA practices (Abdeta et al., 2019; Banjilka & Badjan, 2019; Pickens, 2005).



Banjilka and Badjan (2019) reported that students in Public Health at the University of Gambia knew what physical exercise was, and 60% knew that PA played an important role in preventing non-communicable diseases. Al-Zahrani (2010) reported that most of the dental students knew the importance of PA in maintaining good general health. In contrast, Adedokun et al. (2021) reported that 36.88% of medical students did not have sufficient knowledge about the minimum recommended PA guidelines of 150 minutes per week of moderate-to-vigorous intensity PA, and 50.67% did not know the minimum recommended PA guidelines for strength training for at least 2 days per week. Similarly, Anand et al. (2011) reported that although medical students knew the benefits of PA, they were unaware of the recommended levels of PA for health. In addition, McCarthy and Warne (2022) revealed that only 34% and 23% of males and females, respectively, were able to accurately report the current recommended PA guidelines.

A study by Oli et al. (2018) reported that participants had poor health knowledge regarding diet and PA. Taha (2008) found that students had poor knowledge of PA involvement in the prevention of chronic conditions, such as hypertension and diabetes mellitus. Similarly, Awotidebe et al. (2014) reported that 67.3% of participants had poor knowledge on PA in controlling hypertension. Anand et al. (2011) reported that medical students had poor knowledge of PA, and suggested that this was partly due to the medical curriculum that focused solely on the treatment and control of disease rather than on overall health promotion.

In contrast to the previous studies, Aniodo et al. (2014) reported that undergraduate students had high mean scores for their knowledge of PA, as well as the benefits and the various types of PA. Similarly, Al-Zahrani (2010) reported dental students scored high on knowledge about PA and its importance for general good health maintenance. Muraf et al. (2018) also reported a similar finding that participants had good knowledge of PA. Additionally, Ramezankhani et al. (2013) reported participants had fair to good knowledge regarding PA, and attributed the findings to students receiving adequate education about PA. However, many of these studies showed that, despite the students knowing about the impact of PA, they still did not put their knowledge into good practice (Al-Zahrani, 2010; Jagadeesan et al., 2017).

Knowledge regarding PA may differ based on gender (Khamaiseh & ALBashtawy, 2015). Khamaiseh and ALBashtawy (2015) reported significant differences in male and female students' knowledge regarding stretching exercises. In contrast, McCarthy and Warne (2022) found that there were no significant differences reported for students' knowledge on PA

based on their gender. A study by Aniodo et al. (2014) also reported no significant difference in students' knowledge, when comparing males and females. Similarly, Martins et al. (2019) reported no significant difference between health science students' knowledge, and that both male and female participants displayed similar knowledge about PA. Furthermore, Thompson and Hannon (2012) found that students' knowledge did not differ with age. Additionally, Keating et al. (2010) reported no significant difference in participants knowledge and gender, however, they did report that there were knowledge differences among participants based on the number of years in the university.

A study by Xu et al. (2017) found a significant positive relationship between Chinese students' knowledge of PA and their participation in PA. Muraf et al. (2018) reported a significant relationship between knowledge about PA and participants' attitudes, but no significant relationship with their perceptions or between PA practices and sitting behaviour. Similarly, bin Mohamed Roshdin et al. (2016) reported no significant relationship between participants' knowledge of PA and their PA behaviours. Keating et al. (2010) reported that had there was no significant relationship between university students' knowledge and their overall PA participation in vigorous-, moderate- or light-intensity PA. Furthermore, Ward (2014) reported that students with low PA participation levels were knowledgeable on the PA recommendations, but they found no significant relationship between students' knowledge of PA and their PA participation patterns. In addition, Sultoni and Fitri (2017) also reported that there was no relationship between PA participation and knowledge of PA.



Awotidebe et al. (2014) reported a significant association between participants' knowledge and their age. In contrast Ramautar et al. (2021) reported no significant association between

participants knowledge and their age. A study by McCarthy and Warne (2022) reported that Irish university students and staff's knowledge about PA was not significantly associated with the gender of the participants. This finding was also supported by Ramautar et al. (2021) who reported no significant association between participants knowledge and their gender.

### 2.3. University Students' Perceptions of Physical Activity

A perception is how something is viewed, comprehended, or interpreted (Niedenthal et al., 2005; Pickens, 2005). Initially, perceptions occur in the short-term memory and, if repetitive stimuli are received about PA and its importance for maintaining overall health, the information is then translated into the long-term memory which, over a period of time, helps to form a positive memory trace about PA (Niedenthal et al., 2005; Pickens, 2005). A knowledge of the perceived benefits and barriers to PA play a role in influencing PA participation (Kamarudin, & Omar-Fauzee, 2007; Shirley et al., 2010). A biased perception of PA being expensive and inaccessible could possible generate into a poor or negative attitude towards PA, and this could translate into poor PA participation. Perceptions differ, based on ethnicity and cultural beliefs within society (Hassan et al., 2014). Good perceptions about PA and a recognition of the possible benefits of PA behaviours could possibly assist in PA promotion (Shirley et al., 2010).



In a South African study, the participants aged 35 to 70 years perceived that PIA, poor diet, and poor lifestyle choices increased the prevalence of coronary artery disease (Okop et al., 2016). Awadalla et al. (2014) stated that 51.3% of physically inactive university students perceived time as a limitation to being physically active, because of their busy lifestyles, while 28.1% perceived that a lack of encouragement from friends was a barrier to PA, and

27.8% perceived a lack of support from others was a barrier to PA. Similar to these findings, Oli et al. (2018) reported that participants felt embarrassed to engage in PA in front of other people, and that they had a poor perception of their responsibilities and duties that prevented them from participating in regular PA. The participants also claimed that their lack of leisure time and suitable infrastructure contributed to their lack of PA participation.

Kamarudin and Omar-Fauzee (2007) reported that college female students perceived that it was expensive to participate in PA. Omar-Fauzee et al. (2009) reported a significant difference in students' perceptions of PA based on their gender. A similar study by Blake et al. (2017) reported that the participants' perceptions about PA were significantly different according to gender. In contrast, Leuciuc (2018) found no significant difference between male and female perceptions regarding PA. Blake et al. (2017) also reported no significant difference in students' perceptions based on their school discipline or year-level.



Gouveia et al. (2019) reported that students' self-perception of enjoying PA and their self-perception of competence were related to their attitudes about PA. Similarly, Arikan (2020) reported a significant positive moderate relationship between students' perceptions about PA and their attitudes of PA. In contrast, Muraf et al. (2018) found no significant relationship between participants perceptions and their attitudes about PA. Tsang et al. (2013) reported that for adolescents in martial arts, there was a significant moderate relationship between their perceptions of family support and their PA participation. In contrast, Cheng et al. (2003) reported no significant relationship between the participants perceptions and their level of PA participation. A similar finding was reported by Muraf et al. (2018), which indicated that

participants' perceptions on PA had no significant relationship with their overall PA participation.

Lauderdale et al. (2015) reported that intrinsic and extrinsic motivation may be associated with gender. However, Martins et al. (2019) reported that participants' perceptions of the recommendations on PA for adults were not associated with gender. In contrast, Arikan (2020) found that there was a considerable gender difference in the perceptions of students, with male students having better perceptions than female students. Furthermore, Arikan (2020) reported that students' ages were not associated with their perceptions about PA.

### 2.4. University Students' Attitudes About Physical Activity

Attitudes help to bring meaning to things and situations, and are composed of feelings, particular thoughts or beliefs. Attitudes often translate into congruent behaviours, e.g., when a person has a good or positive attitude about PA in preventing modifiable disease, such as obesity, this good emotion or mindset could eventually lead the individual to engaging in regular PA (Jagadeesan et al., 2017; Pethkar et al., 2010; Pickens, 2005). Physical activity levels and dietary habits of students are associated with their attitudes about disease prevention and health promotion (Fagaras et al., 2015). Negative attitudes about PA increase the likelihood of PIA amongst individuals (Banjilka & Badjan, 2019).



In a college study, Jagadeesan et al. (2017) observed that 27% of students held the belief that PA would not help in overcoming obesity. Banjilka and Badjan (2019) reported that, among public health students, 50% strongly agreed and 37.5% agreed to the statement that "I feel

happy engaging in physical exercise". Furthermore, Banjilka and Badjan (2019) reported that 100% of public health students strongly agreed to the statement that "frequent participation in physical exercise makes one look healthy". A study by Roper (2002) reported that 63% of the participants agreed that PA was the best thing they could do to enhance their health, while 52% agreed that it helped in relieving their stress. Aweto et al. (2013) reported that 64% of participants agreed that increasing daily activity and climbing the stairs at work were sufficient physical activities to improve health.

A study by Anand et al. (2011) stated that the majority of participants had a good attitude toward PA, noting that it was needed to lose weight, and that it should not be limited to a specific gender. Ramezankhani et al. (2013) showed that students had good attitudes about PA, and that there were high mean scores in both females and males for engaging in PA. Furthermore, bin Mohamed Roshdin et al. (2016) reported more than 50% of participants had positive attitudes about exercise and expressed PA as fun. Aweto et al. (2013) also reported that 94.8% of participants had a good attitude toward PA in treatment planning. Similarly, Alderman et al. (2020) reported that participants showed a positive attitude toward supporting PA in order to improve the health of cancer patients. Additionally, Ramautar et al. (2021) reported that participants had good attitudes about the benefits of PA and participating in PA.



A study by Ziari et al. (2017) reported significant differences in students' attitudes according to gender and level of education. Similarly, Bauman et al. (2012) reported significant gender differences in participants attitudes regarding PA. However, Aniodo et al. (2014) reported no significant differences in male and female students attitude scores. Similarly, Ramautar et al. (2021) found no differences in respondents' attitudes based on their gender. Furthermore,

Bebetsos and Antoniou (2009) reported that there were no differences in students' attitudes regarding PA based on their gender.

Muraf et al. (2018) found no significant relationship between respondents' attitudes and their overall PA participation, but found a significant relationship between respondents' attitudes and their participation in vigorous-intensity and moderate-intensity PA. Similarly, bin Mohamed Roshdin et al. (2016) found a significant relationship between participants attitudes and their PA practices.

A study by Omar-Fauzee et al. (2009) reported that males were more likely to have more positive attitudes regarding PA participation and its benefits towards health compared to females. This finding is in contrast to Ramautar et al. (2021), who reported that there was no significant association between participants' attitudes and their gender, and that males and females had similar PA behaviours. Similarly, Ramautar et al. (2021) also reported no significant association between participants' attitudes and their age. Also, Awotidebe et al. (2014) reported that participants' ages were not associated with their attitudes regarding PA. Furthermore, Arikan (2020) also reported no significant association between students' ages and their attitudes about PA.



### 2.5. University Students' Behaviours Regarding Physical Activity

Behaviour is the manner in which one acts (Hiew et al., 2015). Behaviour is influenced intrinsically by feelings and emotions and extrinsically by surroundings and experiences (Hiew et al., 2015). Engaging in regular moderate-intensity PA can reduce stress and anxiety

(Felez-Nobrega et al., 2020). Physical activity is essential in the treatment of modifiable diseases and chronic diseases (Kohl 3rd et al., 2012; Ramya et al., 2017). Physical activity participation is influenced by an individual's knowledge, perceptions and attitudes about PA (Banjilka & Badjan, 2019; Chevance et al., 2019; Hiew et al., 2015). In order to increase the prevalence of regular PA participation among students, their knowledge, perceptions and attitudes about PA need to be determined firstly.

Goje et al. (2014) reported that the overall prevalence of PIA among university students was 41.1%, with females at 48% compared to their male counterparts at 18.8%. Physical inactivity is generally associated with obesity (Grasdalsmoen et al., 2019; Poobalan & Aucott, 2016). Peltzer et al. (2014) reported that over 10% of female students in South Africa were, obese and attributed the prevalence to poor PA participation amongst students. Tapera et al. (2017) investigated the prevalence of obesity at the University of Botswana and found that 11.2% of university students were either overweight or obese. Furthermore, they linked the prevalence of obesity in African universities to the steady rise in PIA and unhealthy dietary intake amongst students (Tapera et al., 2017). Students who were regularly involved in PA were less likely to be overweight or obese (Awadalla et al., 2014; Tapera et al., 2017).



Al-Zahrani (2010) reported that students' good knowledge about the health benefits of PA did not translate into healthy lifestyle behaviours, as 15% were overweight or obese, and only 38% engaged in regular PA. Similarly, bin Mohamed Roshdin et al. (2016) found no significant correlation between participants' knowledge and their behaviours. Furthermore, Jagadeesan et al. (2017) reported that of the 89.5% of students with good knowledge of PA, most were overweight or obese and physically inactive. According to Grasdalsmoen et al.

(2019) approximately 25% of students met the daily recommended PA criteria at age 18–20 years, and this was reduced to about 18% in students aged 29–35 years. The survey also found that there was a consistent increase in body mass index (BMI) in young adults from 2010 to 2018. The prevalence of overweight and obesity was especially noteworthy in older students aged 26-to-35 years who were physically inactive, more especially among older female students (Grasdalsmoen et al., 2019; Okop et al., 2016).

McCarthy and Warne (2022) revealed a substantial difference in gender-based PA engagement, with males engaging in higher levels of PA than females. In contrast Blake et al. (2017) reported no significant difference in participants' PA practices based on gender and academic discipline. Similarly, Ziari et al. (2017) reported no differences in respondents' PA behaviours based on gender and academic programme. In contrast, Keating et al. (2010) reported a significant difference in PA behaviour based on gender, but no significant difference in participants PA behaviours based on the years of study. In contrast, Blake et al. (2017) reported a significant difference in PA behaviours based on the year level of study. The results showed that students who were engaging in vigorous-intensity PA were more likely to also participate in moderate-intensity and light-intensity PA**.**



Comparatively speaking, men were more likely than women to engage in regular PA (Abdeta et al., 2019; McCarthy & Warne, 2022). McCarthy and Warne (2022) found a significant association between regular PA participation and gender. Similarly, bin Mohamed Roshdin et al. (2016) reported a significant association between participants gender and overall PA participation. In contrast Ramautar et al. (2021) reported that, over the years, gender roles have drastically changed and that both males and females had participated infrequently in

regular PA. It was reported that younger students were more likely to participate in regular PA compared to older students (Grasdalsmoen et al., 2019; Taha, 2008). Awotidebe et al. (2014) found no significant association between overall PA practice and age. Similarly, Ramautar et al. (2021) reported participants ages were not associated with their PA behaviour. Additionally, Abdeta et al. (2019) also reported no significant association between students ages and their PA participation. In contrast, bin Mohamed Roshdin et al. (2016) reported a significant association between age and regular PA participation.

## 2.6. University Students' Sleeping Duration and Sitting Patterns

### 2.6.1. University Students' Sleeping Duration

Sleep is essential in healing the body physically, mentally, and emotionally, and plays a role in weight control and in the recovery from burnout (Castelli et al., 2022; Lin et al., 2018; Peltzer & Pengpid, 2016). Sleep deprivation is commonly linked with poor quality of life and poor mental health (Feng et al., 2014). The recommended sleeping time for adults to reap the benefits of sleep is approximately 8 hours a day (Castelli et al., 2022; Lin et al., 2018; Peltzer & Pengpid, 2016). Physical activity is affected by sleep deprivation (Castelli et al., 2022). Peltzer and Pengpid (2016) found that most students slept for too short a duration and did not meet the recommended sleeping time for reaping the health benefits. Similarly, Feng et al. (2014) reported that 38.5% of students has insufficient sleep. Furthermore, a Saudi Arabian study found that female students had insufficient sleep duration, since they slept for less than 8 hours a day (Alzamil et al., 2019). A study reported that students spent less time sleeping, because of the increased study time and academic pressures, which negatively impacted on their quality of life (Lin et al., 2018).

Lin et al. (2018) found no significant gender differences with students sleeping duration. Similarly, Feng et al. (2014) reported no significant differences in males and females with regard to a lack of sleep. Similarly, Lin et al. (2018) reported no significant relationship between students sleep and their gender or age. Furthermore, a systematic review found that slightly more than half of the studies in the review reported no significant relationship between sleep and physical activity (Memon et al., 2021). In contrast, Alzamil et al. (2019) reported a significant positive moderate relationship between students sleep and PA participation. In addition, Alzamil et al. (2019) reported a significant relationship between insufficient sleep and poor PA participation.

Alzamil et al. (2019) reported a significant association between PA participation and sleep, in which they reported that female university students who participated in regular PA, slept for more than 8 hours a day. In contrast, Peltzer and Pengpid (2016) reported no significant association between students sleep duration and their gender, however, there was a significant association between the students sleep duration and age.



### 2.6.2. University Students' Sitting Patterns

Sedentary behavior is linked to an increased risk of cardiovascular, respiratory, metabolic, and cancer illnesses, which could result in increased mortality rates (Matusiak-Wieczorek et al., 2020). Several studies reported prolonged sitting behaviours among university students. The rise in sedentary behaviour is seen to be attributed to students spending a lot of time sitting, while studying (Okop et al., 2016). A study by Matusiak-Wieczorek et al. (2020)

reported that students spent an average time of 46 hours per week sitting, which translated into approximately 7 hours of sitting a day. Another study by Abdeta et al. (2019) reported that participants who sat less than 2 hours a day were twice as likely to engage in regular PA than their counterparts who sat for longer periods of time. In addition, Abdeta et al. (2019) reported a total of 72.8% of students sat for more than 2 hours a day. Furthermore, Alzamil et al. (2019) found that female students spent more time sitting for a longer duration than their male counterparts.

Matusiak-Wieczorek et al. (2020) reported a significant difference in students sitting behaviours based on their academic programme, and reported dietetics student spent less time sitting compared to other academic disciplines. Furthermore, Matusiak-Wieczorek et al. (2020) found no significant difference in university student sitting time and the PA participation. Muraf et al. (2018) reported no significant relationship between participants attitudes about PA and their sitting behaviour. Similarly, Felez-Nobrega et al. (2020) also reported no significant association between sitting behaviour and PA participation, and that respondents were generally quite physically active, despite their prolonged sitting patterns. However, Can and Karaca (2019) found a significant relationship between students who participated in light-intensity PA and sitting time, with the students who participated in light-intensity PA spending the majority of their time sitting compared to students who participated in moderate- and vigorous-intensity PA. Furthermore, prolonged sitting was associated with insomnia, irrespective of PA participation (Werneck et al., 2018).

## 2.7. Theoretical Framework of the Study

The Health Belief Model (HBM) is used for understanding how health behaviour can influence and prevent disease (Jones et al., 2015; Riebie et al., 2016; Taylor et al., 2006). The Health Belief Model is used to study individuals behavioural responses to health-related conditions, and states that an individual's beliefs about being susceptible to disease, and their perceptions about avoiding disease influence their actions (Jones et al., 2015; Riebie et al., 2016). Six constructs motivate individuals to change their behaviour, namely, (1) perceived susceptibility, (2) perceived severity, (3) perceived benefits, (4) perceived barriers, (5) self-efficacy, and (6) cues to action (Riebie et al., 2016).

The six constructs of the HBM suggest feasible steps for determining people's attitudes and behaviours about their health, and possible strategies for motivating individuals to change their risky behaviours, because of the health consequences (Champion & Skinner, 2008; Riebie et al., 2016). For example, the HBM can be explained in the context where individuals would: a) need to feel at risk for developing disease, because of physical inactivity (perceived susceptibility). b) that physical inactivity would negatively impact their quality of life (perceived severity), c) that beginning an exercise programme would reduce their risk of developing disease (perceived benefits), d) that the reduction in risk was worth the time and energy to commit to PA (perceived benefits outweigh perceived barriers), e) the trigger or cue was sufficiently strong to drive them to act immediately to change their risky behaviour (cue to action), and f) that they had the confidence in their ability to exercise regularly (self-efficacy) (Champion & Skinner, 2008; Riebie et al., 2016).

However, these constructs alone are not enough for an individual to start exercising or changing their risky behaviour. Most individuals also need some type of prompt (e.g., a friend/relative having a heart attack) to begin to change their negative behaviour (cue to action) (Champion & Skinner, 2008; Riebie et al., 2016).

In the context of the present study, the HBM was most suitable for understanding and intervening with populations who were motivated to be physically active, primarily for health reasons, because of the focus on health issues for driving motivation (Champion & Skinner, 2008; Riebie et al., 2016; Taylor et al., 2006). Most of the key concepts used in the HBM apply to this study.


## 2.8. Conclusion

Physical activity is crucial for maintaining overall health. Although there is much research on PA, nevertheless, research on the knowledge, perceptions, attitudes, and behaviours regarding PA, especially among health science students was still scarce. Moreover, the results from much of the existing literature was inconsistent and questionable. It is quite understandable that students in the health sciences should have a solid understanding of importance of PA participation, because they will be the future health professionals and will serve as role models for patients and clients.

# CHAPTER THREE: RESEARCH METHODS

## 3.1. Introduction

This chapter presents the context for the study design and implementation. It starts with the study setting and recruitment of participants, followed by the research procedures and statistical analysis of data and, finally, the ethics considerations of the study.

## 3.2. Research Setting and Design

This study was conducted at the University of the Western Cape (UWC) that is located in the northern suburbs of Cape Town and considered to be a cosmopolitan city in the Western Cape Province, South Africa. A quantitative, cross-sectional, and correlational design was utilized in the present study.



## 3.3. Study Population and Sampling of Participants

A total of 177 full-time undergraduate students enrolled at the University of the Western Cape, specifically in the Faculty of Community and Health Sciences (CHS), were conveniently recruited and participated in the study. This included students in their first, second, third, fourth and, where applicable, their fifth year of study. The initial plan of the study was to recruit participants to the study based on their gender, year-level, and academic discipline but, because of the COVID-19 pandemic, this was not possible.

### 3.4. Research Procedures

A five-part questionnaire based on students' sociodemographic information, knowledge, perceptions, attitudes and behaviours regarding PA (Q-KPAB) was developed by the researcher and used for data collection in the study. The questionnaire was developed from existing literature on each of the components of PA that were relevant for the study (Champion & Skinner, 2008; da Costa et al., 2019; Craig et al., 2003; Kurtze et al., 2008; Reethesh et al., 2019; Riebie et al., 2016; Taylor et al., 2006). The Q-KPAB was divided into 5 sections, wherein section one related to the participants' sociodemographic information, section two to knowledge of physical activity, section three to perceptions of physical activity, section four to attitudes about physical activity, and section five to physical activity behaviours.



### 3.5. Validity and Reliability

A critical appraisal assessment tool (CAAT) with ten domains (Specificity, Scope and focus, Responses, Clarity, Ambiguity, Language and Writing style, Organization, Question Length, Decision-making and Questionnaire Length) was used to evaluate the validity of the questionnaire on knowledge, perceptions, attitudes and behaviours regarding physical activity (Q-KPAB) (Appendix C).

The tool had 4 columns, the first contained the ten domains of CAAT, the second the category or domain that was being assessed, the third contained the statement that explained the domain, and the fourth column contained the tick boxes for the expert reviewer's responses to the questionnaire.

The reviewers indicated their responses by selecting the appropriate tick box, i.e., either 'Yes' or 'No', and when the option "No" was selected for any of the ten categories, then the reviewers had to indicate which section(s) and which question(s) in that section of the questionnaire was/were problematic, and how the question(s) could be improved.

The final score of CAAT was obtained by the number of 'Yes' ticks, where each "Yes" tick accounted for 10% of the final score, so that a total of ten "Yes" ticks accounted for a final score of 100%.

The Q-KPAB was scored using three categories and ratings. A score less than or equal to 40 percent (≤ 40%) was considered low, a score between 41-69 percent (41%-69%) was considered moderate and a score greater than or equal to 70 percent (≥ 70%) was considered high. Only a high score (≥ 70%) for the assessment tool was considered applicable for research purposes in the present study.



The Q-KPAB was reviewed by five experts in the field for face and content validity. Thereafter, the questionnaire was then tested in the field to ensure reliability, before it was used for data collection in the main study. The five reviewers gave the following final scores: (1) a hundred percent (100%), (2) ninety percent (90%), (3) ninety percent (90%), (4) seventy percent (70%) and (5) sixty percent (60%). Based on the fifth reviewer, with a final score of 60%, the comments from this reviewer were evaluated and the questionnaire corrected accordingly, until it achieved a minimum score of 70%.

### 3.5.1. Questionnaire Validation

The first draft of the Q-KPAB that was reviewed by experts in the field consisted of 88 questions. Section A consisted of 9 questions, Section B, C and D with 10 questions each and Section E with 49 questions. After the experts had reviewed the questionnaire, 25 questionnaires were changed grammatically and 2 questions were removed from the questionnaire that reduced that total number of questions in the questionnaire to 86.

| | Section A: Before<br>Sociodemographic Information | Section A: After<br>Sociodemographic Information |
|---|---|---|
| **7.** | Where do you stay or live as a student?<br><br>☐ I stay in a residence on the main campus (e.g., Coline Williams, Kovacs, etc.)<br>☐ I stay in a residence off the main campus (e.g., Disa, HPR, etc.)<br>☐ I stay in private residence. | *While you are currently studying, where do you stay/live?*<br><br>☐ *I stay in a residence on the main campus (e.g., Coline Williams, Kovacs, etc.)*<br>☐ *I stay in a residence off the main campus (e.g., Disa, HPR, etc.)*<br>☐ *I stay in private residence.* |
| **8.** | Do you have a safe environment for performing physical activity or exercise where you currently live?<br>☐ Yes<br>☐ No<br>☐ Don't know | *Removed* |
| **9.** | Do you exercise regularly (e.g., exercising 3 or more days a week)?<br>☐ Yes<br>☐ No<br>☐ Sometimes | *Removed* |



In section A of the questionnaire, three questions were corrected for improved understanding, i.e., question 7 was changed to read as follows: 'While you are currently studying, where do you stay/live', while question 8 was considered as vague, and question 9 was considered

redundant, as it was already covered in Section E of the questionnaire, therefore, both these questions were removed.

| | Section B: Before<br>Knowledge of Physical Activity (PA) | Section B: After<br>Knowledge of Physical Activity (PA) |
|---|---|---|
| **10.** | 10. How would you classify casual walking in terms of exercise-intensity?<br><br>☐ A. Light-intensity exercise<br>☐ B. Moderate-intensity exercise<br>☐ C. Vigorous-intensity exercise<br>☐ B and C only<br>☐ All of the above | *How would you classify casual (Talking and singing are both easily performed with casual walking) in terms of exercise-intensity?*<br><br>☐ *A. Light-intensity exercise*<br>☐ *B. Moderate-intensity exercise*<br>☐ *C. Vigorous-intensity exercise*<br>☐ *B and C only*<br>☐ *All of the above* |
| **18.** | 18. For improving health in all adults, the load of physical activity should be changed as follows:<br><br>☐ By increasing the exercise frequency (number of days per week)<br>☐ By increasing the exercise duration (number of minutes per session)<br>☐ By increasing the exercise intensity (number of heart beats per minute)<br>☐ By increasing all of the above | *For improving health in all adults, the load of physical activity should be changed as follows:*<br><br>☐ *By increasing the exercise frequency (number of days per week)*<br>☐ *By increasing the exercise duration (number of minutes per session)*<br>☐ *By increasing the exercise intensity (number of heart beats per minute)*<br>☐ *By increasing all of the above*<br>☐ *I don't know* |
| **19.** | 19. For improving health in all adults, how often should the load of physical activity be changed?<br><br>☐ 1 or more sessions<br>☐ 1 or more days<br>☐ 1 or more weeks<br>☐ 1 or more months | *For improving strength in healthy adults, you need to engage in:*<br><br>☐ *Swimming*<br>☐ *Weight-lifting*<br>☐ *Running*<br>☐ *Cycling*<br>☐ *Dancing* |

In section B, three questions were corrected. Question 10 was changed to read better by explaining exercise intensity using the talk test. In question 18, the statement 'I don't know'

was added as one of the possible answers for the question. Finally, question 19 on exercise progression was changed completely in order to read properly.

| Section C: Before<br>Perceptions of Physical Activity (PA) | | Section C: After<br>Perceptions of Physical Activity (PA) |
|---|---|---|
| **21.** | I lack the will power to be physically active | *Physical activity improves mental health.* |
| **22.** | Physical activity is important to me. | *Physical activity is important for my physical health.* |
| **25.** | Physical activity is necessary for all ages. | *Physical activity is recommended for all ages.* |
| **29.** | Regular physical activity builds good muscle tone and good posture. | *Regular physical activity is necessary for physical fitness.* |

In Section C, four questions were corrected. Question 21 was changed from 'I lack the will-power to be physically active' to 'Physical activity improves mental health'. Question 22 was corrected to read as follows: 'Physical activity is important for my physical health'. Both questions 21 and 22 were corrected in order to incorporate the benefits of physical activity in the different aspects of health. In question 25, the word 'necessary' was changed to 'recommended' for better understanding of the question. Question 29, however, was completely changed from 'Regular physical activity builds good muscle tone and good posture' to 'Regular physical activity is necessary for physical fitness'. While good muscle tone and good posture were considered to be some of the benefits of regular physical activity, the term 'physical fitness' incorporated these benefits and was chosen as the appropriate term to use in the question.



| Section D: Before | Section D: After |
|---|---|

| Attitudes about Physical Activity (PA) | | Attitudes about Physical Activity (PA) |
|---|---|---|
| **30.** | Being physically active is important. | *Regular physical activity is important for my overall health.* |
| **31.** | Being physically active is challenging for me. | *Regular physical activity is difficult for me.* |
| **32.** | Being physically active helps me cope with life. | *Regular physical activity helps me cope with stress.* |
| **33.** | Being physically active helps me cope with my studies. | *I find being physically active stressful.* |
| **34.** | Being physically active has always been a part of my life. | *Regular physical activity helps me balance my physical and mental well-being.* |

In Section D, the first five questions were corrected. The statements for questions 30, 31, 32 and 34 that began with the phrase, 'Being physically active…' were changed to begin with the phrase, 'Regular physical activity…' In addition, question 30 was changed to read as, 'Regular physical activity is important for my overall health' in order to highlight the importance of physical activity. For question 31, the word 'challenging' was changed to 'difficult' for better understanding of the question. For question 32 the term 'life' was changed to 'stress', thus making the final question read as, 'Regular physical activity helps me cope with stress.' Finally, question 33 was considered redundant (since it was already incorporated in question 32), and was changed from, 'Being physically active helps me cope with my studies' to 'I find being physically active stressful.' Question 34 was changed in order to incorporate some of the benefits of regular physical activity, from the original statement of 'Being physically active has always been a part of my life' to the revised statement of 'Regular physical activity helps me balance my physical and mental well-being'.



| Section E: Before<br>Behaviours regarding Physical Activity**:**<br>Occupational Work | | Section E: After<br>Behaviours regarding Physical Activity:<br>Occupational Work |
|---|---|---|
| **40.** | Does your work involve vigorous-intensity activity that causes large | *Does your work involve vigorous-intensity activity, that causes large increases in* |

| | | |
|---|---|---|
| | increases in breathing or heart rate like [carrying or lifting heavy loads, digging or construction work] for at least 10 minutes continuously? | *breathing, that make talking and singing difficult for at least 10 minutes continuously?* |
| **43.** | Does your work involve moderate-intensity activity, that causes small increases in breathing or heart rate such as brisk walking [or carrying light loads] for at least 10 minutes continuously? | *Does your work involve moderate-intensity activity, that causes small increases in breathing, that make talking easy but singing difficult for at least 10 minutes continuously?* |
| **46.** | Does your work involve light-intensity activity, that doesn't cause an increase in breathing or heart rate such as casual walking for at least 10 minutes continuously? | *Does your work involve light-intensity activity, that doesn't cause an increase in breathing that make talking and singing easy for at least 10 minutes continuously?* |
| Behaviours regarding Physical Activity**:** Travel | | Behaviours regarding Physical Activity: Travel |
| **49.** | Do you walk or cycle at a vigorous intensity (fast speed) for at least 10 minutes continuously from place to place? | *Do you walk or cycle on a vigorous intensity, that causes large increases in breathing, that make talking and singing difficulty for at least 10 minutes continuously from place to place?* |
| **52.** | Do you walk briskly or cycle on a moderate intensity (moderate speed) for at least 10 minutes continuously from place to place? | *Do you walk briskly or cycle on a moderate intensity, that causes small increases in breathing, that make talking easy but singing difficult for at least 10 minutes continuously from place to place?* |
| **55.** | Do you walk casually or cycle at a low intensity (low speed) for at least 10 minutes continuously from place to place? | *Do you walk casually or cycle on a low intensity that doesn't cause an increase in breathing, that make talking and singing easy for at least 10 minutes continuously from place to place?* |
| Behaviours regarding Physical Activity**:** Domestic Work | | Behaviours regarding Physical Activity: Domestic Work |
| **58.** | Does your domestic work involve vigorous-intensity activity that causes large increases in breathing or heart rate like [carrying or lifting heavy loads, digging or construction work] for at least 10 minutes continuously? | *Does your domestic work involve vigorous-intensity activity, that causes large increases in breathing, that make talking and singing difficult for at least 10 minutes continuously?* |
| **61.** | Does your domestic work involve moderate-intensity activity, that causes small increases in breathing or heart rate such as brisk walking [or carrying light loads] for at least 10 minutes continuously? | *Does your domestic work involve moderate-intensity activity, that causes small increases in breathing that make talking easy but singing difficulty for at least 10 minutes continuously?* |
| **64.** | Does your domestic work involve light- | *Does your domestic work involve light-intensity* |

| | | |
|---|---|---|
| | intensity activity, that doesn't cause an increase in breathing or heart rate such as casual walking for at least 10 minutes continuously? | *activity, that doesn't cause an increase in breathing that make talking and singing easy for at least 10 minutes continuously?* |
| Behaviours regarding Physical Activity**:** Recreational Activities | | Behaviours regarding Physical Activity: Recreational Activities |
| **67.** | Do you do any vigorous-intensity sports, fitness or recreational (leisure) activities that cause large increases in breathing or heart rate like [running or football] for at least 10 minutes continuously? | *Do you do any vigorous-intensity sports, fitness or recreational (leisure) activities, that cause large increases in breathing, that make talking and singing difficult for at least 10 minutes continuously?* |
| **70.** | Do you do any moderate-intensity sports, fitness or recreational (leisure) activities that cause a small increase in breathing or heart rate such as brisk walking, [cycling, swimming, volleyball] for at least 10 minutes continuously? | *Do you do any moderate-intensity sports, fitness or recreational (leisure) activities, that cause a small increase in breathing, that make talking easy but singing difficult for at least 10 minutes continuously?* |
| **73.** | Do you do any light-intensity sports, fitness or recreational (leisure) activities that doesn't cause an increase in breathing or heart rate such as casual walking, for at least 10 minutes continuously? | *Do you do any light-intensity sports, fitness or recreational (leisure) activities, that doesn't cause an increase in breathing, that make talking and singing easy for at least 10 minutes continuously?* |



In Section E, 12 questions were corrected for better understanding of exercise-intensity using the talk test. For example, question 40 was changed from, 'Does your work involve vigorous-intensity activity that causes large increases in breathing or heart rate like [carrying or lifting heavy loads, digging or construction work] for at least 10 minutes continuously' to read as follows, 'Does your work involve vigorous-intensity activity that causes large increases in breathing and make talking and singing difficult for at least 10 minutes continuously.' The talk test was incorporated to questions 40, 43, 46, 49, 52, 55, 58, 61, 64, 67, 70, and 73.

When all the changes were made to the questionnaire, the final questionnaire consisted of 86 questions in total. Furthermore, in section E the questionnaire was rearranged from the

sequence ‘occupational work, travel, recreational work, domestic work’ to ‘occupational work, travel, domestic work, recreational work’.

Occupational work is what a student does for their profession. It also includes academic studies and clinical or practical work.

Travel PA is defined as cycling or walking from one location to another, as opposed to stationary cycling, such as in a gym, or cycling as part of a sporting/exercise programme.

Recreational work or PA includes activities performed for the purpose of enjoyment, such as walking, playing indoor or outdoor games, swimming, dancing etc.


Domestic work or PA includes activities of daily living, such as cleaning, washing, ironing, gardening, personal hygiene, cooking, cleaning, domestic chores, laundry, gardening, reading, studying, computer games and mobile devices, etc.

### 3.5.2. Questionnaire Reliability

The Q-KPAB was pilot-tested for reliability and validity by administering the questionnaire twice to 20 students conveniently selected from the University of the Western Cape, who did not participate in the main study, with at least a 2-week break between each test. Based on the feedback from the participants in the pilot-test, the final adjustments were made to the questionnaire to ensure completeness. The Cronbach’s alpha coefficient was calculated to

assess the reliability (internal consistency) of the Q-KPAB. The test-retest coefficient for knowledge of PA was 0.735, while the Cronbach's alpha coefficient for perceptions and attitudes was 0.796 and 0.939, respectively. The behaviour section of the questionnaire was based on a previously validated questionnaire on PA behaviours, and was calculated using median minutes per week.

### 3.5.3. Procedures for Administering the Questionnaire

Participants were informed about the research study via email through the UWC Communication and the CHS faculty. In addition, the researcher also sent regular emails to the respective CHS departments to inform potential participants about the study. The emails sent to potential participants consisted of a Google form, where participants had an opportunity to read about the study and gave consent by clicking the box "I give my consent to participate in the study", before the questionnaire was administered through google forms. The researcher was available throughout the data collection period to clarify any questions via email and through telephone calls.



### 3.6. Statistical Analysis

All data was captured by double-entry into a Microsoft Office Excel spreadsheet, and then cleaned of errors. Thereafter, it was exported to the Statistical Package for the Social Sciences (SPSS) version 28.0 (Armonk, NY: IBM Corp) for data analysis. All electronic back-up copies of the data were stored on computer, against password protected files, with access controlled by the researcher. Each participant was allocated a code to protect their identity, when collecting and capturing the data onto the spread sheets (Microsoft Excel and SPSS). The data was checked for normality using a Shapiro-Wilks test. Descriptive statistical

analysis (mean, standard deviation and frequencies), and inferential statistical analysis (Spearman's correlation coefficient, Pearson's Chi-square test and Kruskal-Wallis H) were generated. The Kruskal-Wallis H test was used to determine statistically significant differences between continuous variables. The Dunn's test was applied post hoc and adjusted p-values were reported at a significance level of $p < 0.05$. The Chi-square test was used to determine the statistical association between categorical variables, age-group and gender with knowledge, perceptions, attitudes and PA behaviours. Spearman's correlation coefficient was used to assess for statistically significant correlations between continuous variables (Knowledge, Perceptions, Attitudes, Vigorous-intensity PA, Moderate-intensity PA, Light-intensity PA, sleep and sitting), with the strength of all correlations reported using Akoglu (2018). A p value of less than 0.05 was used to indicate statistical significance for all statistical tests.


### 3.7. Ethics Considerations

Ethics clearance was obtained from the Humanities and Social Sciences Research Ethics Committee (HSSREC) at the University of the Western Cape. Permission was requested from the Registrar of the University of the Western Cape and the departmental chairpersons to conduct the research within the various departments in the CHS faculty. Participants were informed through a google form about the study, including the risks and benefits of the study (Appendix A). Consent was obtained by participants clicking the box "I give my consent to participate in the study", before they could participate in the study. Participation in the study was voluntary, and participants were informed that they could decline or withdraw from the study at any point, without any negative consequences or penalties. The participant's anonymity was ensured by using alpha-numeric codes on all data forms. All research data is

kept in a zipped file on a password-protected computer in the university repository, and all hand-written data is stored safely in a locked cupboard with the supervisor, and will be kept as such for at least five years before being destroyed. Should the results of the study be published in an academic journal and/or presented at an academic conference, the participants' anonymity will always be assured.

# CHAPTER FOUR: RESULTS

## 4.1. Introduction

This chapter presents the results of the data analysis, and the interpretation of the results. In this study, a total of 177 undergraduate students with a mean age of 21.06 (SD = ±2.62) years participated from various departments within the CHS faculty. The student numbers were fairly balanced in terms of gender, with a total of 50.85% (n = 90) being male, 48.02% (n = 85) being female, and 1.13% (n = 2) represented other (i.e., undisclosed gender status). When all participants were separated into age-group categories, the age-group 18-20 years had the highest number of participants and represented 51.98% (n = 92) of the participants in the study, the age-group 21-23 years had 35.03% (n = 62), the age-group 24-26 years had 10.17% (n = 18), and the age-group aged 27 years and older had the lowest number of participants with 2.82% (n = 5). Most of the students spoke English as their home language (54.24%; n = 96). The majority of the undergraduate students were single (94.35%; n = 167), and were in the second and third year-levels (36.16% and 34.46%; n = 64 and n = 61, respectively). Most of the students were from the Department of Sport, Recreation and Exercise Science (SRES) and made up 78.53% (n = 139) of the participants in the study. The majority of the participants lived at home while undertaking their studies at university and made up 59.89% (n = 106) of the participants in the study.



## 4.2. University Students' Knowledge of Physical Activity

The knowledge of students was assessed using a scale whereby students who scored between 0-33% were classified to have "poor" knowledge regarding PA, students who scored between 34-66% were classified to have "fair" knowledge regarding PA and students who scored between 67-100% were classified to have "good" knowledge regarding PA. A total of

16.38% (n = 29) of the students had a poor knowledge of PA, while 67.23% (n = 119) and 16.38% (n = 29) had a fair knowledge and a good knowledge of PA, respectively. Among the female students, 21.18% had a poor knowledge of PA, while 62.35% and 16.47% had a fair knowledge and a good knowledge of PA, respectively. Among the male students, a total 12.22% had a poor knowledge of PA, while 71.11% and 16.67% had a fair knowledge and a good knowledge of PA, respectively. Among the students who represented other on the basis of gender, 100% had a fair knowledge of PA.

### 4.3. University Students' Perceptions of Physical Activity

The perception of students was assessed using a scale whereby students who scored between 0-33% were classified to have "poor" perceptions regarding PA, students who scored between 34-66% were classified to have "fair" perceptions regarding PA and students who scored between 67-100% were classified to have "good" perceptions regarding PA.

A total of 1.69% (n = 3) students had a fair perception of PA and 98.31% (n = 174) had a good perception of PA. Among the female students, 3.53% had a fair perception of PA, while 96.47% had a good perception of PA. Among the male students, 100% had a good perception of PA, and among the students who represented other, 100% also had a good perception of PA.



### 4.4. University Students' Attitudes About Physical Activity

The attitude of students was assessed using a scale whereby students who scored between 0-33% were classified to have a "poor" attitude regarding PA, students who scored between 34-

66% were classified to have a “fair” attitude regarding PA and students who scored between 67-100% were classified to have a “good” attitude regarding PA.

A total of 5.08% (n = 9) students had a fair attitude about PA, and 94.92% (n = 168) had a good attitude about PA. Among the female students, 9.41% had a fair attitude about PA, while 90.59% had a good attitude about PA. Among the male students, a total 1.11% had a fair attitude about PA, while 98.89 had a good attitude about PA. Among the students who represented other, 100% had a good attitude about PA.

Table 4.1: Knowledge, perceptions and attitudes of students regarding PA according to sociodemographic characteristics.

| | | Knowledge | | | | | | Perceptions | | | | Attitudes | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Poor | | Fair | | Good | | Fair | | Good | | Fair | | Good | |
| *Variables* | | *n* | *%* | *n* | *%* | *n* | *%* | *n* | *%* | *n* | *%* | *n* | *%* | *n* | *%* |
| **Number of students** | Total | 29 | 16.38 | 119 | 67.23 | 29 | 16.38 | 3 | 1.69 | 174 | 98.31 | 9 | 5.08 | 168 | 94.92 |
| **Gender** | Female | 18 | 21.18 | 53 | 62.35 | 14 | 16.47 | 3 | 3.53 | 82 | 96.47 | 8 | 9.41 | 77 | 90.59 |
| | Male | 11 | 12.22 | 64 | 71.11 | 15 | 16.67 | 0 | 0.00 | 90 | 100.00 | 1 | 1.11 | 89 | 98.89 |
| | Other | 0 | 0.00 | 2 | 100.00 | 0 | 0.00 | 0 | 0.00 | 2 | 100.00 | 0 | 0.00 | 2 | 100.00 |
| **Age-group (years)** | 18-20 | 15 | 16.30 | 64 | 69.57 | 13 | 14.13 | 2 | 2.17 | 90 | 97.83 | 6 | 6.52 | 86 | 93.48 |
| | 21-23 | 9 | 14.52 | 40 | 64.52 | 13 | 20.97 | 0 | 0.00 | 62 | 100.00 | 2 | 3.23 | 60 | 96.77 |
| | 24-26 | 3 | 16.67 | 13 | 72.22 | 2 | 11.11 | 0 | 0.00 | 18 | 100.00 | 1 | 5.56 | 17 | 94.44 |
| | ≥27 | 2 | 40.00 | 2 | 40.00 | 1 | 20.00 | 1 | 20.00 | 4 | 80.00 | 0 | 0.00 | 5 | 100.00 |
| **Home language** | IsiZulu | 2 | 14.29 | 10 | 71.43 | 2 | 14.29 | 0 | 0.00 | 14 | 100.00 | 2 | 14.29 | 12 | 85.71 |
| | IsiXhosa | 9 | 28.13 | 20 | 62.50 | 3 | 9.38 | 1 | 3.13 | 31 | 96.88 | 2 | 6.25 | 30 | 93.75 |
| | Afrikaans | 2 | 11.11 | 12 | 66.67 | 4 | 22.22 | 1 | 5.56 | 17 | 94.44 | 1 | 5.56 | 17 | 94.44 |
| | English | 11 | 11.46 | 66 | 68.75 | 19 | 19.79 | 1 | 1.04 | 95 | 98.96 | 4 | 4.17 | 92 | 95.83 |
| | Sesotho | 1 | 25.00 | 2 | 50.00 | 1 | 25.00 | 0 | 0.00 | 4 | 100.00 | 0 | 0.00 | 4 | 100.00 |
| | Setswana | 0 | 0.00 | 4 | 100.00 | 0 | 0.00 | 0 | 0.00 | 4 | 100.00 | 0 | 0.00 | 4 | 100.00 |
| | SiSwati | 1 | 50.00 | 1 | 50.00 | 0 | 0.00 | 0 | 0.00 | 2 | 100.00 | 0 | 0.00 | 2 | 100.00 |
| | Sepedi | 1 | 20.00 | 4 | 80.00 | 0 | 0.00 | 0 | 0.00 | 5 | 100.00 | 0 | 0.00 | 5 | 100.00 |
| | Xitsonga | 1 | 100.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 100.00 | 0 | 0.00 | 1 | 100.00 |
| | Other | 1 | 100.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 100.00 | 0 | 0.00 | 1 | 100.00 |
| **Marital status** | Single | 26 | 15.57 | 112 | 67.07 | 29 | 17.37 | 3 | 1.80 | 164 | 98.20 | 9 | 5.39 | 158 | 94.61 |
| | Cohabiting | 1 | 20.00 | 4 | 80.00 | 0 | 0.00 | 0 | 0.00 | 5 | 100.00 | 0 | 0.00 | 5 | 100.00 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Married | 2 | 40.00 | 3 | 60.00 | 0 | 0.00 | 0 | 0.00 | 5 | 100.00 | 0 | 0.00 | 5 | 100.00 |
| **Year level** | 1st year | 10 | 26.32 | 23 | 60.53 | 5 | 13.16 | 1 | 2.63 | 37 | 97.37 | 3 | 7.89 | 35 | 92.11 |
| | 2nd year | 10 | 15.63 | 46 | 71.88 | 8 | 12.50 | 1 | 1.56 | 63 | 98.44 | 3 | 4.69 | 61 | 95.31 |
| | 3rd year | 8 | 13.11 | 39 | 63.93 | 14 | 22.95 | 1 | 1.64 | 60 | 98.36 | 3 | 4.92 | 58 | 95.08 |
| | 4th year | 1 | 8.33 | 10 | 83.33 | 1 | 8.33 | 0 | 0.00 | 12 | 100.00 | 0 | 0.00 | 12 | 100.00 |
| | 5th year | 0 | 0.00 | 1 | 50.00 | 1 | 50.00 | 0 | 0.00 | 2 | 100.00 | 0 | 0.00 | 2 | 100.00 |
| **Academic programme** | DN | 0 | 0.00 | 2 | 40.00 | 3 | 60.00 | 0 | 0.00 | 5 | 100.00 | 0 | 0.00 | 5 | 100.00 |
| | OT | 2 | 22.22 | 6 | 66.67 | 1 | 11.11 | 0 | 0.00 | 9 | 100.00 | 0 | 0.00 | 9 | 100.00 |
| | PT | 1 | 20.00 | 4 | 80.00 | 0 | 0.00 | 0 | 0.00 | 5 | 100.00 | 0 | 0.00 | 5 | 100.00 |
| | Psych | 0 | 0.00 | 1 | 100.00 | 0 | 0.00 | 0 | 0.00 | 1 | 100.00 | 0 | 0.00 | 1 | 100.00 |
| | SW | 4 | 36.36 | 7 | 63.64 | 0 | 0.00 | 0 | 0.00 | 11 | 100.00 | 1 | 9.09 | 10 | 90.91 |
| | SRES | 21 | 15.11 | 94 | 67.63 | 24 | 17.27 | 2 | 1.44 | 137 | 98.56 | 6 | 4.32 | 133 | 95.68 |
| | NM | 1 | 100.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 1 | 100.00 | 0 | 0.00 | 1 | 100.00 |
| | SN | 0 | 0.00 | 5 | 83.33 | 1 | 16.67 | 1 | 16.67 | 5 | 83.33 | 2 | 33.33 | 4 | 66.67 |
| **Place of residence** | Hostel residence on main campus | 7 | 21.88 | 18 | 56.25 | 7 | 21.88 | 0 | 0.00 | 32 | 100.00 | 0 | 0.00 | 32 | 100.00 |
| | Hostel residence off main campus | 0 | 0.00 | 6 | 100.00 | 0 | 0.00 | 0 | 0.00 | 6 | 100.00 | 1 | 16.67 | 5 | 83.33 |
| | Private residence | 7 | 21.21 | 22 | 66.67 | 4 | 12.12 | 2 | 6.06 | 31 | 93.94 | 2 | 6.06 | 31 | 93.94 |
| | Home residence | 15 | 14.15 | 73 | 68.87 | 18 | 16.98 | 1 | 0.94 | 105 | 99.06 | 6 | 5.66 | 100 | 94.34 |

**Note**: n = number of students; DN - Department of Dietetics and Nutrition; OT - Department of Occupational Therapy; PT - Department of Physiotherapy; Psych - Department of Psychology; SW - Department of Social Work; SRES - Department of Sport, Recreation and Exercise Science; NM - School of Natural Medicine; SN - School of Nursing.

Figure 4.1 displays the students' knowledge on the ten questions regarding PA that was based on how well they understood the FITT-P (frequency, intensity, time, type and progression) principle for developing health and physical fitness in sedentary adults. A total of 86.44% of students were able to correctly classify casual walking as light-intensity PA. Only 22.60% of students were able to choose the correct exercise intensities that resulted in improved health for sedentary adults. A total of 35.59% of students knew that the minimum amount of moderate-intensity PA should add up to 150 minutes per week. Only 19.77% of students identified 10 000 steps as the minimum number of steps per day for producing health benefits. Only 33.90% of students knew the minimum number of days of exercise per week for strength training for developing health and fitness. A total of 40.11% of students knew the minimum number of days of exercise for undertaking flexibility training for developing health and fitness. The majority of students (75.14%) were able to identify yoga and dancing as indoor physical activities for developing health. A total of 83.62% students knew the correct cardiovascular, flexibility, muscular strength and muscular endurance activities required for achieving health benefits. Only 46.89% of students knew that for improving health in sedentary adults, the training load of PA could be increased through changing the frequency, duration and/or exercise intensity. A total of 68.36% of students were able to classify weight-lifting as a type of strength training exercise for developing health and fitness.

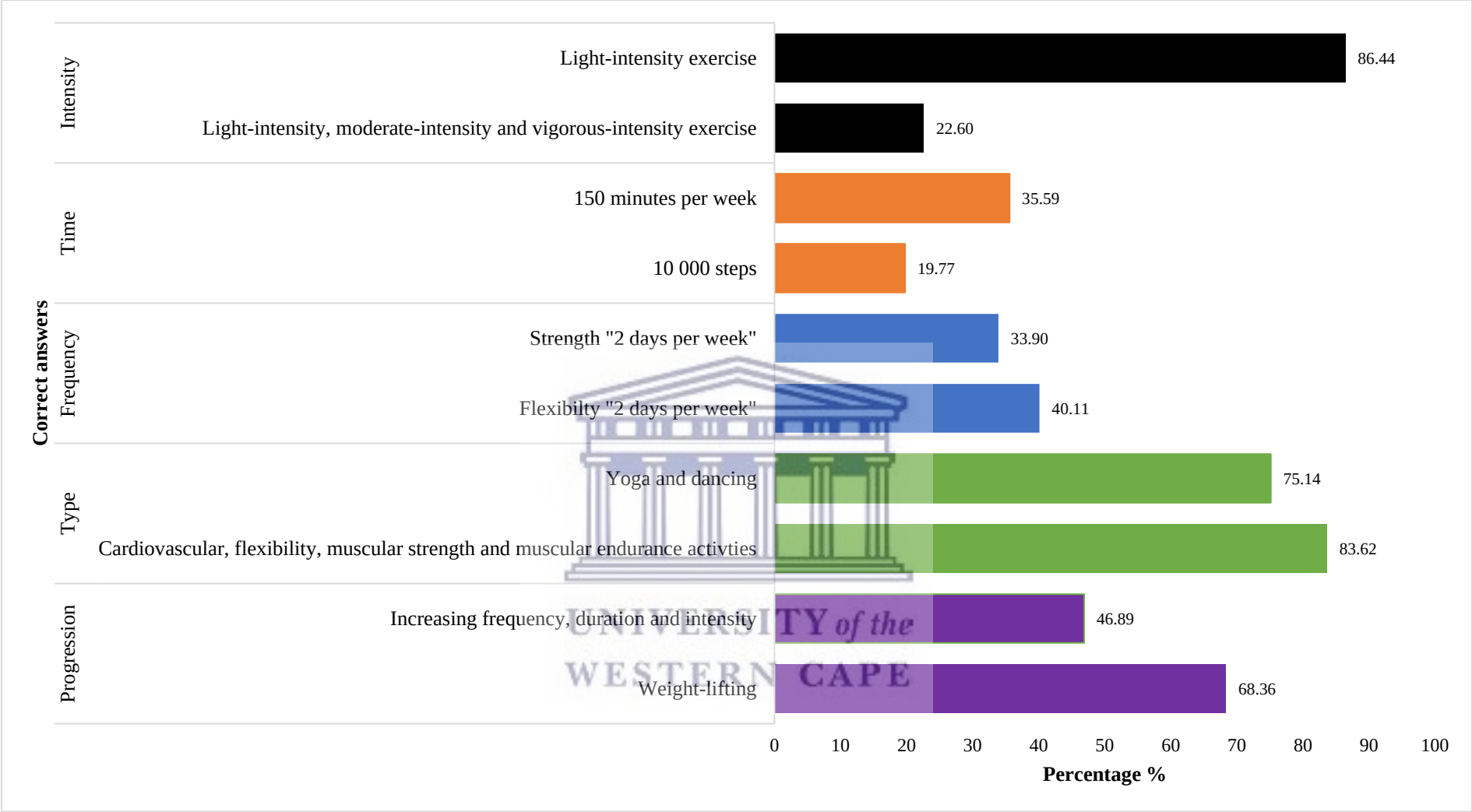



Figure 4.1: Students' knowledge of physical activity based on the FITT-P (frequency, intensity, time, type and progression) principle.

Figure 4.2 displays the students' perceptions on the ten questions regarding PA. A total of 70.62% and 28.25% of students strongly agreed or agreed, respectively, with the statement that "Regular physical activity is necessary for physical fitness". A total of 53.67% and 41.81% of students strongly agreed or agreed, respectively, with the statement that "Regular physical activity helps me to function better in my activities of daily living". A total of 12.99% and 44.63% of students strongly agreed or agreed, respectively, with the statement that "My academic studies prevent me from being physically active". A total of 22.60% and 41.24% of students strongly agreed or agreed, respectively with the statement that "Engaging in regular physical activity is expensive". A total of 64.51% and 34.46% of students strongly agreed or agreed, respectively, with the statement that "Physical activity is recommended for all ages". A total of 37.85% and 49.15% of students strongly agreed or agreed, respectively, with the statement that "Physical activity is necessary for preventing disease". A total of 45.20% and 32.20% of students strongly agreed or agreed, respectively, with the statement that "Physical activity is boring". A total of 79.66% and 19.77% of students strongly agreed or agreed, respectively, with the statement that "Physical activity is important for my physical health". A total of 77.40% and 22.60% of students strongly agreed or agreed, respectively, with the statement that "Physical activity improves mental health". A total of 60.45% and 32.20% of students strongly agreed or agreed, respectively, with the statement that "I like physical activity".

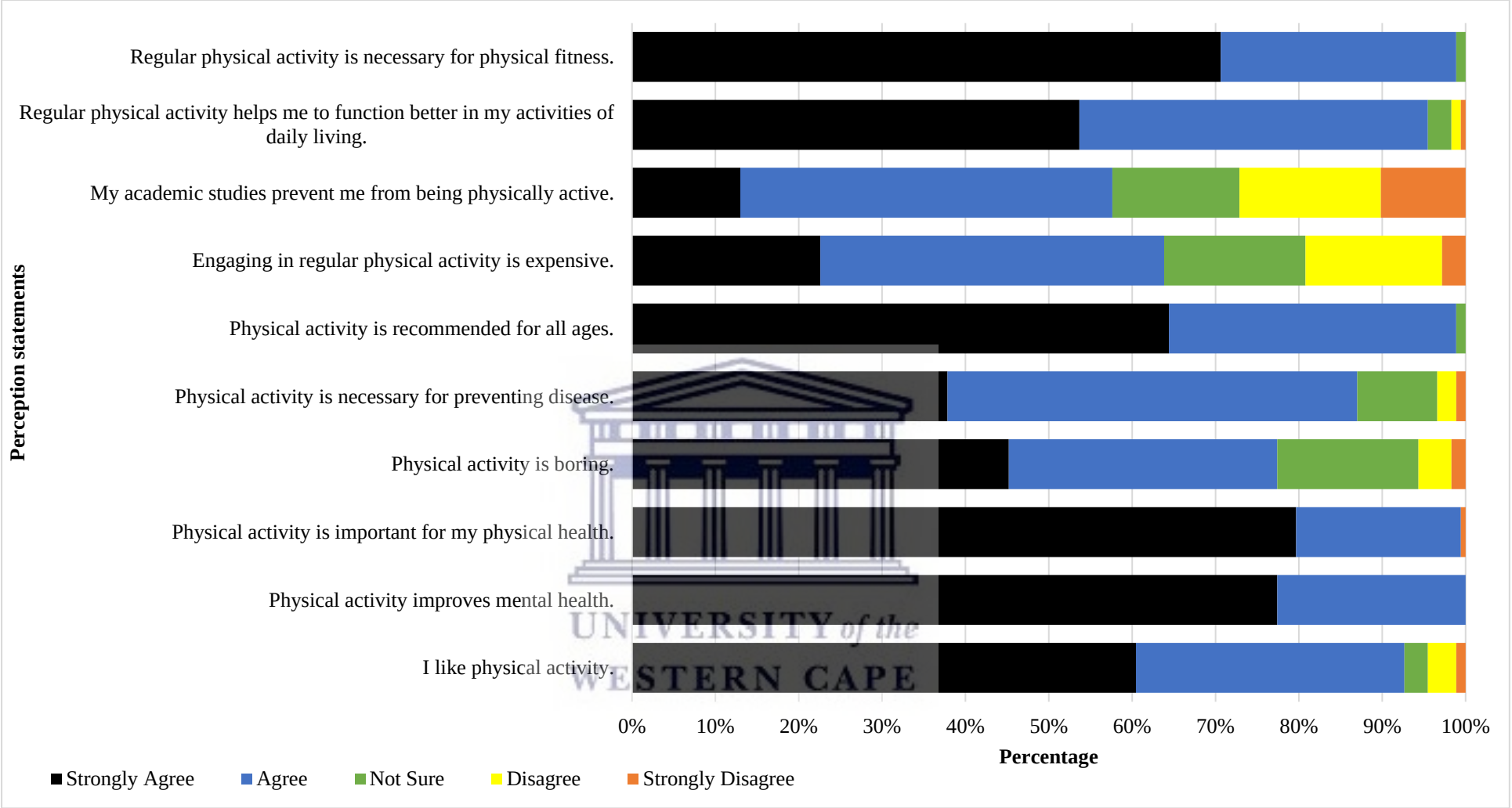



Figure 4.2: Students' perceptions of physical activity.

Figure 4.3 displays the attitudes of students for the ten questions about PA. A total of 51.41% and 33.90% of students strongly agreed or agreed, respectively, with the statement that "I encourage others to be physically active". A total of 40.11% and 36.16% of students strongly agreed or agreed, respectively, with the statement that "I am motivated to be physically active". A total of 46.33% and 41.81% of students strongly agreed or agreed, respectively, with the statement that "I try my best to engage in physical activities". A total of 59.32% and 32.20% of students strongly agreed or agreed, respectively, with the statement that "I enjoy being physically active". A total of 62.71% and 33.33% of students strongly agreed or agreed, respectively, with the statement that "I feel good about myself when I am physically active". A total of 47.46% and 45.20% of students strongly agreed or agreed, respectively, with the statement that "Regular physical activity helps me to balance my physical and mental well-being". A total of 46.89% and 37.29% of students strongly agreed or agreed, respectively, with the statement that "I find being physically active stressful". A total of 48.59% and 38.98% of students strongly agreed or agreed, respectively, with the statement that "Regular physical activity helps me cope with stress". A total of 42.94% and 24.86% of students strongly agreed or agreed, respectively, with the statement that "Regular physical activity is difficult for me". A total of 68.36% and 31.07% of students strongly agreed or agreed, respectively, with the statement that "Regular physical activity is important for my overall health".

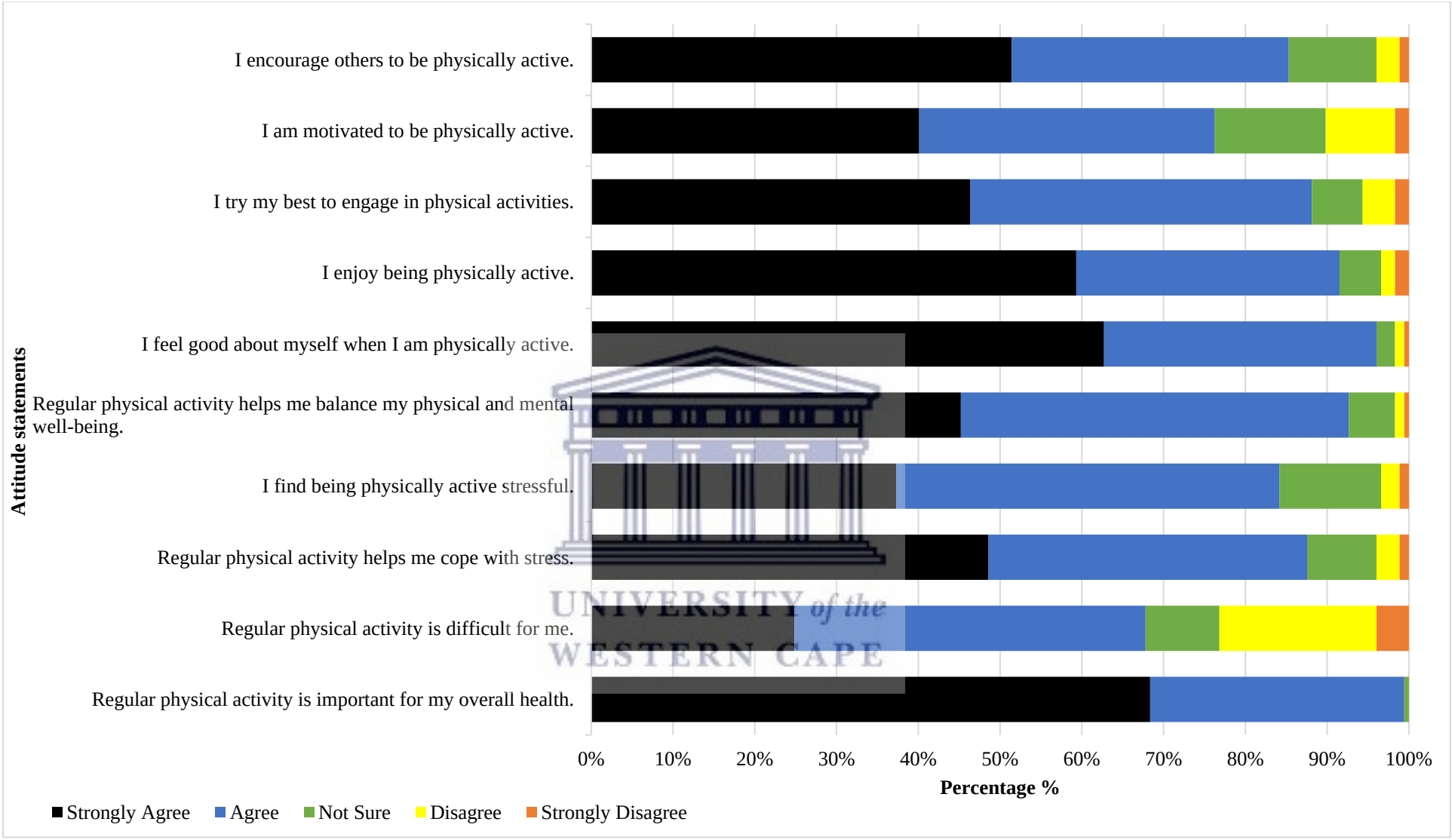





Figure 4.3: Students' attitudes about physical activity.

Table 4.2 shows the PA behaviours of students based on median and IQR. Students spent 64.17 minutes per day doing vigorous-intensity PA for a frequency of 3.50 days per week. They spent 45.00 minutes per day doing moderate-intensity PA for a frequency of 3.00 days per week. They spent 50.00 minutes per day doing light-intensity PA for a frequency of 3.67 days per week.

Table 4.2: Physical activity behaviours of students according to the median and IQR.

| PA activities | Median | IQR |
|---|---|---|
| Vigorous-intensity PA (minutes per day) | 64.17 | 45.00 |
| Frequency of vigorous-intensity PA (days per week) | 3.50 | 2.00 |
| Moderate-intensity PA (minutes per day) | 45.00 | 40.00 |
| Frequency of moderate-intensity PA (days per week) | 3.00 | 1.56 |
| Light-intensity PA (minutes per day) | 50.00 | 40.83 |
| Frequency of light-intensity PA (days per week) | 3.67 | 2.00 |

**Note:** IQR-inter-quartile range



### 4.5. University Students' Behaviours Regarding Physical Activity

#### 4.5.1. Physical Activity Related to Occupational Work

With regard to occupational work of vigorous-intensity, a total of 23.16% (n = 41) of students reported that they fell into this category of PA behaviour. From this total of students, 36.59% (n = 15) were females and 63.41% (n = 26) were males. Students aged 18-20 years represented 53.66% (n = 22) of this sample, while 31.71% (n = 13) of this sample were aged 21-23 years.

For occupational work of moderate-intensity, a total of 37.29% (n = 66) of students reported that they fell into this category of PA behaviour. Among this sample of students, 48.48% (n =

32) were females and 51.52% (n = 34) were males. Students aged 18-20 years represented 51.52% (n = 34) of this sample, while 31.82% (n = 21) of this sample were aged 21-23 years.

For occupational work of light-intensity, a total of 68.93% (n = 122) of students reported that they fell into this category of PA behaviour. Among this sample of students, 49.18% (n = 60) were females and 49.18% (n = 60) were males. Students aged 18-20 years represented 50.00% (n = 61) of this sample, and 36.07% (n = 44) of this sample were aged 21-23 years.

### 4.5.2. Physical Activity Related to Travel

With regard to travel-related PA of vigorous-intensity, a total of 32.77% (n = 58) of students reported that they fell into this category of PA behaviour. From this sample of students, 36.21% (n = 21) and 63.79% (n = 37) were females and males, respectively. Students aged 18-20 years represented 50.00% (n = 29) of this sample, while 37.93% (n = 22) of this sample was aged 21-23 years.



For travel-related PA of moderate-intensity, a total of 37.85% (n = 67) of students reported that they fell into this category of PA behaviour. From this sample of students, 56.72% (n = 38) and 43.28% (n =29) were females and males, respectively. Students aged 18-20 years represented 50.75% (n = 34) of this sample, while 34.33% (n = 23) of this sample was aged 21-22 years.

For travel-related PA of light-intensity, a total of 62.15% (n = 110) of students reported that they fell into this category of PA behaviour. From this sample of students, 51.82% (n = 57)

were females, while 47.27% (n = 52) were males. Students aged 18-20 years represented 56.36% (n = 62) of this sample, while 31.82% (n = 35) of the sample were aged 21-23 years.

### 4.5.3. Physical Activity Related to Domestic Work

With regard to domestic work of vigorous-intensity, a total of 16.95% (n = 30) of students reported that they fell into this category of PA behaviour. From this sample of students, 36.67% (n = 11) and 63.33% (n = 19) were females and males, respectively. Students aged 18-20 years and 21-23 years represented 40.00% (n = 12) and 33.33% (n = 10) of this sample, respectively.

For domestic work of moderate-intensity, a total of 27.12% (n = 48) of students reported that they fell into this category of PA behaviour. From this sample of students, 54.17% (n = 26) and 45.83% (n = 22) were females and males, respectively. Students aged 18-20 years were 47.92% (n = 23) of this sample, while 33.33% (n = 16) of this sample was aged 21-23 years.



For domestic work of light-intensity, a total of 64.41% (n = 114) of students reported that they fell into this category of PA behaviour. From this sample of students, 53.51% (n = 61) were females, while 45.61% (n = 52) were males. Students aged 18-20 years and 21-23 years represented 47.37% (n = 54) and 37.72% (n = 43) of the sample, respectively.

### 4.5.4. Physical Activity Related to Recreation

With regard to recreational PA of vigorous-intensity, a total of 74.58% (n = 132) of students reported that they fell into this category of PA behaviour. From this sample of students,

37.12% (n = 49) were females and 61.36% (n = 81) were males. Students aged 18-20 years represented 52.27% (n = 69) of this sample, and 36.36% (n = 48) were aged 21-23 years.

For recreational PA of moderate-intensity, a total of 67.80% (n = 120) of students reported that they fell into this category of PA behaviour. From this sample of students, 44.17% (n = 53) were females and 54.17% (n = 65) were males. Students aged 18-20 years represented 54.17% (n = 65) of this sample, and 36.66% (n = 44) were aged 21-23 years.

For recreational PA of light-intensity, a total of 45.20% (n = 80) of students reported that they fell into this category of PA behaviour. From this sample of students, 51.25% (n = 41) were females and 47.50% (n = 38) were males. Students aged 18-20 years represented 55.00% (n = 44) of this sample, and 31.25% (n = 25) were aged 21-23 years.



Table 4.3: Physical activity behaviours of students related to occupational work, travel, domestic work and recreation.

| Variables | n | Median | IQR |
|---|---|---|---|
| Vigorous-intensity PA related to occupation | 41 | 70.00 | 63.75 |
| Moderate-intensity PA related to occupation | 66 | 60.00 | 71.25 |
| Light-intensity PA related to occupation | 122 | 60.00 | 90.00 |
| Vigorous-intensity PA related to travel | 58 | 32.50 | 40.00 |
| Moderate-intensity PA related to travel | 67 | 30.00 | 25.00 |
| Light-intensity PA related to travel | 110 | 30.00 | 40.00 |
| Vigorous-intensity PA related to domestic work | 30 | 45.00 | 70.00 |
| Moderate-intensity PA related to domestic work | 48 | 42.50 | 30.00 |
| Light-intensity PA related to domestic work | 114 | 45.00 | 35.63 |
| Vigorous-intensity PA related to recreation | 132 | 80.00 | 73.75 |
| Moderate-intensity PA related to recreation | 120 | 60.00 | 41.25 |
| Light-intensity PA related to recreation | 81 | 45.00 | 30.00 |

**Note:** n-total number of students, IQR-inter-quartile range

Table 4.4 shows the PA behaviours of students related to occupational work, travel, domestic work and recreational work according to the students' gender and age. The PA behaviors of students are composed of different exercise intensities for each component.

Table 4.4: Physical activity behaviours of students related to occupational work, travel, domestic work and recreation according to the students' gender and age.

| | | | Gender | | | | | | Age-group (years) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total | | Female | | Male | | Other | | 18-20 | | 21-23 | | 24-26 | | ≥27 | |
| | *n* | % | *n* | % | *n* | % | *n* | % | *n* | % | *n* | % | *n* | % | *n* | % |
| **OV** | 41 | 23.16 | 15 | 36.59 | 26 | 63.41 | 0 | 0.00 | 22 | 53.66 | 13 | 31.71 | 5 | 12.20 | 1 | 2.44 |
| **OM** | 66 | 37.29 | 32 | 48.48 | 34 | 51.52 | 0 | 0.00 | 34 | 51.52 | 21 | 31.82 | 9 | 13.64 | 2 | 3.03 |
| **OL** | 122 | 68.93 | 60 | 49.18 | 60 | 49.18 | 2 | 1.64 | 61 | 50.00 | 44 | 36.07 | 13 | 10.66 | 4 | 3.28 |
| **TV** | 58 | 32.77 | 21 | 36.21 | 37 | 63.79 | 0 | 0.00 | 29 | 50.00 | 22 | 37.93 | 5 | 8.62 | 2 | 3.45 |
| **TM** | 67 | 37.85 | 38 | 56.72 | 29 | 43.28 | 0 | 0.00 | 34 | 50.75 | 23 | 34.33 | 8 | 11.94 | 2 | 2.99 |
| **TL** | 110 | 62.15 | 57 | 51.82 | 52 | 47.27 | 1 | 0.91 | 62 | 56.36 | 35 | 31.82 | 11 | 10.00 | 2 | 1.82 |
| **DV** | 30 | 16.95 | 11 | 36.67 | 19 | 63.33 | 0 | 0.00 | 12 | 40.00 | 10 | 33.33 | 6 | 20.00 | 2 | 6.67 |
| **DM** | 48 | 27.12 | 26 | 54.17 | 22 | 45.83 | 0 | 0.00 | 23 | 47.92 | 16 | 33.33 | 7 | 14.58 | 2 | 4.17 |
| **DL** | 114 | 64.41 | 61 | 53.51 | 52 | 45.61 | 1 | 0.88 | 54 | 47.37 | 43 | 37.72 | 14 | 12.28 | 3 | 2.63 |
| **RV** | 132 | 74.58 | 49 | 37.12 | 81 | 61.36 | 2 | 1.52 | 69 | 52.27 | 48 | 36.36 | 13 | 9.85 | 2 | 1.52 |
| **RM** | 120 | 67.80 | 53 | 44.17 | 65 | 54.17 | 2 | 1.67 | 65 | 54.17 | 44 | 36.66 | 8 | 6.67 | 3 | 2.50 |
| **RL** | 80 | 45.20 | 41 | 51.25 | 38 | 47.50 | 1 | 1.25 | 44 | 55.00 | 25 | 31.25 | 8 | 10.00 | 3 | 3.75 |

**Note:** n = number of students; OW-Occupational work; OV - occupational physical activity of vigorous-intensity; OM - occupational physical activity of moderate-intensity; OL-occupational physical activity of light-intensity; TV - travel-related physical activity of vigorous-intensity; TM – travel-related physical activity of moderate-intensity; TL – travel-related physical activity of light-intensity; DW - physical activity related to domestic work; DV - domestic physical activity of vigorous-intensity; DM - domestic physical activity of moderate-intensity; DL - domestic physical activity of light-intensity; RV – recreational physical activity of vigorous-intensity; RM – recreational physical activity of moderate-intensity; RL – recreational physical activity of light-intensity.

Figure 4.4 shows the sleep and total sitting patterns of the students. All students with a total of 100% (n=177) spent time sleeping. The students slept for a mean of 356.05 (SD = ±171.03) minutes per day, which is approximately 5 hours and 57 minutes. A total of 95.48% (169) students spent time sitting every week. The students spent time sitting for 477.49 minutes per day (7 hours and 57 minutes).

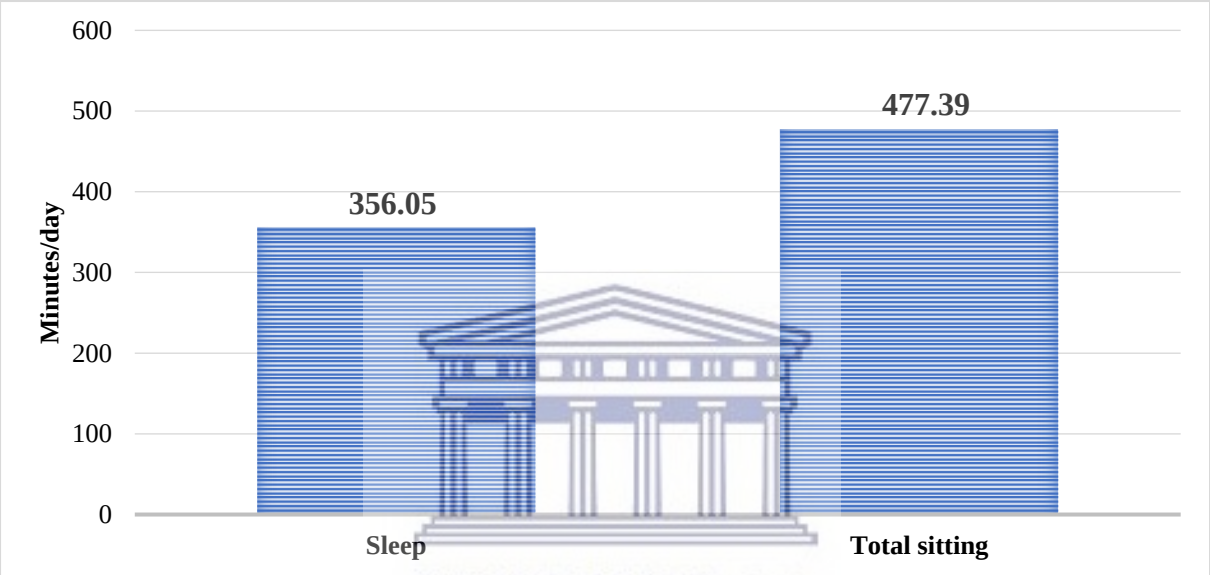





Figure 4.4: Students' sleep and total sitting time.

### 4.6. University Students' Sitting Patterns

Table 4.5 shows the sitting patterns of the students according to gender and age. The mean occupational sitting for students was 223.57 minutes (3 hours and 43 minutes). Occupational sitting was reported in 72.32% (n = 128) of students. Among the students 52.34% (n = 67) were female and 46.09% (n = 59) were males. Students aged 18-20 years represented 51.56% (n = 66) of this sample, while 34.38 % (n = 44) were aged 21-23 years, with 10.94% (n = 14) aged 24-26 years, and 3.13% (n = 4) aged 27 years and older.

The mean travel sitting for students was 58.59 minutes. Travel sitting of students was 61.02% (n=108). Among the students 48.15% (n = 52) were females and 51.85% (n = 56) were males. Students aged 18-20 years represented 42.59% (n = 46) of this sample, while 40.74 % (n = 44) were aged 21-23 years, with 12.04% (n = 13) aged 24-26 years and 4.63% (n = 5) aged 27 & above years.



The mean domestic sitting of students was 94.09 minutes (1 hour and 34 minutes). Domestic sitting of students was 31.64% (n=56). Among the students 51.79% (n = 29) were female and 46.43% (n = 26) were males. Students aged 18-20 years represented 55.36% (n = 31) of this sample, while 35.71% (n = 20) were aged 21-23 years, with 5.36% (n = 3) aged 24-26 years and 3.57% (n = 2) aged 27 & above years.

The mean recreational sitting was 101.14 minutes (1 hours and 41 minutes). Recreational sitting of students was 55.37% (n=98). Among the students 46.94% (n = 46) were females and 51.02% (n = 50) were males. Students aged 18-20 years represented 58.16% (n = 57) of

this sample, while 29.59% (n = 29) were aged 21-23 years, with 9.18% (n = 9) aged 24-26 and 3.06% (n = 3) aged 27 & above years.

Table 4.5: Students' sitting patterns according to gender and age.

| | | **Occupational Sitting** (3 hrs,43 min) | | **Travel-related sitting** (58.59 min) | | **Domestic sitting** (1hr,34 min) | | **Recreational sitting** (1hr,41 min) | |
|---|---|---|---|---|---|---|---|---|---|
| ***Variables*** | | *n* | *%* | *n* | *%* | *n* | *%* | *n* | *%* |
| **Number of students** | Total | 128 | 72.32 | 108 | 61.02 | 56 | 31.64 | 98 | 55.37 |
| **Gender** | Female | 67 | 52.34 | 52 | 48.15 | 29 | 51.79 | 46 | 46.94 |
| | Male | 59 | 46.09 | 56 | 51.85 | 26 | 46.43 | 50 | 51.02 |
| | Other | 2 | 1.56 | 0 | 0.00 | 1 | 1.79 | 2 | 2.04 |
| **Age-group (years)** | 18-20 | 66 | 51.56 | 46 | 42.59 | 31 | 55.36 | 57 | 58.16 |
| | 21-23 | 44 | 34.38 | 44 | 40.74 | 20 | 35.71 | 29 | 29.59 |
| | 24-26 | 14 | 10.94 | 13 | 12.04 | 3 | 5.36 | 9 | 9.18 |
| | ≥27 | 4 | 3.13 | 5 | 4.63 | 2 | 3.57 | 3 | 3.06 |

**Note:** n = number of students; %-percentage; hr-hour, min-minutes.



Table 4.6 reports on the students' knowledge, perceptions and attitudes according to the score points for each section and based on the sociodemographic characteristics of the students. The total number of points that a student could obtain for knowledge was 10 points, and for perceptions and attitudes 50 points each.

The mean knowledge score for all students was 5.12 (SD= ±1.53) points. The mean points scored for knowledge for the females was 4.99 (SD = ±1.64) points, and for the males it was 5.27 (SD = ±1.41) points. According to age-group categories, the mean points scored for knowledge for the age-group 18-20 years was 5.05 (SD = ±1.45) points, for the age-group 21-23 years it was 5.24 (SD = ±1.62) points, for the age-group 24-26 years it was 5.17 (SD =

±1.54), and for the age-group 27 years and older it was 4.80 (SD = ±2.05) points. The highest knowledge scores were found from students who spoke English 5.52 (SD = ±1.40) and Afrikaans 5.33 (SD = ±1.61) as their home language. Single and cohabiting students had high knowledge mean scores of 5.16 (SD = ±1.52) and 5.00 (SD = ±1.41) respectively. Students in their 5th year of study had a mean of 6.00 (SD = ±1.41) points and students in their 3rd year of study had a mean of 5.48 (SD = ±1.61). Students in the Department of Dietetics and Nutrition and School of nursing scored had high mean points of 6.60 (SD = ±1.14) and 5.33 (SD = ±1.21) respectively. Students who stay at home while studying and those staying at a private residence had high mean scores of 5.34 (SD = ±1.43) and 4.82 (SD = ±1.63) respectively.

The mean perception score for all students was 43.16 (SD = ±3.70) points. The mean points scored for perception for the females was 42.32 (SD = ±3.86) points and for the males it was 43.88 (SD = ±3.38) points. According to age-group categories, the mean points scored for perception for the age-group 18-20 years was 42.91 (SD = ±3.65) points, for the age-group 21-23 years it was 43.56 (SD = ±3.38) points, for the age-group 24-26 years it was 44.17 (SD = ±3.90) points, and for the age-group 27 years and older is was 39.00 (SD = ±5.57) points. The highest perception scores were found from students who spoke Setswana 45.25 (SD = ±3.50) and English 43.67 (SD = ±3.82) as their home language. Single and cohabiting students had high perception mean scores of 43.27 (SD = ±3.68) and 42.20 (SD = ±4.44) respectively. Students in their 5th year of study had a mean of 46.50 (SD = ±4.95) points and students in their 1st year of study had a mean of 43.39 (SD = ±3.97). Students in the Department of physiotherapy and the Department of Dietetics and Nutrition scored had high mean points of 45.60 (SD = ±1.52) and 44.20 (SD = ±4.21) respectively. Students who stay at a hostel residence off main campus and those who stay at home while studying had high mean scores of 43.50 (SD = ±3.73) and 43.43 (SD = ±3.66) respectively.

The mean attitude score for all students was 42.82 (SD = ±5.77) points. The mean points scored attitude for the females was 40.73 (SD = ±6.57) points and for the males it was 44.74 (SD = ±4.11) points. According to age-group categories, the mean points scored for attitude for the age-group 18-20 years was 42.85 (SD = ±5.42) points, for the age-group 21-23 years it was 42.55 (SD = ±4.76) points, for the age-group 24-26 years it was 43.56 (SD = ±5.93) points, and for the age-group 27 years and older it was 43.20 (SD = ±5.54) points. The highest attitude scores were found from students who spoke Sesotho 45.25 (SD = ±4.86) and Setswana 44.25 (SD = ±4.92) as their home language. Single and cohabiting students had high attitude mean scores of 42.92 (SD=5.86) and 41.40 (SD = ±4.77) respectively. Students in their 5$^{th}$ year of study had a mean of 44.50 (SD = ±7.78) points and students in their 2$^{nd}$ year of study had a mean of 43.13 (SD = ±5.85). Students in the Department of Dietetics and Nutrition and the Department of Sport Recreation and Exercise Science scored had high mean points of 43.40 (SD = ±5.68) and 43.29 (SD = ±5.50) respectively. Students who stay at home while studying and those staying at a hostel residence on main campus had high mean scores of 43.06 (SD = ±6.18) and 42.56 (SD = ±4.28) respectively.



Table 4.6: Students' knowledge, perceptions and attitudes of physical activity according to sociodemographic characteristics.

| | | **Knowledge** (Points) | | **Perceptions** (Points) | | **Attitudes** (Points) | |
|---|---|---|---|---|---|---|---|
| *Variables* | | $\bar{X}$ | *SD* | $\bar{X}$ | *SD* | $\bar{X}$ | *SD* |
| **Gender** | Female | 4.99 | 1.64 | 42.32 | 3.86 | 40.73 | 6.57 |
| | Male | 5.27 | 1.41 | 43.88 | 3.38 | 44.74 | 4.11 |
| | Other | 4.50 | 0.71 | 46.50 | 3.54 | 45.50 | 3.54 |
| **Age-group (years)** | 18-20 | 5.05 | 1.45 | 42.91 | 3.65 | 42.85 | 6.42 |
| | 21-23 | 5.24 | 1.62 | 43.56 | 3.38 | 42.55 | 4.76 |
| | 24-26 | 5.17 | 1.54 | 44.17 | 3.90 | 43.56 | 5.93 |
| | ≥27 | 4.80 | 2.05 | 39.00 | 5.57 | 43.20 | 5.54 |
| **Home language** | IsiZulu | 4.86 | 1.92 | 41.79 | 3.91 | 41.21 | 6.10 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | IsiXhosa | 4.28 | 1.37 | 42.91 | 3.33 | 41.84 | 5.33 |
| | Afrikaans | 5.33 | 1.61 | 42.39 | 3.91 | 42.94 | 4.86 |
| | English | 5.52 | 1.40 | 43.67 | 3.82 | 43.34 | 6.20 |
| | Sesotho | 4.75 | 1.71 | 43.00 | 0.82 | 45.25 | 4.86 |
| | Setswana | 4.75 | 0.96 | 45.25 | 3.50 | 44.25 | 4.92 |
| | SiSwati | 4.50 | 2.12 | 42.00 | 1.41 | 39.00 | 2.83 |
| | Sepedi | 4.60 | 1.14 | 41.40 | 4.10 | 43.20 | 4.97 |
| | Xitsonga | 3.00 | 0.00 | 42.00 | 0.00 | 40.00 | 0.00 |
| | Other | 3.00 | 0.00 | 40.00 | 0.00 | 38.00 | 0.00 |
| **Marital status** | Single | 5.16 | 1.52 | 43.27 | 3.68 | 42.92 | 5.86 |
| | Cohabiting | 5.00 | 1.41 | 42.20 | 4.44 | 41.40 | 4.77 |
| | Married | 4.20 | 1.64 | 40.40 | 3.05 | 41.00 | 3.08 |
| **Year-level** | 1st year | 4.95 | 1.75 | 43.39 | 3.97 | 42.71 | 6.78 |
| | 2nd year | 4.88 | 1.34 | 42.94 | 3.43 | 43.13 | 5.85 |
| | 3rd year | 5.48 | 1.61 | 43.16 | 3.94 | 42.82 | 5.32 |
| | 4th year | 5.08 | 1.00 | 43.00 | 3.05 | 41.33 | 4.40 |
| | 5th year | 6.00 | 1.41 | 46.50 | 4.95 | 44.50 | 7.78 |
| **Academic programme** | DN | 6.60 | 1.14 | 44.20 | 4.21 | 43.40 | 5.68 |
| | PT | 4.80 | 1.30 | 45.60 | 1.52 | 41.00 | 5.10 |
| | Psych | 5.00 | 0.00 | 44.00 | 0.00 | 43.00 | 0.00 |
| | SW | 4.27 | 1.27 | 42.45 | 3.67 | 40.45 | 5.56 |
| | SRES | 5.17 | 1.55 | 43.24 | 3.64 | 43.29 | 5.50 |
| | NM | 3.00 | 0.00 | 40.00 | 0.00 | 38.00 | 0.00 |
| | SN | 5.33 | 1.21 | 41.00 | 5.14 | 38.67 | 12.23 |
| | Other | 5.00 | 1.50 | 42.44 | 4.28 | 42.56 | 4.56 |
| **Place of residence** | Hostel residence on main campus | 4.81 | 1.75 | 43.38 | 3.68 | 42.56 | 4.28 |
| | Hostel residence off main campus | 4.67 | 0.52 | 43.50 | 3.73 | 42.50 | 7.26 |
| | Private residence | 4.82 | 1.63 | 42.00 | 3.80 | 42.39 | 5.61 |
| | Home residence | 5.34 | 1.43 | 43.43 | 3.66 | 43.06 | 6.18 |

**Note**: n = no of students; $\bar{x}$ - mean; SD - standard deviation; DN - Department of Dietetics and Nutrition; OT - Department of Occupational Therapy; PT - Department of Physiotherapy; Psych - Department of Psychology; SW - Department of Social Work; SRES - Department of Sport, Recreation and Exercise Science; NM - School of Natural Medicine; SN - School of Nursing.



Table 4.7 shows the students sleeping time and sitting patterns according to gender and age-group.

Students slept for a mean of 356.05 minutes per day (5 hours and 57 minutes). The female students slept a mean of 323.71 (SD = ±179.83) minutes per day and the male students slept a mean of 387.18 (SD = ±159.08) minutes per day. The students aged 18-20 years slept a mean of 361.18 (SD = ±161.23) minutes per day, those aged 21-23 years slept a mean of 350.65 (SD = ±172.81), those aged 24-26 years slept a mean of 386.67 (SD = ±184.33) minutes per day, and those aged 27 years and older slept a mean of 207.00 (SD = ±250.19) minutes per day.

The students total sitting behaviours were 477.39 minutes per day (7 hours and 57 minutes). The mean sitting time for occupational work for all students was 223.57 minutes per day (3 hours and 43 minutes). The mean sitting time for occupational work for the female students was 246.34 (SD = ±18.72) minutes per day and for the males it was 199.95 (SD = ±134.85) minutes per day, while those students represented as other it was 157.50 (SD = ±159.10) minutes per day. The mean sitting time for the students aged 18-20 was 212.61 (SD = ±145.66) minutes per day, for the students aged 21-23 years it was 222.05 (SD = ±192.35) minutes per day, for the students aged 24-26 years it was 275.36 (SD = ±175.59) minutes per day, and for the students aged 27 years and older it was 240.00 (SD = ±146.97) minutes per day.



The mean sitting time for travel for all students was 58.59 minutes per day. The mean sitting time for travel for the female students was 67.40 (SD = ±59.90) minutes per day and for the males it was 50.40 (SD = ±52.66) minutes per day. The mean sitting time for the students aged 18-20 years was 44.46 (SD = ±33.68) minutes per day, for the students aged 21-23 years it was 69.89 (SD = ±62.99) minutes per day, for the students aged 24-26 years it was 53.27

(SD = ±31.88) minutes per day, and for the students aged 27 years and older it was 103.00 (SD = ±145.24) minutes per day.

The mean sitting time for domestic work for all students was 94.09 minutes per day (1 hour and 34 minutes). The mean sitting time for domestic work for the female students was 96.86 (SD = ±101.18) minutes per day and for the males it was 91.15 (SD = ±89.94) minutes per day. The mean sitting time for the students aged 18-20 years it was 87.55 (SD = ±93.70) minutes per day, for the students aged 21-23 years it was 115.50 (SD = ±103.63) minutes per day, for the students aged 24-26 years it was 46.67 (SD = ±23.09) minutes per day, and for the students aged 27 years and older it was 52.50 (SD = ±10.61) minutes per day.

The mean sitting time for recreation for all students was 101.14 minutes per day (1 hour and 41 minutes). The mean sitting time for recreational PA for the female students was 122.28 (SD = ±111.42) minutes per day and for the males it was 83.94 (SD = ±86.17) minutes per day. The mean sitting time for the students aged 18-20 years was 95.31 (SD = ±102.47) minutes per day, for the students aged 21-23 years it was 127.57 (SD = ±101.50) minutes per day, for the students aged 24-26 years it was 52.78 (SD = ±44.38), and for the students aged 27 years and older it was 101.67 (SD = ±120.45) minutes per day.



Table 4.7: Students sleeping and sitting patterns according to gender and age.

| | | Gender | | | Age-group (years) | | | |
|---|---|---|---|---|---|---|---|---|
| | | Female | Male | Other | 18-20 | 21-23 | 24-26 | ≥27 |
| **Sleep** | $\bar{X}$ | 323.71 | 387.18 | 330.00 | 361.80 | 350.65 | 386.67 | 207.00 |
| | SD | 179.83 | 159.08 | 42.43 | 161.23 | 172.81 | 184.33 | 250.19 |
| **OS** | $\bar{X}$ | 246.34 | 199.95 | 157.50 | 212.61 | 222.05 | 275.36 | 240.00 |
| | SD | 187.72 | 134.85 | 159.10 | 145.66 | 192.35 | 175.59 | 146.97 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **TS** | $\bar{X}$ | 67.40 | 50.40 | 0.00 | 44.46 | 69.89 | 53.27 | 103.00 |
| | SD | 59.90 | 52.66 | 0.00 | 33.68 | 62.99 | 31.88 | 145.24 |
| **DS** | $\bar{X}$ | 96.86 | 91.15 | 90.00 | 87.55 | 115.50 | 46.67 | 52.50 |
| | SD | 101.18 | 89.94 | 0.00 | 93.70 | 103.63 | 23.09 | 10.61 |
| **RS** | $\bar{X}$ | 122.28 | 83.94 | 45.00 | 95.31 | 127.57 | 52.78 | 101.67 |
| | SD | 111.42 | 86.17 | 21.21 | 102.47 | 101.50 | 44.38 | 120.45 |

**Note:** n - number of students; $\bar{x}$ - mean; SD - standard deviation. OS - occupational sitting; TS – travel-related sitting; DS - domestic sitting; RS - recreational sitting.

Table 4.8 shows the differences in students' knowledge, perceptions and attitudes regarding PA behaviours based on their sociodemographic characteristics. There was a significant difference in students' perceptions based on gender ($H = 8.424$, $p = 0.015$) and a significant difference between students' attitudes based on gender ($H = 19.790$, $p < 0.001$). There was no significant difference in student knowledge based on vigorous-intensity PA, moderate-intensity PA and light-intensity PA.

There was a significant difference in students' vigorous-intensity PA based on age-group categories ($H = 12.357$, $p = 0.006$). There was no significant difference in students' knowledge, perceptions, attitudes for moderate-intensity PA and light-intensity PA based on age-group.

There was a significant difference in students' knowledge based on home language ($H = 24.275$, $p = 0.004$). There was no significant difference in students' perceptions and attitudes for vigorous-intensity PA, moderate-intensity PA and light-intensity PA based on home language.

There were no significant differences in students' knowledge, perceptions, attitudes for vigorous-intensity PA, moderate-intensity PA and light-intensity PA based on year-level, academic programme and place of residence.

Table 4.8: Differences in students' knowledge, perceptions, attitudes and behaviours of physical activity based on sociodemographic characteristics.

| Variable | | Knowledge | Perceptions | Attitudes | VIPA | MIPA | LIPA |
|---|---|---|---|---|---|---|---|
| | H | 2.141 | 8.424 | 19.790 | 2.427 | 0.804 | 0.923 |
| | df | 2 | 2 | 2 | 2 | 2 | 2 |
| **Gender** | p | 0.343 | 0.015* | <.001** | 0.297 | 0.669 | 0.630 |
| | H | 0.961 | 5.141 | 1.799 | 12.357 | 4.015 | 4.401 |
| **Age-group** | df | 3 | 3 | 3 | 3 | 3 | 3 |
| | p | 0.811 | 0.162 | 0.615 | 0.006** | 0.260 | 0.221 |
| | H | 24.275 | 8.327 | 9.019 | 9.110 | 9.834 | 7.770 |
| **Home language** | df | 9 | 9 | 9 | 8 | 8 | 9 |
| | p | 0.004** | 0.502 | 0.436 | 0.333 | 0.277 | 0.557 |
| | H | 1.461 | 3.788 | 2.284 | .043 | .173 | 1.120 |
| **Marital status** | df | 2 | 2 | 2 | 2 | 2 | 2 |
| | p | 0.482 | 0.150 | 0.319 | 0.979 | 0.917 | 0.571 |
| | H | 5.287 | 1.844 | 2.528 | 5.301 | 3.987 | 1.608 |
| **Year-level** | df | 4 | 4 | 4 | 4 | 4 | 4 |
| | p | 0.259 | 0.764 | 0.640 | 0.258 | 0.408 | 0.807 |
| | H | 11.141 | 6.352 | 6.245 | 3.810 | 12.423 | 6.291 |
| **Academic programme** | df | 7 | 7 | 7 | 6 | 6 | 7 |
| | p | 0.133 | 0.499 | 0.511 | 0.702 | 0.053 | 0.506 |
| | H | 6.051 | 3.033 | 1.822 | 1.664 | .737 | 1.269 |
| **Place of residence** | df | 3 | 3 | 3 | 3 | 3 | 3 |
| | p | 0.109 | 0.387 | 0.610 | 0.645 | 0.864 | 0.736 |

**Note:** *indicates statistically significant difference p<0.05; **indicates statistically significant difference p<0.01; H – indicates Kruskal-Wallis H; VIPA - vigorous-intensity physical activity; MIPA – moderate-intensity physical activity; LIPA – light-intensity physical activity.

A Dunn's post-hoc test was applied to the findings in Table 4.8 to minimize type I error. Table 4.9 shows the adjusted p values at a significance level of p = 0.05. There was a significant difference in students' perceptions between females and males (H = -19.580, p = 0.033). There was a significant difference in students' attitudes between females and males (H = -34.093, p < 0.001).

There was a significant difference in students' vigorous-intensity PA between the age-groups 18-20 years and 24-26 years (H = -32.195, p = 0.047), and between age-groups 21-23 years and 24-26 years (H = -38.787, p = 0.012).

There was a significant difference in students' knowledge between the home languages of IsiXhosa and English (H = -43.005, p = 0.001), and Afrikaans and other language (H = 76.833, p = 0.001).

Table 4.9: Statistically significant differences in knowledge, perceptions, attitudes and behaviours of physical activity based on sociodemographic characteristics.



| Variable | Gender | H | p |
|---|---|---|---|
| **Perceptions** | Female-Male | -19.580 | 0.033* |
| | Female-Other | -61.147 | 0.281 |
| | Male-Other | -41.567 | 0.763 |
| **Attitudes** | Female-Male | -34.093 | 0.000** |
| | Female-Other | -39.026 | 0.858 |
| | Male-Other | -4.933 | 1.000 |
| | **Age-group (years)** | | |
| **Vigorous-intensity physical activity** | 18-20 vs 21-23 | 6.592 | 1.000 |
| | 18-20 vs 24-26 | -32.195 | 0.047* |
| | 18-20 vs ≥27 | 48.377 | 0.628 |

| | | | |
|---|---|---|---|
| | 21-23 vs 24-26 | -38.787 | 0.012* |
| | 21-23 vs ≥27 | 41.784 | 0.982 |
| | 24-26 vs ≥27 | 80.571 | 0.063 |
| | **Home language** | | |
| | IsiZulu vs IsiXhosa | 25.538 | 1.000 |
| | IsiZulu vs Afrikaans | -10.405 | 1.000 |
| | IsiZulu vs English | -17.467 | 1.000 |
| | IsiZulu vs Sesotho | 10.804 | 1.000 |
| | IsiZulu vs Setswana | 12.554 | 1.000 |
| | IsiZulu vs Siswati | 11.429 | 1.000 |
| | IsiZulu vs Sepedi | 15.429 | 1.000 |
| | IsiZulu vs Xitsonga | 66.429 | 1.000 |
| | IsiZulu vs Other | 66.429 | 1.000 |
| | IsiXhosa vs Afrikaans | -35.943 | 0.656 |
| | IsiXhosa vs English | -43.005 | 0.001** |
| | IsiXhosa vs Sesotho | -14.734 | 1.000 |
| | IsiXhosa vs Setswana | -12.984 | 1.000 |
| | IsiXhosa vs Siswati | -14.109 | 1.000 |
| | IsiXhosa vs Sepedi | -10.109 | 1.000 |
| | IsiXhosa vs Xitsonga | 40.891 | 1.000 |
| | IsiXhosa vs Other | 40.891 | 1.000 |
| **Knowledge** | Afrikaans vs English | -7.063 | 1.000 |
| | Afrikaans vs Sesotho | 21.208 | 1.000 |
| | Afrikaans vs Setswana | 22.958 | 1.000 |
| | Afrikaans vs Siswati | 21.833 | 1.000 |
| | Afrikaans vs Sepedi | 25.833 | 1.000 |
| | Afrikaans vs Xitsonga | 76.833 | 0.656 |
| | Afrikaans vs Other | 76.833 | 0.001** |
| | English vs Sesotho | 28.271 | 1.000 |
| | English vs Setswana | 30.021 | 1.000 |
| | English vs Siswati | 28.896 | 1.000 |
| | English vs Sepedi | 32.896 | 1.000 |
| | English vs Xitsonga | 83.896 | 1.000 |
| | English vs Other | 83.896 | 1.000 |
| | Sesotho vs Setswana | 1.750 | 1.000 |
| | Sesotho vs Siswati | 0.625 | 1.000 |
| | Sesotho vs Sepedi | 4.625 | 1.000 |
| | Sesotho vs Xitsonga | 55.625 | 1.000 |
| | Sesotho vs Other | 55.625 | 1.000 |

| | | |
|---|---|---|
| Setswana vs Siswati | -1.125 | 1.000 |
| Setswana vs Sepedi | 2.875 | 1.000 |
| Setswana vs Xitsonga | 53.875 | 1.000 |
| Setswana vs Other | 53.875 | 1.000 |
| Siswati vs Sepedi | 4.000 | 1.000 |
| Siswati vs Xitsonga | 55.000 | 1.000 |
| Siswati vs Other | 55.000 | 1.000 |
| Sepedi vs Xitsonga | 51.000 | 1.000 |
| Sepedi vs Other | 51.000 | 1.000 |
| Xitsonga vs Other | 0.000 | 1.000 |

**Note:** H – indicates Kruskal-Wallis H.

Table 4.10 shows the differences in students' PA behaviours based on gender, academic programme and year level. There were no significant differences in students' vigorous-intensity PA for occupational work based on gender, academic programme and the year-level of study. There were also no significant differences in students' moderate-intensity PA for occupational work based on gender, academic programme and the year-level of study. There were also no significant differences in students' light-intensity PA for occupational work based on gender, academic programme and the year-level of study.



There were no significant differences in students' vigorous-intensity PA, moderate-intensity PA, and light-intensity PA for travel based on gender, academic programme and the year-level of study.

There were also no significant differences in students' vigorous-intensity PA, moderate-intensity PA, and light-intensity PA for domestic work based on gender, academic programme and the year-level of study.

In addition, there were no significant differences in students' vigorous-intensity PA, moderate-intensity PA, and light-intensity PA for recreation based on gender, academic programme and the year-level of study.

Table 4.10: Differences in students' behaviours based on gender, academic programme and year-level.

| Variable | | Occupation work-related vigorous-intensity PA | Occupation work-related moderate-intensity PA | Occupation work-related light-intensity PA | Travel related vigorous-intensity PA | Travel related moderate-intensity PA | Travel related light-intensity PA | Domestic work-related vigorous-intensity PA | Domestic work-related moderate-intensity PA | Domestic work-related light-intensity PA | Recreation related vigorous-intensity PA | Recreation related moderate-intensity PA | Recreation related light-intensity PA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Gender** | H | 0.30 | 0.01 | 2.93 | 0.05 | 0.06 | 0.19 | 0.14 | 2.31 | 0.93 | 2.04 | 1.53 | 0.84 |
| | df | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 2 | 2 | 2 |
| | p | 0.59 | 0.91 | 0.23 | 0.83 | 0.80 | 0.91 | 0.71 | 0.13 | 0.63 | 0.36 | 0.47 | 0.66 |
| **Academic programme** | H | 2.13 | 1.81 | 1.39 | 2.28 | 2.90 | 5.65 | 3.14 | 2.80 | 4.10 | 3.61 | 3.59 | 3.34 |
| | df | 3 | 3 | 4 | 3 | 3 | 4 | 2 | 3 | 4 | 4 | 4 | 4 |
| | p | 0.55 | 0.61 | 0.85 | 0.52 | 0.41 | 0.23 | 0.21 | 0.42 | 0.39 | 0.46 | 0.46 | 0.50 |
| **Year-level** | H | 2.13 | 1.81 | 1.39 | 2.28 | 2.90 | 5.65 | 3.14 | 2.80 | 4.10 | 3.61 | 3.59 | 3.34 |
| | df | 3 | 3 | 4 | 3 | 3 | 4 | 2 | 3 | 4 | 4 | 4 | 4 |
| | p | 0.55 | 0.61 | 0.85 | 0.52 | 0.41 | 0.23 | 0.21 | 0.42 | 0.39 | 0.46 | 0.46 | 0.50 |

**Note***:* H – indicates Kruskal-Wallis H; df- degrees of freedom, p-significance.

Table 4.11 shows the differences in students' sitting and sleeping patterns based on their sociodemographic characteristics. There was a significant difference in students sitting time for travel based on gender (H = 4.669, p = 0.031), but no other significant differences in sitting time for occupational work, domestic work, recreational work, and total sitting time, as well as for sleep.

There were no significant differences in students sitting time for occupational work, travel, domestic work, recreational activities, and total sitting time, as well as for sleep based on age-group categories.

There were significant differences in students sitting time for domestic work (H = 12.886, p = 0.045), and sleep (H = 18.575, p = 0.029) based on home language. However, there were no other significant differences in students occupational sitting, travel sitting, recreational sitting and total sitting based on students' home language.



There were no significant differences in students occupational sitting, travel sitting, domestic sitting, recreational sitting, total sitting and sleep based on students' marital status. Also, there were no significant differences in students occupational sitting, travel sitting, domestic sitting, recreational sitting, total sitting and sleep based on students' year level of study.

There were significant differences in students' sitting time for occupational work (H = 15.402, p = 0.017), for travel (H = 15.374, p = 0.031), and for total sitting (H = 18.155, p = 0.011) based on students' academic programme.

There were no other significant differences in students sitting time for occupational work, travel, domestic work, recreation, total sitting and sleep based on students' place of residence.

Table 4.11: Differences in students' sitting and sleeping behaviours based on sociodemographic characteristics.

| Variable | | Sleep | Occupational sitting | Travel sitting | Domestic sitting | Recreation sitting | Total Sitting |
|---|---|---|---|---|---|---|---|
| **Gender** | H | 5.806 | 1.413 | 4.669 | .649 | 4.967 | 5.665 |
| | df | 2 | 2 | 1 | 2 | 2 | 2 |
| | p | 0.055 | 0.493 | 0.031* | 0.723 | 0.083 | 0.059 |
| **Age-group** | H | 2.092 | 1.732 | 4.806 | 1.638 | 6.342 | 2.261 |
| | df | 3 | 3 | 3 | 3 | 3 | 3 |
| | p | 0.554 | 0.630 | 0.187 | 0.651 | 0.096 | 0.520 |
| **Home language** | H | 18.575 | 2.623 | 5.666 | 12.886 | 9.430 | 6.614 |
| | df | 9 | 8 | 7 | 6 | 7 | 8 |
| | p | 0.029* | 0.956 | 0.579 | 0.045* | 0.223 | 0.579 |
| **Marital status** | H | 2.558 | 0.747 | 0.901 | 0.783 | 1.648 | 1.047 |
| | df | 2 | 2 | 2 | 2 | 2 | 2 |
| | p | 0.278 | 0.688 | 0.637 | 0.676 | 0.439 | 0.592 |
| **Year-level** | H | 1.276 | 2.635 | 5.134 | 2.393 | 4.013 | 3.122 |
| | df | 4 | 4 | 4 | 3 | 4 | 4 |
| | p | 0.865 | 0.621 | 0.274 | 0.495 | 0.404 | 0.538 |
| **Academic programme** | H | 6.400 | 15.402 | 15.374 | 1.198 | 10.618 | 18.155 |
| | df | 7 | 6 | 7 | 4 | 7 | 7 |
| | p | 0.494 | 0.017* | 0.031* | 0.878 | 0.156 | 0.011* |
| **Place of residence** | H | 4.253 | 2.698 | .477 | 5.043 | 1.325 | 1.635 |
| | df | 3 | 3 | 3 | 3 | 3 | 3 |
| | p | 0.235 | 0.441 | 0.924 | 0.169 | 0.723 | 0.651 |

**Note:** * indicates statistically significant difference p<0.05; **indicates statistically significant difference P<0.01; H – indicates Kruskal-Wallis H.

A post-hoc Dunn's test was applied to the findings in Table 4.11 to minimize type I error. Table 4.12 shows the adjusted p values at a significance level of $p < 0.05$. The significant difference in sitting time for travel between female and male students was constant because the same variables were being assessed ($H = 4.669$, $p = 0.031$). There were no other significant differences in students sitting time for domestic work and sleep based on home language. There was a significant difference in students sitting time for travel between the Department of Social Work and the Department of Sport, Recreation and Exercise Science ($H = 44.621$, $p = 0.008$), and for students' total sitting time between the Department of Social Work and the Department of Sport, Recreation and Exercise Science ($H = 61.694$, $p = 0.003$).

Table 4.12: Statistically significant differences in students' sitting and sleeping patterns based on sociodemographic characteristics.

| Variable | | H | p |
|---|---|---|---|
| | **Gender** | | |
| **Travel sitting** | Female- Male | 4.669 | 0.031* |
| | **Home language** | | |
| **Domestic sitting** | IsiZulu vs IsiXhosa | 5.786 | 1.000 |
| | IsiZulu vs Afrikaans | 20.500 | 1.000 |
| | IsiZulu vs English | 12.020 | 1.000 |
| | IsiZulu vs Sesotho | -12.750 | 1.000 |
| | IsiZulu vs Siswati | 7.500 | 1.000 |
| | IsiZulu vs Sepedi | 29.250 | 0.951 |
| | IsiXhosa vs Afrikaans | 14.714 | 1.000 |
| | IsiXhosa vs English | 6.234 | 1.000 |
| | IsiXhosa vs Sesotho | -18.536 | 1.000 |
| | IsiXhosa vs Siswati | 1.714 | 1.000 |
| | IsiXhosa vs Sepedi | 23.464 | 1.000 |
| | Afrikaans vs English | -8.480 | 1.000 |
| | Afrikaans vs Sesotho | -33.250 | 0.753 |
| | Afrikaans vs Siswati | -13.000 | 1.000 |
| | Afrikaans vs Sepedi | 8.750 | 1.000 |
| | English vs Sesotho | -24.770 | 1.000 |

| | | | |
|---|---|---|---|
| | English vs Siswati | -4.520 | 1.000 |
| | English vs Sepedi | 17.230 | 1.000 |
| | Sesotho vs Siswati | 20.250 | 1.000 |
| | Sesotho vs Sepedi | 42.000 | 0.399 |
| | Siswati vs Sepedi | 21.750 | 1.000 |
| | IsiZulu vs IsiXhosa | 28.808 | 1.000 |
| | IsiZulu vs Afrikaans | 28.020 | 1.000 |
| | IsiZulu vs English | 0.751 | 1.000 |
| | IsiZulu vs Sesotho | -2.411 | 1.000 |
| | IsiZulu vs Setswana | 1.964 | 1.000 |
| | IsiZulu vs Siswati | 65.714 | 1.000 |
| | IsiZulu vs Sepedi | 46.464 | 1.000 |
| | IsiZulu vs Xitsonga | -61.536 | 1.000 |
| | IsiZulu vs Other | -35.036 | 1.000 |
| | IsiXhosa vs Afrikaans | -0.788 | 1.000 |
| | IsiXhosa vs English | -28.057 | 0.299 |
| | IsiXhosa vs Sesotho | -2.411 | 1.000 |
| | IsiXhosa vs Setswana | -31.219 | 1.000 |
| | IsiXhosa vs Siswati | 36.906 | 1.000 |
| | IsiXhosa vs Sepedi | 17.656 | 1.000 |
| | IsiXhosa vs Xitsonga | -90.344 | 1.000 |
| | IsiXhosa vs Other | -63.844 | 1.000 |
| | Afrikaans vs English | -27.269 | 1.000 |
| | Afrikaans vs Sesotho | -30.431 | 1.000 |
| | Afrikaans vs Setswana | -26.056 | 1.000 |
| | Afrikaans vs Siswati | 37.694 | 1.000 |
| | Afrikaans vs Sepedi | 18.444 | 1.000 |
| | Afrikaans vs Xitsonga | -89.556 | 1.000 |
| | Afrikaans vs Other | -63.056 | 1.000 |
| | English vs Sesotho | -3.161 | 1.000 |
| | English vs Setswana | 1.214 | 1.000 |
| **Sleep** | English vs Siswati | 64.964 | 1.000 |
| | English vs Sepedi | 45.714 | 1.000 |
| | English vs Xitsonga | -62.286 | 1.000 |
| | English vs Other | -35.786 | 1.000 |
| | Sesotho vs Setswana | 4.375 | 1.000 |
| | Sesotho vs Siswati | 68.125 | 1.000 |
| | Sesotho vs Sepedi | 48.875 | 1.000 |
| | Sesotho vs Xitsonga | -59.125 | 1.000 |
| | Sesotho vs Other | -32.625 | 1.000 |

| | | | |
|---|---|---|---|
| | Setswana vs Siswati | 63.750 | 1.000 |
| | Setswana vs Sepedi | 44.500 | 1.000 |
| | Setswana vs Xitsonga | -63.500 | 1.000 |
| | Setswana vs Other | -37.000 | 1.000 |
| | Siswati vs Sepedi | -19.250 | 1.000 |
| | Siswati vs Xitsonga | -127.250 | 1.000 |
| | Siswati vs Other | -100.750 | 1.000 |
| | Sepedi vs Xitsonga | -108.000 | 1.000 |
| | Sepedi vs Other | -81.500 | 1.000 |
| | Xitsonga vs Other | 26.500 | 1.000 |
| | **Academic programme** | | |
| **Occupational sitting** | DN vs OT | 5.188 | 1.000 |
| | DN vs PT | 25.150 | 1.000 |
| | DN vs SW | -32.350 | 1.000 |
| | DN vs SRES | 12.271 | 1.000 |
| | DN vs NM | -2.750 | 1.000 |
| | DN vs SN | 25.250 | 1.000 |
| | OT vs PT | 19.963 | 1.000 |
| | OT vs SW | -37.538 | 0.905 |
| | OT vs SRES | 7.083 | 1.000 |
| | OT vs NM | -7.938 | 1.000 |
| | OT vs SN | 20.063 | 1.000 |
| | PT vs SW | -57.500 | 0.127 |
| | PT vs SRES | -12.879 | 1.000 |
| | PT vs NM | -27.900 | 1.000 |
| | PT vs SN | 0.100 | 1.000 |
| | SW vs SRES | 44.621 | 0.008** |
| | SW vs NM | 29.600 | 1.000 |
| | SW vs SN | 57.600 | 0.237 |
| | SRES vs NM | -15.021 | 1.000 |
| | SRES vs SN | 12.979 | 1.000 |
| | NM vs SN | 28.000 | 1.000 |
| **Travel sitting** | DN vs OT | -7.482 | 1.000 |
| | DN vs PT | -28.325 | 1.000 |
| | DN vs Psych | 43.875 | 1.000 |
| | DN vs SW | -16.208 | 1.000 |
| | DN vs SRES | 10.672 | 1.000 |
| | DN vs NM | 43.875 | 1.000 |
| | DN vs SN | 9.775 | 1.000 |
| | OT vs PT | -20.843 | 1.000 |

| | | | |
|---|---|---|---|
| | OT vs Psych | 51.357 | 1.000 |
| | OT vs SW | -8.726 | 1.000 |
| | OT vs SRES | 18.155 | 1.000 |
| | OT vs NM | 51.357 | 1.000 |
| | OT vs SN | 17.257 | 1.000 |
| | PT vs Psych | 72.200 | 0.962 |
| | PT vs SW | 12.117 | 1.000 |
| | PT vs SRES | 38.997 | 0.186 |
| | PT vs NM | 72.200 | 0.962 |
| | PT vs SN | 38.100 | 1.000 |
| | Psych vs SW | -60.083 | 1.000 |
| | Psych vs SRES | -33.203 | 1.000 |
| | Psych vs NM | 0.000 | 1.000 |
| | Psych vs SN | -34.100 | 1.000 |
| | SW vs SRES | 26.881 | 1.000 |
| | SW vs NM | 60.083 | 1.000 |
| | SW vs SN | 25.983 | 1.000 |
| | SRES vs NM | 33.203 | 1.000 |
| | SRES vs SN | -0.897 | 1.000 |
| | NM vs SN | -0.897 | 1.000 |
| | DN vs OT | -10.700 | 1.000 |
| | DN vs PT | -6.500 | 1.000 |
| | DN vs Psych | 75.300 | 1.000 |
| | DN vs SW | -62.800 | 0.534 |
| | DN vs SRES | -1.106 | 1.000 |
| | DN vs NM | -39.200 | 1.000 |
| | DN vs SN | -3.617 | 1.000 |
| | OT vs PT | 4.200 | 1.000 |
| | OT vs Psych | 86.000 | 1.000 |
| | OT vs SW | -52.100 | 0.693 |
| | OT vs SRES | 9.594 | 1.000 |
| | OT vs NM | -28.500 | 1.000 |
| | OT vs SN | 7.083 | 1.000 |
| | PT vs Psych | 81.800 | 1.000 |
| **Total Sitting** | PT vs SW | -56.300 | 0.997 |
| | PT vs SRES | 5.394 | 1.000 |
| | PT vs NM | -32.700 | 1.000 |
| | PT vs SN | 2.883 | 1.000 |
| | Psych vs SW | -138.100 | 0.199 |
| | Psych vs SRES | -76.406 | 1.000 |

| | | |
|---|---|---|
| Psych vs NM | -114.500 | 1.000 |
| Psych vs SN | -78.917 | 1.000 |
| SW vs SRES | 61.694 | 0.003** |
| SW vs NM | 23.600 | 1.000 |
| SW vs SN | 59.183 | 0.536 |
| SRES vs NM | -38.094 | 1.000 |
| SRES vs SN | -2.511 | 1.000 |
| NM vs SN | 35.583 | 1.000 |

**Note:** *indicates statistically significant difference p<0.05; **indicates statistically significant difference P<0.01; H – indicates Kruskal-Wallis H.

Table 4.13 shows the relationships between the students' knowledge, perceptions, attitudes and behaviours regarding PA. There was a significant positive moderate relationship between students' perceptions and attitudes ($r = 0.66$, $p < 0.001$). There was a significant very weak positive relationship between students' attitudes and vigorous-intensity PA ($r = 0.16$, $p = 0.05$). There was also a significant very weak negative relationship between students' attitudes with total sitting time ($r = -0.16$, $p = 0.04$). There was a significant moderate positive relationship between students' vigorous-intensity PA and moderate-intensity PA ($r = 0.43$, $p < 0.001$). There was also a weak significant positive relationship between students' vigorous-intensity PA and light-intensity PA ($r = 0.22$, $p = 0.01$). There was a significant moderate positive relationship between students' moderate-intensity PA and light-intensity PA ($r = 0.47$, $p < 0.001$).

Table 4.13: Relationship between students' knowledge, perceptions, attitudes and behaviours regarding physical activity.

| Variable | Knowledge | Perceptions | Attitudes | Vigorous-intensity PA | Moderate-intensity PA | Light-intensity PA | Total sitting |
|---|---|---|---|---|---|---|---|
| **Perceptions** | 0.11 | | | | | | |
| **Attitudes** | 0.10 | 0.66** | | | | | |
| **Vigorous intensity PA** | 0.02 | 0.06 | 0.16* | | | | |
| **Moderate intensity PA** | -0.15 | 0.10 | 0.09 | 0.43** | | | |
| **Light intensity PA** | -0.03 | 0.08 | 0.11 | 0.22* | 0.47** | | |
| **Total sitting** | 0.02 | -0.15 | -0.16* | 0.06 | -0.07 | 0.10 | |
| **Sleep** | 0.04 | 0.03 | 0.00 | 0.03 | -0.02 | 0.01 | 0.12 |

**Note:** *indicates statistically significant relationship p<0.05; **indicates statistically significant relationship p<0.01.

Table 4.14 shows the associations between the students' knowledge, perceptions, attitudes and behaviours according to gender and age. There was a significant association between students' perceptions and age ($\chi^2$ = 10.53, p = 0.05). There was a significant association between students' attitudes and gender ($\chi^2$ = 6.89, p = 0.03). There was a significant association between students' vigorous-intensity PA and gender ($\chi^2$ = 31.40, p < 0.001) and vigorous-intensity PA and age ($\chi^2$ = 18.80, p = 0.04).

Table 4.14: Association between students' knowledge, perceptions, attitudes and behaviours of physical activity according to age and gender.

| Variable | | Knowledge | Perceptions | Attitudes | Vigorous-intensity PA | Moderate-intensity PA | Light-intensity PA | Total sitting |
|---|---|---|---|---|---|---|---|---|
| **Gender** | $\chi$ 2 | 3.19 | 4.49 | 6.89 | 31.40 | 4.11 | 7.83 | 3.50 |
| | p | 0.48 | 0.14 | 0.03* | <0.001** | 0.92 | 0.37 | 0.98 |
| **Age** | $\chi$ 2 | 6.63 | 10.53 | 2.18 | 18.80 | 15.50 | 19.97 | 10.25 |
| | p | 0.32 | 0.05* | 1.00 | 0.04* | 0.11 | 0.50 | 0.72 |

**Note:** *indicates statistically significant association p<0.05; **indicates statistically significant association p<0.01. $\chi^2$ = Chi square.

# CHAPTER FIVE: DISCUSSION

## 5.1. Introduction

This section is structured based on the objectives and hypotheses of the study. The section discusses the knowledge, perceptions, attitudes and behaviours of undergraduate university students regarding PA, the differences among students based on their sociodemographic characteristics, as well as the correlations and associations between the relevant outcome variables in the study according to the students' sociodemographic characteristics.

## 5.2. University Students' Knowledge of Physical Activity

Both in industrialized and emerging nations, the prevalence of physical inactivity has risen over time (Banjilka & Badjan, 2019; Poobalan & Aucott, 2016; Ramya et al., 2017). Invariably, a poor understanding of the value of PA leads to poor perceptions, which in turn translates into poor attitudes and poor behaviours concerning PA (Blake et al., 2017; Pickens, 2005).



The data from the present study suggested that most of the students had a fair knowledge of PA. Most of the students in the present study were able to correctly identify walking as a form of light-intensity PA. They were able to determine yoga and dancing as suitable indoor physical activities for developing health in sedentary adults. They also knew that cardiovascular, flexibility, muscular strength and muscular endurance activities were all required for achieving health benefits in sedentary adults, and they were able to classify

weight-lifting as a suitable type of strength training exercise. However, only 22.60% students were able to choose the correct exercise intensities that resulted in improved health in sedentary adults. Furthermore, only 35.59% of students knew that the minimum amount of moderate-intensity PA should add up to 150 minutes per week, and only 33.90% of students knew that the minimum number of days of exercise per week for strength training should be 2 days. According to Adedokun et al. (2021), 36.88% of medical students were unaware that the minimum PA guidelines for moderate-to-vigorous intensity PA was 150 minutes per week, and that the minimum recommended PA guideline for strength training was 2 days per week. Similarly, McCarthy and Warne (2022) reported that 63% of male students and 77% of female students were unable to correctly report the recommended PA guidelines for healthy adults. Ziari et al. (2017) reported similar findings to that of the participants in the present study, wherein their participants' knowledge on PA was scored as moderate at 66.3%. Furthermore, Alsulami et al. (2018) reported that 86% of participants had appropriate knowledge about the importance of PA and its risk factors.



Ramezankhani et al. (2013) reported that, based on age-group, undergraduate medical science students had good-to-intermediate knowledge of PA. Similarly, the findings of bin Mohamed Roshdin et al. (2016) reported that participants had a good knowledge of PA, and the majority knew the benefits of exercise in order to help fight numerous diseases, to improve one's mood and to improve muscular strength and endurance. In addition, Aniodo et al. (2014) found that 66.34% of physiotherapy students had a good knowledge of PA, as well as the benefits associated with PA, and the different types of PA. A study by Al-Zahrani (2010) reported that female dental students scored high on knowledge of PA and its importance in the maintenance of general health.

In contrast to these studies, Taha (2008) reported that students had a poor knowledge of the significance of PA in the prevention of both diabetes and high blood pressure. Similarly, Awotidebe et al. (2014) reported a poor knowledge among participants for PA and its benefits for hypertension. Additionally, Anand et al. (2011) reported that medical students had poor knowledge of PA, as they were not aware of the PA guidelines and the anthropometric measures of PA, but only knew about the benefits of PA. The poor knowledge could be partly explained by the medical curriculum that focused solely on the treatment and control of disease rather than on overall health promotion (Anand et al., 2011).

The differences in the knowledge of students across the various studies may be due to differences in how students were educated about the importance of PA in the treatment and management of chronic conditions (Anand et al., 2011; Blake et al., 2017; Ramezankhani et al., 2013). Another difference reported in the study by Awotidebe et al. (2014) was because of the difference in study population, since that study reported using Nigerian patients and not university students. Furthermore, differences in students' knowledge of PA may be influenced by differences in the methodology of the different studies and how the students' knowledge was scored and classified.



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The present study reported no significant difference in students' knowledge based on gender, academic programme and the year-level of study. This finding was similar to that reported by Keating et al. (2010) who also found no significant differences in students' knowledge based on gender, field of study, and the number of years that the students were at university. Similarly, Aniodo et al. (2014) found no significant difference in students' knowledge when

comparing males and females. Furthermore, this finding was supported by studies of Martins et al. (2019) and Thompson and Hannon (2012) who reported no significant difference in students' knowledge according to gender, and that both male and female participants demonstrated similar knowledge regarding PA. In addition, McCarthy and Warne (2022) also found no significant difference in the students' knowledge of PA based on their gender, since both male and female students reported similar knowledge on PA. The similarities in the results from the present study and those from previous literature may be due to the research being conducted in a similar population.

The study observed a significant difference in students' knowledge based on their home-language. There was a significant difference in students' knowledge whose home-language was IsiXhosa (South African ethnic language) and English, and for Afrikaans and another language (as reported in the study).

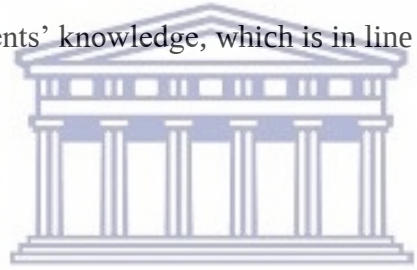


The present study reviewed the relationship between students' knowledge, perceptions, attitudes and behaviours regarding PA. The present study found no significant relationship between students' knowledge and their perceptions or attitudes, specifically with regard to vigorous-, moderate-, and light-intensity PA, as well as with total sitting time. A similar study conducted in Nigeria by Muraf et al. (2018) found no significant relationship between students' knowledge and perceptions with regard to vigorous-, moderate-, and light-intensity PA. Similarly, bin Mohamed Roshdin et al. (2016) reported no significant relationship between participants knowledge of PA and their PA practice. Furthermore, Ward (2014) reported no significant relationship between college students' knowledge of PA and their PA behaviours, because they were knowledgeable about the PA guidelines and its benefits for

health, but they were not translating their knowledge into practice, because they were not engaging in regular PA.

As reported in the present study, the study by bin Mohamed Roshdin et al. (2016) also reported that there was no significant relationship between students' knowledge and their attitudes. In contrast to the present study, Muraf et al. (2018) reported a significant relationship between students' knowledge and their attitudes.

Keating et al. (2010) reported that Southern state university students demonstrated no significant relationship between their total PA, as well as their vigorous-, moderate-, and light-intensity PA and the students' knowledge, which is in line with the results of the present study.





The present study found no significant association between students' knowledge and their gender or age. Similarly, McCarthy and Warne (2022) reported that the knowledge of university students and staff about PA was not associated with the gender of the participants. Furthermore, Ramautar et al. (2021) reported that gender and age were not associated with the participants PA knowledge. In contrast, Awotidebe et al. (2014) reported a significant association between participants knowledge on PA and age. The differences in these study findings could be related to differences in the population characteristics. The study by Awotidebe et al. (2014) involved participants aged 40 to 60 years, unlike the current study that recruited young university students who were primarily in their early twenties.

### 5.3. University Students' Perceptions of Physical Activity

Participating in PA is admittedly influenced by the perceived benefits and barriers to PA (Kamarudin, & Omar-Fauzee, 2007; Shirley et al., 2010). A positive perception of PA as being beneficial for the treatment of chronic disease and improving quality of life may aid in PA promotion, leading to increased PA participation (Shirley et al., 2010).

The results of the present study reported that the majority of students had a good perception of PA. Most of the students strongly agreed or agreed that regular PA being necessary for physical fitness, and that PA was important for improving their physical and mental health. Similar results were reported by Omar-Fauzee et al. (2009) that college students had a good perception about physical education and the significance of PA for health. Furthermore, Muraf et al. (2018) reported that participants had overall good perceptions on physical activity, and were not discouraged by families or friends to participate in PA. The participants had good perceptions concerning the benefits of PA and its importance for improving quality of life. However, although the students in the current study had overall good perceptions about PA, 22.60% of students strongly agreed and 41.22% agreed with the statement that "Engaging in regular physical activity [was] expensive". Similarly, Kamarudin and Omar-Fauzee (2007) also reported that female students had a poor perception that it was expensive to participate in PA. Furthermore, 45.20% of students strongly agreed and 32.20% agreed with the statement that "Physical activity [was] boring". These misperceptions may be attributed to a lack of knowledge about PA, with some students possibly assuming that participating in PA only occurred at a gym and, therefore, were not well-informed about the different places and alternative spaces where PA could be performed. It could also be that certain students associated PA with formal, structured exercise and, therefore, held the belief

that PA was boring. Martins et al. (2019) found that some health science students had misperceptions of PA. These students perceived that they knew the PA guidelines for healthy adults, but the results from that reported that only 9.8% of them accurately knew the PA guidelines. This misperception of the PA guidelines could be related to the students not having sufficient education on the PA guidelines or the importance thereof (Martins et al., 2019).

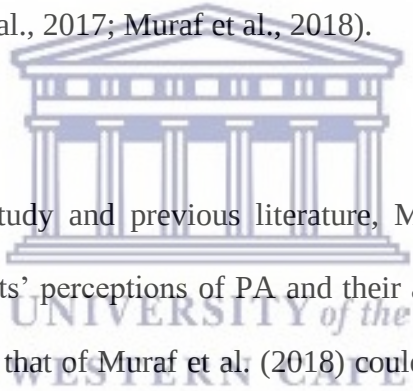
The present study reported a significant difference in students' perceptions based on gender. There was a significant difference in female and male students' perceptions of PA in the current study, even though they both scored high for perception of PA. These findings agree with the results in the study in college students by Omar-Fauzee et al. (2009) that reported a significant difference in students' perceptions of physical education and the importance of PA based on gender. Similarly, Blake et al. (2017) reported that perceptions regarding PA were significantly different due to gender. The significant differences in perceptions based on gender could possibly be explained by males being more supported and encouraged to be physically active and, therefore, they often displayed good perceptions of PA in contrast to females. A study by Yan and Cardinal (2013) reported female students were less likely to participate in PA, because they lacked personal support, and seldom had partners with whom to workout. In contrast, Leuciuc (2018) found no significant difference in male and female perceptions of PA, and this may indicate that students had fairly similar perceptions of PA for health.



The present study also reported no significant difference in students' perceptions of PA with regard to the academic programme and year-level of study. Similar findings were also

reported by Blake et al. (2017) where no significant differences were found in students' perceptions of PA based on their school discipline and year-level.

The present study found a significant moderate relationship between students' perceptions and attitudes, which suggested that students with good perceptions of PA also had good attitudes about PA. Similarly, Arikan (2020) found a significant positive relationship in students' perceptions and their attitudes. Furthermore, previous literature by Gouveia et al. (2019) reported that students' self-perception of enjoying PA and their self-perceptions of competence correlated well with their attitudes about PA. The notion that good perceptions lead to good feelings and emotions may help to explain the positive link between perceptions and attitudes. Furthermore, perceptions shape attitudes, and certain attitudes translate into particular behaviours (Blake et al., 2017; Muraf et al., 2018).




In contrast with the present study and previous literature, Muraf et al. (2018) found no relationship between participants' perceptions of PA and their attitudes. The variation in the results of the current study and that of Muraf et al. (2018) could be related differences in the participants socioeconomic backgrounds and beliefs, as beliefs shape our views (Pickens, 2005).

The present study also found no relationship between students' perceptions and PA behaviours. This finding is similar with Muraf et al. (2018) who reported no significant relationship between participants perceptions and overall PA participation. Similarly, Cheng et al. (2003) reported no relationship between students' perceptions on the perceived barriers to PA and their PA participation. In contrast, Xu et al. (2017) found a significant positive

relationship between students' knowledge of PA and students engaging in PA, since students who were knowledgeable about PA also participated in regular PA.

The present study also found no relationship between students' perceptions and their participation in vigorous-intensity, moderate-intensity and light-intensity PA. In contrast to this finding, the study by Tsang et al. (2013) reported that adolescents who engaged in martial arts demonstrated a significant moderate relationship between their perceptions of family support and PA participation. This finding was also reported by Muraf et al. (2018) who found a significant relationship between participants' perceptions and moderate-intensity PA participation.

The present study found no significant association between students' perceptions and gender, but a significant association between students' perceptions and age. Martins et al. (2019) also reported no association between students' self-perceived knowledge of PA guidelines for healthy adults and gender. However, according to Arikan (2020), the perceptions of students of PA were considerably influenced by gender, with male students having better perceptions of PA than their female counterparts. Furthermore, Arikan (2020) found no significant association in students' perceptions with their age. The significant association between perceptions and age could be partly explained by younger participants having much less responsibilities and, hence, fewer barriers to PA participation in comparison to older participants.

### 5.4. University Students' Attitudes About Physical Activity

Attitudes are made up of a mood, which is a specific way of thinking or belief that influences behaviour, and helps to give objects and situations meaning (Pethkar et al., 2010; Pickens, 2005). A person will eventually engage in regular PA, if they have a good attitude about PA, especially its role in treating chronic illnesses and preventing non-communicable diseases (Jagadeesan et al., 2017; Pickens, 2005).

The results from the present study showed that 94.9% of the students had a positive attitude about PA. Most of the students in the study strongly agreed or agreed to enjoying being physically active. They also strongly agreed or agreed to feeling good about themselves, when they were physically active, and indicated the importance of regular physical activity for their overall health. Anand et al. (2011), stated that the majority of participants in their study had a good attitude toward PA and noted that it was needed to lose weight, regardless of gender. These results were similar to those by Alsulami et al. (2018) who reported that 89.5% of students had positive attitudes about regular PA and its benefits. Aweto et al. (2013) also reported that 94.8% of participants had a good attitude toward PA in treatment planning and in promoting good health. Similarly, Alderman et al. (2020) reported that participants showed a positive attitude toward PA to help improve the health of cancer patients. Furthermore, several studies agreed that participants had good and positive attitudes about PA for general health and in assisting to reduce the prevalence of disease (Banjilka & Badjan, 2019; Jagadeesan et al., 2017; Jagadeesan et al., 2017; Muraf et al., 2018; Ramautar et al., 2021; and Ramezankhani et al., 2013). Perthkar et al., 2010 also reported that children with positive attitudes about PA, grew up to be physically active adults, which demonstrated that good attitudes influence PA behaviours throughout the lifespan and across both genders.

In contrast to the results of the current study, Ranasinghe et al. (2016) reported that undergraduate physiotherapy students in Sri Lanka had poor or negative attitudes towards PA. The variations in the results from the different studies could possibly be related to insufficient education being given to students about the significance of PA, especially in low- and middle-income countries.

The present study reports a significant difference in students' attitudes with gender but no significant difference between students' attitudes with academic program and the year level of study. The current study found a significant difference in students' attitudes between female and male students. This finding is similar to Ziari et al. (2017) that reported a significant difference between students' attitudes with gender and educational level. The similarities could relate to possibly female and male students having different experiences and beliefs which is reflected of the difference in attitudes (Pickens, 2005).



In contrast to the current study, Aniodo et al. (2014) reported no significant difference in students' attitudes between males and females. Similarly, Bebetsos and Antoniou reported no significant differences students' attitudes regarding PA and gender. Ramautar et al. (2021) found no differences between participants' attitudes and their gender. In addition, Anand et al. (2011) also reported that no significant difference between females and males' attitudes regarding PA.

The present study found no significant relationship between students' attitudes and PA behaviours. Similarly, bin Mohamed Roshdin et al. (2016) found that there was no significant relationship in participants attitudes and their PA practices. This finding was in contrast with

Muraf et al. (2018) who found a significant relationship between attitude and overall PA participation. Furthermore, when students' attitudes regarding PA were assessed using different PA intensities in the current study, there was a significant weak positive relationship between students' attitudes and participation in vigorous-intensity PA, but not in moderate- and light-intensity PA. The findings of the present study were similar to that of Muraf et al. (2018) who reported a significant relationship between participants' attitudes and participation in vigorous-intensity PA. Furthermore, unlike the current study, Muraf et al. (2018) reported a significant relationship between participants attitudes and their participation in moderate-intensity PA. The differences in the results between the different studies could be partly explained by the fact that the study by Muraf et al. (2018) was conducted among hospital outpatients who had been diagnosed with essential hypertension for a minimum of 6 months. These patients would have been educated on the importance of physical activity in improving hypertension and, hence, would have accounted for their good attitudes about PA that positively impacted their behaviours.



Moreover, the present study found a significant association between students' attitudes and gender, but no association between students' attitudes and age. A study by Omar-Fauzee et al. (2009) reported that males were more likely to have positive attitudes compared to females about PA participation, as well as its benefits and how it helped cope with stress. In contrast to the current study, Ramautar et al. (2021) reported that there was no significant association between participants' attitudes and gender, since gender roles had changed over the years, so much so that males and females had similar PA behaviours. Significant gender differences in exercise motivation were revealed in a study by Lauderdale et al. (2015), and it was reported that males responded more favourably to intrinsic drive than females. Male participants displayed greater intrinsic drive to participate in PAs than the female participants

that could help explain some of the discrepancies in the results between students' attitudes based on gender. Gouveia et al. (2019) found no association between students' attitudes regarding PA and age. Similarly, Ramautar et al. (2021) reported no significant association between participants attitudes about PA and their ages. Similarly, Arikan (2020) reported no significant association between students age and their attitudes towards PA. Furthermore, Awotidebe et al., (2014) also found that participants ages were not associated with their attitudes about PA.

### 5.5. University Students' Behaviours Regarding Physical Activity

Feelings, emotions, and experiences, as well as one's socio-ecological environment all influence behaviour (Hiew et al., 2015). Physical activity is defined as any physiological movement produced by skeletal muscle that involves the expenditure of energy (Anand et al., 2011). Physical activity is essential in the treatment of modifiable and non-communicable disease, as well as in improving overall health in all individuals across the lifespan (Kohl 3rd et al., 2012; Ramya et al., 2017).



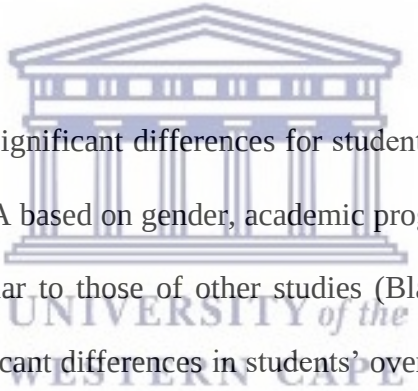
The prevalence of PIA is reported to be moderate-to-high among university students (Goje et al., 2014). Physical inactivity is associated with various non-communicable diseases, such obesity, dyslipidaemia, hypertension and diabetes (Feng et al., 2014; Okop et al., 2016). Peltzer et al. (2014) reported that 10% of female students in South Africa presented with obesity, and attributed the prevalence to poor PA participation amongst these students. A significant proportion of students agreed that being regularly involved in PA decreases the chances of developing non-communicable disease (Awadalla et al., 2014; Tapera et al., 2017).

In the present study, students spent 64.17 median minutes per day doing vigorous-intensity PA and met the American College of Sports Medicine (ACSM) guidelines of a minimum of 20 minutes of vigorous-intensity PA for at least 3 days a week (≥ 75 minutes/week) (Riebie et al., 2016). Similarly, McCarthy and Warne (2022) reported male students spent 60 median minutes per day doing vigorous-intensity PA. The present study also found that students spent 45.00 median minutes per day doing moderate-intensity PA for 3.00 days and did not meet the recommended ACSM guidelines for moderate-intensity PA of at least 30 minutes for 5 days a week (≥150 minutes/week) (Riebie et al., 2016). This is contrary to McCarthy and Warne (2022) who reported male students spent a relatively high 90 median minutes per day doing moderate-intensity PA. Although the students did not meet the recommended guidelines when participating in moderate-intensity PA, students still had good PA practices as they meet the ACSM PA guideline for the combination of moderate to vigorous-intensity PA per week.


The students' behaviours met the recommended moderate to vigorous intensity and PA participation according to the ACSM guidelines. Similarly, Aniodo et al. (2014) found that students had high PA behaviours of 81.38%. The findings of the study were supported by several studies that reported that university students had good PA practices despite prolonged sitting and sleeping patterns (Matusiak-Wieczorek et al., 2020; Papaconstantinou et al., 2020).

In contrast, Grasdalsmoen et al. (2019) reported that approximately 75% of students did not meet the daily recommended PA criteria at age 18–20 years, and this increased to about 82% in students aged 29–35 years. Similarly, Al-Zahrani (2010) reported that only 38% dental

students engaged in moderate and or vigorous intensity. Al-Zahrani (2010) suggested that the poor PA participation among dental students related to insufficient education regarding PA being given to dental students as part of the curriculum. A study by Alsulami et al. (2018) reported insufficient PA practices among participants and attributed the PIA to be as a result of occupational work responsibilities, and women being banned from driving as well as walking alone, which decreased chances of them going to public facilities for PA. The differences in the study may relate to the study population, 78% of the participants in the present study belonged to the SRES department. Most of the students were part of the SRES department participated in various sports programs at the university, and trained regularly for various tournaments throughout the year, this could relate to the overall good PA participation reported in the study.




The present study reported no significant differences for students' participation in vigorous-, moderate- and light-intensity PA based on gender, academic programme and the year-level of study. These findings are similar to those of other studies (Blake et al., 2017; Ziari et al., 2017) which reported no significant differences in students' overall participation in PA based on gender and academic discipline. Keating et al. (2010) also reported no significant differences in participants PA behaviours based on the year-level of study. Ramautar et al. (2021), suggested no gender differences exist with PA participation as the world has changed over the years and both genders were more likely to participate in regular PA due to being exposed to similar opportunities.

In contrast, Keating et al. (2010) reported a significant difference in PA behaviours between the genders. Similarly, Khamaiseh and AL-Bashtawy (2015) reported significant differences

between male and female students regarding stretching exercises. Furthermore, McCarthy and Warne (2022) revealed a substantial difference in gender-based PA participation, with males engaging in higher levels of PA than females. Moreover, Blake et al. (2017) also reported significant differences in PA behaviours based on the students' year-level of study. The differences in the results of the various studies may be partly related to the increased academic pressures and responsibilities as the students' years of study increased (Felez-Nobrega et al., 2020). The students' responsibilities could possibly be a barrier to them exercising (Felez-Nobrega et al., 2020).

The present study also observed a significant difference in students' vigorous intensity PA and age. The participation of vigorous intensity PA was significantly different between age-groups 18-20 and 24-26 years and age-groups 21-23 and 24-26 years.



The present study found a significant positive moderate relationship between students' participation in moderate- and vigorous-intensity PA, and a significant positive week relationship between students' participation in light- and vigorous-intensity PA. Furthermore, the present study reported a significant positive moderate relationship between students' participation in light- and moderate-intensity PA. The results showed that students who engaged in even light-intensity PA were more likely to also participate in moderate- and vigorous-intensity PA.

The present study found a significant association between students' participation in vigorous-intensity PA, gender and age, but no significant association between students' participation in light- or moderate-intensity PA, gender and age. Previous studies reported contrasting results

on the association between PA behavior, gender and age (Awotidebe et al., 2014; McCarthy & Warne, 2022; bin Mohamed Roshdin et al., 2016). McCarthy and Warne reported a significant association between gender and PA participation. Similarly, bin Mohamed Roshdin et al. (2016) found a significant association between gender and overall regular PA participation. In contrast, Ramautar et al. (2021), found no statistically significant association between participants' gender and their engagement in PA. Taha (2008) also reported no significant association between PA behaviour with age. Similarly, Awotidebe et al. (2014) found no significant association between PA participation and age. Younger students were reported as more likely to engage in regular PA in comparison to the older students, because of their differences in academic pressures and responsibilities (Grasdalsmoen et al., 2019; Taha, 2008). This can be as a result of younger students having less obligations to their families than older students. Due to their family and financial obligations, older students who are sometimes married and working full-time find it difficult to balance their schedules and set aside time for regular PA (Grasdalsmoen et al., 2019; Oli et al., 2018; Taha, 2008).



## 5.6. University Students' Sleeping Duration and Sitting Patterns

### 5.6.1. Sleeping Duration

Inadequate sleep has a potential negative effect on physical performance and overall quality of life (Castelli et al., 2022; Lin et al., 2018). Sleep duration that is less than 7 hours is considered insufficient (Lin et al., 2018). The present study found that students slept for a mean of 356.05 (SD = ±171.03) minutes per day which is approximately 5 hours and 57 minutes a day. This is similar to a study by Lin et al. (2018) which found that 46.74% of third year undergraduate students had insufficient sleep, since they slept less than 7 hours a day. Similarly, Papaconstantinou et al. (2020) found the average sleep time of students was 6.80

hours per night which was slightly under the recommended hours of sleep per night. The similarities in insufficient sleep time between the current study and previous literature may be related to students' academic pressures and having to stay up late in order to study (Feng et al., 2014).

In the present study there was no significant difference in sleeping behaviours based on gender, because male and female students reported similar sleeping times. Similarly, Lin et al. (2018) reported no significant difference in male and female students sleeping duration. Also, Feng et al. (2014) reported no significant differences in males and females sleeping durations, and that both suffered from a lack of sleep.

The present study found no significant relationship between sleep and PA. Similarly, a systematic review found that slightly more than half of the studies in the review reported no significant relationship between sleep and PA (Memon et al., 2021). However, Alzamil et al. (2019) reported a significant positive moderate relationship between students sleep and PA participation, with insufficient sleep resulting in poor PA participation.



### 5.6.2. Sitting Patterns

Sedentary behaviour has been linked to an increased risk of cardiovascular and metabolic disease, as well as various cancers, which could lead to increased mortality rates (Matusiak-Wieczorek et al., 2020). Several studies found that university students had poor sitting habits (Abdeta et al., 2019; Peltzer & Pengpid, 2014). Sedentary behaviour has increased as a result of students spending more time sitting, while studying (Okop et al., 2016).

In the present study students spent an average of 477.39 minutes sitting, approximately 7 hours and 57 minutes of sitting per day. The finding is similar to Matusiak-Wieczorek et al. (2020) which reported that students spent an average of 46 hours sitting every week, approximately 7 hours of sitting per day. Similarly, Peltzer and Pengpid (2014) also reported a high sitting average of undergraduate students in underdeveloped and developing countries. However, Peltzer and Pengpid (2014) reported a variation in results as undergraduate students in South Africa, Namibia and Russia reported to sit for less than 300 minutes a day. Similarly, Abdeta et al. (2019) reported participants that sat less than 2 hours a day were two times more likely to engage in regular PA than their counterparts. The variations in results of the current study alongside other literature could be explained in part by students underestimating their sitting behaviours (Peltzer & Pengpid, 2014).



The present study found a significant difference in students total sitting time based on their academic programme, but no significant difference in university students sitting behaviours based on gender and year-level of study. Similarly, Matusiak-Wieczorek et al. (2020) reported a significant difference in students sitting time based on academic discipline. This could be partly explained by various academic programmes being structured differently, which could promote sedentary behaviour in certain programmes compared to others (Matusiak-Wieczorek et al., 2020).

The present study found a significant very weak negative relationship between students' attitudes and their total sitting time. This is contrary to the results reported by Muraf et al. (2018) who indicated no significant relationship between participants attitudes and their

sitting behaviour. The present study also found no significant relationships in students total siting time and participation in vigorous-, moderate- and light-intensity PA. Similarly, Felez-Nobrega et al. (2020) found no significant relationship between sitting behaviour and PA participation, irrespective of the fact that respondents were physically active amidst their poor sitting patterns. Werneck et al. (2018) reported that prolonged sitting was associated with insomnia, irrespective of PA participation (Werneck et al., 2018). According to Matusiak-Wieczorek et al. (2020). the relationship between PA and the time spent sitting had an overall effect on health.

Can and Karaca (2019) reported a significant relationship between students who participated in light-intensity PA and sitting, which indicated that students who participated in light-intensity PA also spent more time sitting compared to those who participated in moderate- and vigorous-intensity PA.



The current study found no association between students total sitting time and gender, and between students' total sitting time and age. A study by Peltzer and Pengpid (2014) reported no significant association in students sitting behaviours and gender, but found a significant association in students' sitting duration and age.

### 5.7. Hypotheses of the Study

The study hypothesised that undergraduate students would have good knowledge, perceptions, and attitudes, but poor behaviours regarding PA.

The hypothesis that students displayed good knowledge, but poor behaviours was rejected, as students in the present study had fair knowledge and good PA behaviours.

The hypothesis that students reflected good perceptions and good attitudes about PA was accepted, as the results from the study showed that students had good perceptions and good attitudes about PA.

It also hypothesized that undergraduate student's knowledge, perceptions, attitudes, and behaviours regarding PA would be associated with selected sociodemographic characteristics, such as age and gender. The hypothesis that students' knowledge would be associated with age and gender was rejected, as the results from the current study showed no association between these variables. The hypothesis that students' perceptions would be associated with gender was also rejected. However, the hypothesis that students' perceptions would be associated with age was accepted. Also, the hypothesis that students' attitudes would be associated with gender was accepted, but not students' attitudes and age. The hypotheses that students' PA would be associated with gender, and students' PA with age were both accepted.



### 5.8. Strengths and Limitations of the Study

The present study constructed and validated a new questionnaire on PA, which had reported results similar to that of previous literature. The similarities of the results may be an indication of a quality of the research instrument.

To our knowledge, this is the first South African study to look at knowledge, perceptions, attitudes and PA behaviours of university students in one study.

There were a few limitations of the study. The relatively small sample size of 177 undergraduate students negatively impacted the power of the study. Another limitation was that differences in students based on academic programs was not adequately represented as the proportion of the sample size varied. However, this was unavoidable as some academic programs have relatively small number of students in comparison to other programs. The information of the study was self-reported data and therefore could be subject to bias. Moreover, the present study was cross-sectional, and therefore the results of the study were not absolute.



**5.9. Conclusion**

Undergraduate students had fair knowledge, good perceptions and good attitudes regarding PA. Most of the students engaged in regular PA and met the minimum PA participation recommendations. There was no significant relationship between students' knowledge about PA and their PA behaviours, which could partially reveal that knowledge on PA is not enough to promote regular PA participation. There was a significant difference in students' perceptions and gender and in students' attitudes and gender. Students' attitudes and vigorous intensity PA were associated with gender furthermore, only students' perceptions and vigorous intensity PA were associated with age. There is a need to educate health sciences students about the importance of PA as future practitioners, so they may set a good example to future clients and patients in their workplaces.

## 5.10. Recommendations

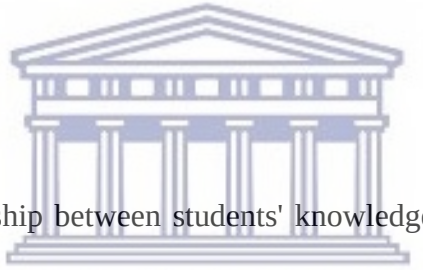
It is recommended that future studies should have a relatively large sample size to improve the strength of the results. Future studies may also look at comparing students' knowledges, attitudes, perceptions and PA behaviours within different faculties and also in comparison to other universities. They may also look at a possible trend between sleeping and sitting behaviours and its effect on PA participation. In order to limit bias reporting, future studies may try incorporating physical measures for PA. They may also include longitudinal data as this will help in establishing patterns over a long period of time.

Physical activity, nutrition alongside emotional and mental health are essential components to living a healthy life. It is also recommended that universities introduce a foundational course that would educate not only health science students but include all students from various faculties about the importance of physical activity, nutrition including emotional and mental health as core elements for overall health. This foundational course would teach students on the minimum recommended participation for PA, different physical activities for all ages, and the various PA intensities. The nutritional aspect of the course would focus on educating students on the basic dietary foods that help with providing the human body with nutrients and healing the body. Lastly students would be taught on emotional and mental health and how it affects the human body. The main objective of the course is to highlight how lifestyle choices influence health, and how we have a role in improving our quality of life.

## 5.11. Summary

The study set out to determine the knowledge, perceptions, attitudes, and behaviours of undergraduate students in the Faculty of Community and Health Sciences at a university in the Western Cape regarding PA. The study found that undergraduate students had fair knowledge, good perceptions and good attitudes regarding PA. The majority of the students engaged in regular PA and met the global minimum PA participation recommendations.

The study assed the differences in students' knowledge, perceptions, attitudes, and behaviours regarding PA based on gender, academic programme and year level. The study found that there was a significant difference in students' perceptions and gender and in students' attitudes with regard to gender.




It also determined the relationship between students' knowledge, perceptions, attitudes, and behaviours regarding physical activity. The study found no significant relationship between students' knowledge, perceptions and attitudes about PA and their PA behaviours. The study reported a significant positive moderate relationship between students' attitudes and perceptions. The study found a significant positive very weak relationship in students' attitudes and vigorous intensity PA. It also found a significant positive moderate relationship in students' vigorous intensity PA and moderate intensity PA participation. Furthermore, it found a significant weak positive relationship in students vigorous intensity PA and light intensity PA. In addition is also found a significant positive moderate relationship in students' moderate intensity PA and light intensity PA participation indicating that overall students who participated in vigorous intensity PA were more likely to also participate in moderate intensity PA and light intensity PA.

Furthermore, the study examined the association between demographic characteristics and students' knowledge, perception, attitudes, and behaviours regarding PA. The study found that students' attitudes and vigorous-intensity PA were associated with gender. Furthermore, only students' perceptions and vigorous-intensity PA were associated with age.

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APPENDIX A: INFORMATION LETTER

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Private Bag X 17, Bellville, 7535, South Africa

*Tel: +27 21-959 2409 Fax: 27 21-959 3688*

**E-mail:** 3633706@myuwc.ac.za

## INFORMATION SHEET

**Project Title:** **Relationship between knowledge, perceptions, attitudes, and behaviours of undergraduate university students regarding physical activity**

Dear Participant,



### Introduction

This is an invitation for you to participate in a study. This information sheet will help you to decide whether you would like to participate in this study or not. Before you decide to participate, it is required for you to fully understand what is involved in this study. If there are any questions regarding this study, please feel free to ask.

### What is this study about?

This is a research project being conducted by Nonhle Qwabe from the University of the Western Cape. You are invited to participate in this research project to determine your knowledge, perceptions, attitudes, and behaviours regarding physical activity. This will give

you an indication of the areas you need to focus on to improve your health, as well as contribute to advancing research in this field.

**What will I be asked to do if I agree to participate?**

You will be asked to complete a consent form before any information or data is recorded. Participation will require completing a self-administered questionnaire either online via google form or by paper. The questionnaire will ask about your personal information, your lifestyle, and your knowledge, perceptions, attitudes, and behaviours about physical activity.

**Would my participation in this study be kept confidential?**

All your personal information will be kept strictly confidential. All recorded data will be kept confidential by replacing your name with alphanumeric codes and saving the information in a password-protected computer folder that will be accessed by the researcher and supervisor only. If we write a report or article about this research project, your identity will be protected.



**What are the risks of this research?**

There may be some risks from participating in this research study. Possible expected risks of an emotional and psychological nature may include feeling self-conscious, embarrassed, or anxious, due to having fears of possible negative outcomes. Where necessary, an appropriate referral will be made to a suitable professional at the Centre for Student Support Services (CSSS) for further assistance or intervention.

**What are the benefits of this research?**

The benefits to you include personal enrichment and awareness of your current knowledge of physical activity and obesity. As a student, you will be able to establish which areas you need

to expand your knowledge to bring about change in your lifestyle. The research may also be of value to you as a future practitioner in the health sector.

**Do I have to be in this research, and may I stop participating at any time?**

Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. If you decide not to participate in this study or if you stop participating at any time, you will not be penalized or lose any benefits to which you otherwise qualify.

**Is any assistance available if I am negatively affected by participating in this study?**

If you are negatively affected by participating in the study, you can inform the Department of Sport, Recreation and Exercise Science, Nonhle Qwabe, and/or the study supervisor, Prof Leach.



**What if I have questions?**

This research is being conducted by Nonhle Qwabe from the University of the Western Cape. If you have any questions about the research study itself, please contact Nonhle Qwabe on 3633706@myuwc.ac.za.

Should you have any questions regarding this study and your rights as a research participant or if you wish to report any problems you have experienced related to the study, please contact:

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Dean FCHS: Prof Anthea Rhoda
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APPENDIX B: CONSENT FORM


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**Private Bag X 17, Bellville, 7535, South Africa**
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## CONSENT FORM

**Title of the Research Project:** **Relationship between knowledge, perceptions, attitudes, and behaviours of undergraduate university students regarding physical activity.**

The study has been described to me in language that I understand, and I freely and voluntarily agree to participate. My questions about the study have been answered. I understand that my identity will not be disclosed and that I may withdraw from the study without giving a reason at any time and this will not negatively affect me in any way.



**Participant's name:** **…….**

**Participant's signature:** **…….**

**Date:** **……**

APPENDIX C: QUESTIONNAIRE ON KNOWLEDGE, PERCEPTIONS, ATTITUDE AND BEHAVIOURS REGARDING PHYSICAL ACTIVITY (QKPAB)

**UNIVERSITY OF THE WESTERN CAPE**

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**Questionnaire on Knowledge, Perceptions, Attitudes and Behaviours regarding Physical Activity.**

**Section A: Personal Information**

**Instructions:**
Please tick the appropriate box to select your response for each of the following statements or questions.

| QUESTION | | RESPONSE | Code |
|---|---|---|---|
| 1. | Sex | ☐ 1.Male<br>☐ 2.Female | ☐ 1<br>☐ 2 |
| 2. | Date of birth (DOB) | _____(yyyy,mm,dd) | |
| 3. | Home language | ☐ 1.IsiZulu<br>☐ 2.IsiXhosa<br>☐ 3.Afrikaans<br>☐ 4.English<br>☐ 5.Sesotho<br>☐ 6.Setswana<br>☐ 7.SiSwati<br>☐ 8. Sepedi<br>☐ 9. Xitsonga<br>☐ 10. IsiNdebele<br>☐ 11.Tshivenda<br>☐ 12. Other, if other please specify_____ | ☐ 1<br>☐ 2<br>☐ 3<br>☐ 4<br>☐ 5<br>☐ 6<br>☐ 7<br>☐ 8<br>☐ 9<br>☐ 10<br>☐ 11<br>☐ 12 |
| 4. | Marital status | ☐ 1.Single<br>☐ 2.Cohabiting/living together<br>☐ 3.Married<br>☐ 4.Divorced<br>☐ 5.Widowed | ☐ 1<br>☐ 2<br>☐ 3<br>☐ 4<br>☐ 5 |

| | | | |
|---|---|---|---|
| | | ☐ 6.Separated | ☐ 6 |
| 5. | Current year level of registration | ☐ 1.1st year<br>☐ 2. 2nd year<br>☐ 3. 3rd year<br>☐ 4. 4th year<br>☐ 5. 5th year | ☐ 1<br>☐ 2<br>☐ 3<br>☐ 4<br>☐ 5 |
| 6. | Department or school of study in the faculty | ☐ 1. Department of Dietetics and Nutrition<br>☐ 2. Department of Occupational Therapy<br>☐ 3. Department of Physiotherapy<br>☐ 4.Department of Psychology<br>☐ 5. Department of Social Work<br>☐ 6. Department of Sport, Recreation and Exercise Science<br>☐ 7. School of Natural Medicine<br>☐ 8. School of Nursing<br>☐ 9. Other, if other please specify _____ | ☐ 1<br>☐ 2<br>☐ 3<br>☐ 4<br>☐ 5<br>☐ 6<br>☐ 7<br>☐ 8<br>☐ 9 |
| 7. | Where do you stay or live as a student? | ☐ 1. I stay in a residence on the main campus (e.g., Coline Williams, Kovacs, etc.)<br>☐ 2. I stay in a residence off the main campus (e.g., Disa, HPR, etc.)<br>☐ 3. I stay in private residence, as a border<br>☐ 4. I stay at home | ☐ 1<br>☐ 2<br>☐ 3<br>☐ 4 |

**Section B: Knowledge of Physical Activity**

Please tick the appropriate box to select your response for each of the following statements or questions.



| | QUESTION | RESPONSE | |
|---|---|---|---|
| 8 | How would you classify casual walking (Talking and singing are both easily performed with casual walking) in terms of exercise-intensity? | ☐ **1 A. Light-intensity exercise**<br>☐ 2 B. Moderate-intensity exercise<br>☐ 3 C. Vigorous-intensity exercise<br>☐ 4 B and C only<br>☐ 5 All of the above | ☐ 1<br>☐ 2<br>☐ 3<br>☐ 4<br>☐ 5 |
| 9 | For sedentary adults, which exercise intensity or intensities will result in improved health? | ☐ 1 A. Light-intensity exercise<br>☐ 2 B. Moderate-intensity exercise<br>☐ 3 C. Vigorous-intensity exercise<br>☐ 4 B and C only<br>☐ **5 All of the above** | ☐ 1<br>☐ 2<br>☐ 3<br>☐ 4<br>☐ 5 |

| | | | |
|---|---|---|---|
| 1 | For achieving health benefits in healthy adults, the minimum amount of moderate-intensity physical activity and/or exercise should add up to at least _____ minutes per week. | ☐ 1 120 minutes per week<br>☐ 2 130 minutes per week<br>☐ 3 140 minutes per week<br>☐ **4 150 minutes per week** | ☐ 1<br>☐ 2<br>☐ 3<br>☐ 4 |
| 1 | For achieving health benefits in sedentary adults, the minimum number of steps should add up to _____ steps per day. | ☐ 1 4 000 steps per day<br>☐ 2 6 000 steps per day<br>☐ 3 8 000 steps per day<br>☐ **4 10 000 steps per day (get a suitable reference)**<br>☐ 5 All of the above | ☐ 1<br>☐ 2<br>☐ 3<br>☐ 4<br>☐ 5 |
| 1 | In healthy adults, the minimum number of days of exercise per week for strength training should add up to_____ days per week. | ☐ 1 1 day per week<br>☐ **2 2 days per week**<br>☐ 3 3 days/more per week<br>☐ 4 All of the above | ☐ 1<br>☐ 2<br>☐ 3<br>☐ 4 |
| 1 | In healthy adults, the minimum number of days of exercise per week for flexibility training should add up to_____ days per week. | ☐ 1 1 day per week<br>☐ **2 2 days per week**<br>☐ 3 3 days/more per week<br>☐ 4 All of the above | ☐ 1<br>☐ 2<br>☐ 3<br>☐ 4 |
| 1 | For achieving health benefits in all adults, the following indoor physical activities can be performed: | ☐ 1 A. Yoga<br>☐ 2 B. Cooking<br>☐ 3 C. Dancing<br>☐ 4 D. Computer games<br>☐ **5 A and C only**<br>☐ 6 All of the above | ☐ 1<br>☐ 2<br>☐ 3<br>☐ 4<br>☐ 5<br>☐ 6 |
| 1 | For achieving health benefits in all adults, the following physical activities should be performed: | ☐ 1 Cardiovascular activities e.g., running, dancing, etc.<br>☐ 2 Muscular strength activities e.g., weight lifting, strength training, etc.<br>☐ 3 Muscular endurance activities e.g., push-ups, sit-ups, etc.<br>☐ 4 Flexibility activities e.g., stretching, yoga, etc.<br>☐ **5 All of the above** | ☐ 1<br>☐ 2<br>☐ 3<br>☐ 4<br>☐ 5 |
| 1 | For improving health in all adults, the load of physical activity should be changed as follows: | ☐ 1 By increasing the exercise frequency (number of days per week)<br>☐ 2 By increasing the exercise duration (number of minutes per session)<br>☐ 3 By increasing the exercise intensity (number of heart beats per minute) | ☐ 1<br>☐ 2<br>☐ 3 |

| | | | |
|---|---|---|---|
| | | ☐ **4 By increasing all of the above**<br>☐ 5 I don't know | ☐ 4<br>☐ 5 |
| 1 | For improving strength in healthy adults, you need to engage in: | ☐ 1 Swimming<br>☐ **2 Weight-lifting**<br>☐ 3 Running<br>☐ 4 Cycling<br>☐ 5 Dancing | ☐ 1<br>☐ 2<br>☐ 3<br>☐ 4<br>☐ 5 |

**Section C: Perceptions of Physical Activity**
**Instructions:**
Please tick the appropriate box to select your response for each of the following statements that reflects your current perception.

| | Perceptions about physical activity (PA) | Strongly agree | Agree | Not sure | Disagree | Strongly disagree | Code |
|---|---|---|---|---|---|---|---|
| 18 | I like physical activity. | | | | | | SA-5, A-4, NS-3, D-2, SD-1 |
| 19 | Physical activity improves mental health. | | | | | | SA-5, A-4, NS-3, D-2, SD-1 |
| 20 | Physical activity is important for my health physical health. | | | | | | SA-5, A-4, NS-3, D-2, SD-1 |
| 21 | Physical activity is boring. | | | | | | **SD-5, D-4, NS-3, A-2, SA-1** |
| 22 | Physical activity is necessary for preventing diseases. | | | | | | SA-5, A-4, NS-3, D-2, SD-1 |
| 23 | Physical activity is recommended for all ages. | | | | | | SA-5, A-4, NS-3, D-2, SD-1 |
| 24 | Engaging in regular physical activity is expensive. | | | | | | **SD-5, D-4, NS-3, A-2, SA-1** |
| 25 | My academic studies prevent me from | | | | | | **SD-5, D-4, NS-3, A-2,** |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | being physically active. | | | | | | **SA-1** |
| 26 | Regular physical activity helps me to function better in my activities of daily living. | | | | | | SA-5, A-4, NS-3, D-2, SD-1 |
| 27 | Regular physical activity is necessary for physical fitness. | | | | | | SA-5, A-4, NS-3, D-2, SD-1 |

**Section D: Attitudes About Physical Activity**

**Instructions:**
Please tick the appropriate box to select your response for each of the following statements that reflects your current attitude.

| **Attitudes about physical activity (PA)** | | **Strongly agree** | **Agree** | **Not sure** | **Disagree** | **Strongly disagree** | **Code** |
|---|---|---|---|---|---|---|---|
| 28 | Regular physical activity is important for my overall health. | | | | | | SA-5, A-4, NS-3, D-2, SD-1 |
| 29 | Regular physical activity is difficult for me. | | | | | | **SD-5, D-4, NS-3, A-2, SA-1** |
| 30 | Regular physical activity helps me cope with stress. | | | | | | SA-5, A-4, NS-3, D-2, SD-1 |
| 31 | I find being physically active stressful. | | | | | | **SD-5, D-4, NS-3, A-2, SA-1** |
| 32 | Regular physical activity helps me balance my physical and mental well-being. | | | | | | SA-5, A-4, NS-3, D-2, SD-1 |
| 33 | I feel good about myself when I am physically active. | | | | | | SA-5, A-4, NS-3, D-2, SD-1 |
| 34 | I enjoy being physically active. | | | | | | SA-5, A-4, NS-3, D-2, |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | SD-1 |
| 35 | I try my best to engage in physical activities. | | | | | | SA-5, A-4, NS-3, D-2, SD-1 |
| 36 | I am motivated to be physically active. | | | | | | SA-5, A-4, NS-3, D-2, SD-1 |
| 37 | I encourage others to be physically active. | | | | | | SA-5, A-4, NS-3, D-2, SD-1 |

**Section E: Physical Activity Behaviours**

**Instructions:**

- Please tick the appropriate box you would like to select for your response to each of the following statements that reflects your current physical activity behavior and fill in where applicable.

| **OCCUPATIONAL WORK (Refers to the job or work that a person does for their profession, it includes clinical work)** | | |
|---|---|---|
| | **Questions** | **Response** |
| 38 | Does your work involve vigorous-intensity activity, that causes large increases in breathing, that make talking and singing difficult for at least 10 minutes continuously? | 1. Yes ☐<br>0. No ☐, ***If No go to Q43*** |
| 39 | In a typical week, on how many days do you do vigorous intensity activities as part of your work? | Number of days ☐ |
| 40 | In a typical day, how much time do you spend (in minutes only) doing vigorous-intensity activities at work? e.g. 45 minutes per day | Minutes ☐☐:☐☐ mins |
| 41 | Does your work involve moderate-intensity activity, that causes small increases in breathing, that make talking easy but singing difficult for at least 10 minutes continuously? | 1. Yes ☐<br>0. No ☐, ***If No go to Q46*** |
| 42 | In a typical week, on how many days do you do moderate-intensity activities as part of your work? | Number of days ☐ |
| 43 | In a typical day, how much time do you spend (in minutes only) | Minutes ☐☐:☐☐ |

| | | |
|---|---|---|
| | doing moderate-intensity activities at work? e.g. 45 minutes per day | mins |
| 44 | Does your work involve light-intensity activity, that doesn't cause an increase in breathing that make talking and singing easy for at least 10 minutes continuously? | 1. Yes ☐<br>0. No ☐, ***If No go to Q49*** |
| 45 | In a typical week, on how many days do you do light-intensity activities as part of your work? | Number of days ☐ |
| 46 | In a typical day, how much time do you spend (in minutes only) doing light-intensity activities at work? e.g. 45 minutes per day | Minutes ☐☐:☐☐ mins |
| **TRAVEL**<br>**(This refers to "cycling or walking" from one place to another and NOT stationery cycling e.g., in a gym, or cycling as part of sporting/exercise programme).** | | |
| 47 | Do you walk or cycle on a vigorous intensity, that causes large increases in breathing, that make talking and singing difficulty for at least 10 minutes continuously from place to place? | 1. Yes ☐<br>0. No ☐, ***If No go to Q50*** |
| 48 | In a typical week, how many days do you walk or cycle on fast speed for at least 10 minutes continuously from place to place? | Number of days ☐ |
| 49 | In a typical day, how much time do you spend (in minutes only) walking or cycling on fast speed for travel? e.g. 45 minutes per day | Minutes ☐☐:☐☐ mins |
| 50 | Do you walk briskly or cycle on a moderate intensity, that causes small increases in breathing, that make talking easy but singing difficult for at least 10 minutes continuously from place to place? | 1. Yes ☐<br>0. No ☐, ***If No go to Q53*** |
| 51 | In a typical week, how many days do you walk briskly or cycle on a moderate speed for at least 10 minutes continuously from place to place? | Number of days ☐ |
| 52 | In a typical day, how much time do you spend (in minutes only) walking briskly or cycling on a moderate speed for travel? e.g. 45 minutes per day | Minutes ☐☐:☐☐ hrs mins |
| 53 | Do you walk casually or cycle on a low intensity that doesn't cause an increase in breathing, that make talking and singing easy for at least 10 minutes continuously from place to place? | 1. Yes ☐<br>0. No ☐, ***If No go to Q56*** |
| 54 | In a typical week, how many days do you walk casually or | Number of days ☐ |

| | | |
|---|---|---|
| | cycle on low speed for at least 10 minutes continuously from place to place? | |
| 55 | In a typical day, how much time do you spend (in minutes only) walking casually or cycling on a low speed for travel? e.g. 45 minutes per day | Minutes ☐☐:☐☐ mins |
| **DOMESTIC WORK**<br>**(Includes activities of daily living, e.g., cleaning, washing, ironing, gardening, personal hygiene, cooking, cleaning, domestic chores, laundry, gardening, reading, studying, computer games and mobile devices)** | | |
| 56 | Does your domestic work involve vigorous-intensity activity, that causes large increases in breathing, that make talking and singing difficult for at least 10 minutes continuously? | 1. Yes ☐<br>0. No ☐, ***If No go to Q59*** |
| 57 | In a typical week, how many days do you do vigorous intensity activities as part of your domestic work? | Number of days ☐ |
| 58 | In a typical day, how much time do you spend (in minutes only) doing vigorous-intensity activities of domestic work? e.g. 45 minutes per day | Minutes ☐☐:☐☐ mins |
| 59 | Does your domestic work involve moderate-intensity activity, that causes small increases in breathing that make talking easy but singing difficulty for at least 10 minutes continuously? | 1. Yes ☐<br>0. No ☐, ***If No go to Q62*** |
| 60 | In a typical week, how many days do you do moderate-intensity activities as part of your domestic work? | Number of days ☐ |
| 61 | In a typical day, how much time do you spend (in minutes only) doing moderate-intensity activities of domestic work? e.g. 45 minutes per day | Minutes ☐☐:☐☐ mins |
| 62 | Does your domestic work involve light-intensity activity, that doesn't cause an increase in breathing that make talking and singing easy for at least 10 minutes continuously? | 1. Yes ☐<br>0. No ☐, ***If No go to Q65*** |
| 63 | In a typical week, how many days do you do light-intensity activities as part of your domestic work? | Number of days ☐ |
| 64 | In a typical day, how much time do you spend (in minutes only) doing light-intensity activities of domestic work? e.g. 45 minutes per day | Minutes ☐☐:☐☐ mins |
| **RECREATIONAL ACTIVITIES**<br>**(Includes activities done for the purpose of enjoyment, e.g., walking, playing indoor or** | | |

| | | |
|---|---|---|
| **outdoor games, swimming, dancing, etc.)** | | |
| 65 | Do you do any vigorous-intensity sports, fitness or recreational (leisure) activities, that cause large increases in breathing, that make talking and singing difficult for at least 10 minutes continuously? | 1. Yes ☐<br>0. No ☐, ***If No go to Q68*** |
| 66 | In a typical week, how many days do you do vigorous-intensity sports, fitness or recreational (leisure) activities? | Number of days ☐ |
| 67 | In a typical day, how much time do you spend (in minutes only) doing vigorous-intensity sports, fitness or recreational activities? e.g. 45 minutes per day | Minutes ☐☐:☐☐ mins |
| 68 | Do you do any moderate-intensity sports, fitness or recreational (leisure) activities, that cause a small increase in breathing, that make talking easy but singing difficult for at least 10 minutes continuously? | 1. Yes ☐<br>0. No ☐, ***If No go to Q71*** |
| 69 | In a typical week, how many days do you do moderate-intensity sports, fitness or recreational (leisure) activities? | Number of days ☐ |
| 70 | In a typical day, how much time do you spend (in minutes only) doing moderate-intensity sports, fitness or recreational (leisure) activities? e.g. 45 minutes per day | Minutes ☐☐:☐☐ mins |
| 71 | Do you do any light-intensity sports, fitness or recreational (leisure) activities, that doesn't cause an increase in breathing, that make talking and singing easy for at least 10 minutes continuously? | 1. Yes ☐<br>0. No ☐, ***If No go to Q74*** |
| 72 | In a typical week, how many days do you do light-intensity sports, fitness or recreational (leisure) activities? | Number of days ☐ |
| 73 | In a typical day, how much time do you spend (in minutes only) doing light-intensity sports, fitness or recreational (leisure) activities? e.g. 45 minutes per day | Minutes ☐☐:☐☐ mins |
| **SLEEP**<br>**(Time spent sleeping on average per week)** | | |
| 74 | How much time on average per day do you spend (in minutes only) sleeping? e.g. 45 minutes per day | Minutes ☐☐:☐☐ mins |
| **SEDENTARY BEHAVIOUR/SITTING**<br>**(Includes time spent while on social media and excludes sleeping time)** | | |
| 75 | Do you spend time sitting for occupational work? | 2. Yes ☐<br>0. No ☐, ***If No go to Q78*** |

| | | |
|---|---|---|
| 76 | In a typical week, how many days do you spend sitting for occupational work? | Number of days ☐ |
| 77 | In a typical day, how much time do you spend (in minutes only) sitting for occupational work? e.g. 45 minutes per day | Minutes ☐☐:☐☐ mins |
| 78 | Do you spend time sitting for travel? | 1. Yes ☐<br>0. No ☐, ***If No go to Q81*** |
| 79 | In a typical week, how many days do you spend sitting for travel? | Number of days ☐ |
| 80 | In a typical day, how much time do you spend (in minutes only) sitting for travel? e.g. 45 minutes per day | Minutes ☐☐:☐☐ mins |
| 81 | Do you spend time sitting for recreation? | 1. Yes ☐<br>0. No ☐, ***If No go to Q84*** |
| 82 | In a typical week, how many days do you spend sitting for recreation? | Number of days ☐ |
| 83 | In a typical day, how much time do you spend (in minutes only) sitting for recreation? e.g. 45 minutes per day | Minutes ☐☐:☐☐ mins |
| 84 | Do you spend time sitting for domestic work? | 1. Yes ☐<br>0. No ☐, ***If No you have completed the questionnaire*** |
| 85 | In a typical week, how many days do you spend sitting for domestic work? | Number of days ☐ |
| 86 | In a typical day, how much time do you spend (in minutes only) sitting for domestic work? e.g. 45 minutes per day | Minutes ☐☐:☐☐ mins |



**This is the end of the questionnaire, thank you for participating.**

APPENDIX D: CRITICAL APPRAISAL ASSESSMENT TOOL

**UNIVERSITY OF THE WESTERN CAPE**
**Private Bag X 17, Bellville, 7535, South Africa**
***Tel: +27 21-959 2409 Fax: 27 21-959 3688***
**E-mail:** 3633706@myuwc.ac.za

# Critical Appraisal Assessment Tool

# for evaluating the

# Questionnaire on Knowledge, Perceptions, Attitudes and Behaviours regarding Physical Activity

**Instructions**

This is a critical appraisal assessment tool (CAAT) with ten domains (categories) that is used to evaluate the validity of the Questionnaire on Knowledge, Perceptions, Attitudes and Behaviours regarding Physical Activity.

This tool has 4 columns, the first is the number of the 10 domains of CAAT, the second contains the category or domain (in highlighted text) that is being assessed, the third is the statement that explains the domain, and the fourth column contains the tick boxes for the reviewer's responses.

Please indicate your response by selecting the appropriate tick box. If the option "No" is selected for any of the ten categories, please use the feedback table to indicate:

- Which section(s) and which question(s) in that section of the questionnaire is/are problematic, and
- How the question(s) can be improved.

***N.B Please refer to the example given in the feedback table.***

| No. | Category/Domain | Statement | Response | |
|---|---|---|---|---|
| | | | Yes | No |
| 1. | **Specificity** of the questions in sections B, C, D and E of the questionnaire. | Each question is specific and related to knowledge, perceptions, attitudes and behaviours regarding physical activity. | ☐ | ☐ |
| 2. | **Scope and focus** of the questions in sections B, C, D and E of the | All the questions together cover the full scope and critical areas (focus) of knowledge, perceptions, attitudes and behaviours regarding physical activity. | ☐ | ☐ |

| | | | | |
|---|---|---|---|---|
| | questionnaire. | | | |
| 3. | **Responses** to the questions in sections B, C, D and E of the questionnaire. | The responses and format are appropriate for each question. | ☐ | ☐ |
| 4. | **Clarity** of the questions in sections B, C, D and E of the questionnaire | Each question is clear and easy to understand. | ☐ | ☐ |
| 5. | **Ambiguity** of the questions in sections B, C, D and E of the questionnaire. | Each question is focused on a single issue that requires a single answer. The questions are not ambiguous or double-barreled. | ☐ | ☐ |
| 6. | **Language and Writing style** in the questions in sections B, C, D and E of the questionnaire. | The language and writing style are appropriate for each question. | ☐ | ☐ |
| 7. | **Organization** of the sections and questions in each section of the questionnaire. | The questionnaire is organised into three sections that are logical, and the questions in each section are logical and easy to follow. | ☐ | ☐ |
| 8. | **Question Length** | Each question has the appropriate length. It is not too long or too short. | ☐ | ☐ |
| 9. | **Decision-making** regarding the questions in sections B, C, D and E of the questionnaire. | Each question requires careful decision-making before making a response. | ☐ | ☐ |
| 10. | **Questionnaire Length** | The questionnaire is an appropriate length. It is not too long or too short. | ☐ | ☐ |



## Feedback Table

**Instructions**

This feedback table is only applicable for the responses where "No" was selected in the assessment tool above.

Please use the table to indicate any feedback about the questionnaire and how it can be improved. Please fill in each column in the table when giving feedback. An example is provided (in italics and grey background) how to complete the table.

| Category/Domain | Section(s) | Question(s) | Feedback |
|---|---|---|---|
| *2. Scope and Focus* | *C* | *3* | *The question is not focused on knowledge, perceptions, attitudes and behaviours regarding physical activity, it needs to be re-focused properly.* |
| | | | |
| | | | |

## Scoring of CAAT

**Instructions**

Please tick the appropriate box for the total number of 'Yes" ticks to see the final score for the evaluation or grading of the questionnaire.

| Number of 'YES' ticks | Final Score of CAAT (%) |
|---|---|
| 1 ☐ | 10 |
| 2 ☐ | 20 |
| 3 ☐ | 30 |
| 4 ☐ | 40 |
| 5 ☐ | 50 |
| 6 ☐ | 60 |
| 7 ☐ | 70 |
| 8 ☐ | 80 |
| 9 ☐ | 90 |
| 10 ☐ | 100 |



***Scoring Categories:***

| *Score* | *Rating* |
|---|---|
| ≤ 40% | Low |
| 41% - 69% | Moderate |
| ≥ 70% | High |

***N.B. Only a high score (≥ 70%) for the assessment tool will be applicable for research purposes.***

APPENDIX E: ETHICS CLEARANCE

UNIVERSITY *of the* WESTERN CAPE


19 October 2020

Ms NAP Qwabe
SRES
**Faculty of Community and Health Sciences**

| | |
|---|---|
| **Ethics Reference Number:** | HS20/8/5 |
| **Project Title:** | Relationship between knowledge, perceptions, attitudes and behaviours of undergraduate university students regarding physical activity. |
| **Approval Period:** | 30 September 2020 – 30 September 2023 |

I hereby certify that the Humanities and Social Science Research Ethics Committee of the University of the Western Cape approved the methodology and ethics of the above mentioned research project.

Any amendments, extension or other modifications to the protocol must be submitted to the Ethics Committee for approval.

**Please remember to submit a progress report by 30 November each year for the duration of the project.**

***The permission to conduct the study must be submitted to HSSREC for record keeping purposes.***

The Committee must be informed of any serious adverse event and/or termination of the study.

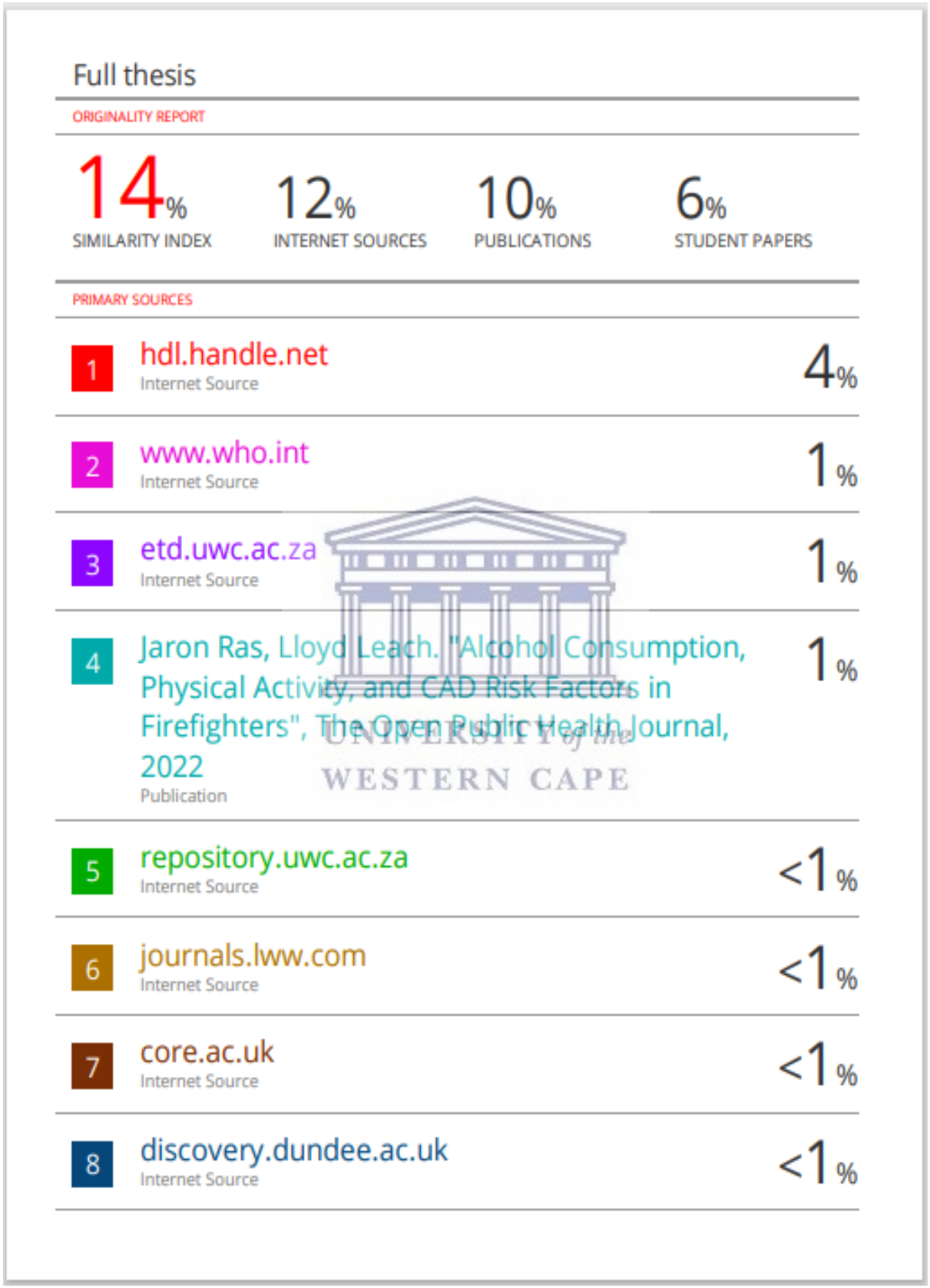
*Ms Patricia Josias*
*Research Ethics Committee Officer*
*University of the Western Cape*

Director: Research Development
University of the Western Cape
Private Bag X 17
Bellville 7535
Republic of South Africa
Tel: +27 21 959 4111
Email: research-ethics@uwc.ac.za

*NHREC Registration Number: HSSREC-130416-049*

FROM HOPE TO ACTION THROUGH KNOWLEDGE.

## APPENDIX F: TURN-IT-IN REPORT



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