DURBAN UNIVERSITY OF TECHNOLOGY

FACTORS CONTRIBUTING TO SUCCESS IN ANATOMY AND PHYSIOLOGY IN FIRST YEAR STUDENTS IN THE KZNCN NURSING PROGRAMME

ELEANOR MARGARET LANGTREE

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FACTORS CONTRIBUTING TO SUCCESS IN ANATOMY AND PHYSIOLOGY IN FIRST YEAR STUDENTS IN THE KZNCN NURSING PROGRAMME

Eleanor Margaret Langtree

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Supervisor : Dr A. Razak
Co-supervisor: Dr F. Haffejee
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Declaration

This is to certify that the work is entirely my own and not of any other person, unless explicitly acknowledged (including citation of published and unpublished sources). The work has not previously been submitted in any form to the Durban University of Technology or to any other institution for assessment or for any other purpose.

_____ _____
Signature of student Date

Approved for final submission

_____ _____
Dr A. Razak Date
RN, RM, PhD

_____ _____
Dr F. Haffejee Date
PhD

Dedication

In dedication to my father Derek Wyatt-Goodall – A teacher whose intellectual integrity was built on a quest for the Truth.

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ABSTRACT

Introduction:

There is a global shortage of nurses, particularly in South Africa where there is a scarce resource of professional nurses. Since KwaZulu-Natal College of Nursing (KZNCN) is tasked with the responsibility of training 86% of professional nurses in the province, it is unfortunate to lose 22% of these students through failure and attrition. Most of these failures are in the subject of Anatomy and Physiology.

Aim of study:

The aim of the study was to establish factors that impact on the success in Anatomy and Physiology in first year student nurses affiliated to KZNCN, in a South African context.

Methodology:

A quantitative descriptive survey research design was used to establish relationships between variables that impact on nursing students' success in Anatomy and Physiology.

Results:

The majority of respondents were Black (86.7%) from rural areas (61.3%) of KwaZulu-Natal. Their nurse training was in English as a second language (78.6%) but most respondents felt that they were coping well with being taught in English ($p < 0.001$). However, respondents with English as a first language obtained significantly higher marks in Anatomy and Physiology I ($p = 0.003$) and there was a good correlation between matriculation English and Anatomy and Physiology II results ($p = 0.02$). There was also a good correlation between matriculation Biology/Life Science mark and Anatomy and Physiology I marks ($p < 0.001$). Additionally, good performance in Anatomy and Physiology I was a good indicator for success in Anatomy and Physiology II ($p < 0.001$).

A significant number of respondents found the academic workload, financial stressors and long working hours stressful but engaged in positive coping skills to address these.

Conclusion:

Prior knowledge in English and Biology/Life Sciences has a significant positive impact on student performance in Anatomy and Physiology.

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List of Acronyms

DoH: Department of Health (South Africa)

DP: Duly Performed

ESL: English second language

FGS: First Generation Student

KZNCN: KwaZulu-Natal College of Nursing

SANC: South African Nursing Council

R425 Nursing Programme: The South African Nursing Council Regulation 425 directs the education and training of a nurse in a four year nurse training programme (Government Gazette Regulation number 425 of 22nd February 1985 as amended) culminating in a qualification as a Professional Nurse with additional qualifications in Midwifery, Community and Psychiatric Nursing.

CHAPTER 1: INTRODUCTION

1.1 Background of the study

There is currently a shortage of nurses in South Africa (Pillay 2009: 39; Mokoka, Oosthuizen and Ehlers 2010: 1). A study was commissioned in 2008 by the South African Department of Labour, to identify and confirm that nursing was a scarce, critical skill in South Africa. The findings established at both the government and industry level that South Africa had an aging workforce of professional nurses (less than 10% are below the age of 30 years) and that there was a shortage of nurses at all levels, and specifically at a professional level in the public health sector (Wildschut and Mqolozana 2008: 61-63). It was estimated that by 2011 there would be a deficit of 18 758 nurses (George, Quinlan and Reardon 2009: 29). One of the new policies drawn up by the Department of Labour to address this problem involves increasing nurse numbers by training and retaining nurses. The nursing programme encompasses the comprehensive four years of training leading to a diploma in General Nursing, Community Nursing, Midwifery and Psychiatric Nursing Science.

The programme is run by the KwaZulu-Natal College of Nursing (KZNCN), is offered at 10 campuses in KwaZulu-Natal and is affiliated to the University of Zululand and the University of KwaZulu-Natal. The Department of Health (DoH) funds the infrastructure for the education of nurses thus ensuring a continuous and adequate supply of professional nurses for the Public Health system in the country. The programme is provided by the DoH in the form of a state funded bursary system for students and funding of the infrastructure of campuses and the KZNCN. Each of the 10 campuses has an accreditation agreement with the South African Nursing Council for an allocation of between 25 and 45 student nurses (depending on the staffing and structural resources of each campus).

These provincial campuses in South Africa train the bulk of professional nurses for the Public Service. All the provinces in South Africa function in a similar manner with regard to nurse training. In the province of KwaZulu-Natal, KZNCN trained 534 public service professional nurses with the R425 programme in 2012 as opposed to 70 nurses trained from all Universities in KwaZulu-Natal in 2012 (South African Nursing Council 2013:1).

New nursing recruits commence training on a six monthly cycle annually every January and July throughout the province. Each student group is identified by the year and month of their commencement of training, for example the student group commencing training in July 2012 are recognised as belonging to group "7/2012" and those that commence training in January 2013 are designated as "1/2013". A bursary is awarded to each student who receives a stipend to the value of R3000 per month throughout their training. This allocation of funds is to provide for the accommodation, transport, uniforms and books for student nurses during their training. The bursary funding is withdrawn for the period involved if a student repeats a module.

The R425 (Regulation 425 of 22 February 1985) programme is a four year nurse training programme culminating in a qualification as a Professional Nurse with additional qualifications in Midwifery, Community and Psychiatric Nursing. This nursing diploma bursary programme offered by KZNCN and the DoH should be seen in relation to the current schooling education system in South Africa. Due to political and national policy changes and political influence over many years, the schooling system is not preparing school leavers adequately for tertiary study (Alfreds 2014; Prew 2014; Prince and Yeld 2012:1, Wilson-Strydom 2010: 313 - 325). Tertiary education is a scarce resource in South Africa, as many youth in the country are unable to secure positions at tertiary institutions as there are a limited number of student positions available (Department of Higher Education and Training 2013: 1). Studying for a qualification, such as the nursing diploma programme is a valuable and sought after educational opportunity since the unemployment rate in South Africa is currently 24.9% (Statistics South Africa 2012). In order to redress past political inequality in the education system, student admission into the nursing diploma

programme in KZNCN has ethnic quotas, and is open, indicating that entrance is not related to the quality of points from the matriculation certificate (i.e. where the highest matriculation points gain admission) (Department of Health Human Resource Circular 27 of 2010).

In 2009, following a Senate Meeting of KZNCN, a task team was selected to review the admission criteria of student nurses into the R425 programme. This decision by management was prompted by two factors: firstly the change in the format of the national matriculation certificate and secondly the latest statistics that revealed poor examination results of students in the discipline of Anatomy and Physiology (KZNCN Principals Committee Meeting 2010:8.4.2). The problem of the attrition rate due to academic failure was addressed by changing the entry level into the nursing diploma programme from 1st July 2010. This involved increasing the minimum required matriculation points from 20 to 25, as well as other requirements regarding subjects and marks obtained from the matriculation certificate, which is elaborated upon in the literature review (Department of Health Human Resource Circular 27 of 2010).

Another change ratified by College Council in 2010 was increasing the Duly Performed (DP) mark for entry to write nursing examinations from 45% to 50% from January 2011. This change was initiated for two reasons, namely, to be more in line with interpretation of the academic rules according to KZNCN and also to limit student admission to examinations when they were not academically prepared to write the examination. Students unable to attain the DP were not considered competent in that subject. However, these changes to the admission criteria and the DP mark have not made a noticeable difference in the pass rate and resultant high attrition of first year students due to failure in Anatomy and Physiology from 2010 to date (KZNCN May statement of results: 2012).

In the last five groups of first year students during the period January 2010 to July 2012 there was an attrition rate of 22%. The period in which the largest attrition occurs is during the first year due to failure in Anatomy and Physiology I and II modules.

The results from the examinations held in May 2012 where two Anatomy and Physiology examinations were written are as follows:

- Group 1/2012 – of the 292 students writing Anatomy and Physiology I, 27% failed.
- Group 07/2011 – of the 279 students writing examinations, 28% failed Anatomy and Physiology II, 3% Fundamental Nursing Science, 2% Social Sciences and 0% Community Nursing Science (KZNCN May statement of results: 2012).

There could be many possible reasons for the poor performance in Anatomy and Physiology. These reasons may involve the students, the institutions, available resources, and the programme or course content.

1.2 Significance of the study

There is a global shortage of nurses (Pillay 2009: 39) particularly in South Africa (Mokoka, Oosthuizen and Ehlers 2010: 01), where there is a scarce resource of professional nurses (Wildschut and Mqolozana 2008: 61-63). Since KZNCN is tasked with the responsibility of training 86% of professional nurses in the province (South African Nursing Council 2011:1), it is unfortunate to lose 22% of these students through failure and attrition.

As students admitted to the programme meet the specific criteria determined for entry into the nursing programme, it is anticipated that students should progress through the programme without substantial academic difficulty. Once a student vacates a post through failure or attrition that empty post cannot be filled as the programme runs sequentially and a newcomer is unable to step in where the last student left. This gap represents a lost opportunity for a student in South Africa, which is especially regrettable considering “free” higher education due to a bursary system is currently a scarce resource in South Africa (Department of Higher Education and Training 2013: 1).

With unemployment in South Africa currently at 24.9% (Statistics South Africa 2012), it means that a lost student post is a lost opportunity for a South African youth to gain a skill and the earning capacity that a qualification would empower them with (Department of Higher Education and Training 2013: 1).

Since there is a shortage of professional nurses in the country, if 22% of students do not complete their qualification, the DoH has difficulty meeting the planned staff quota of professional staff in institutions. There is also a financial loss to the DoH in terms of the bursary, which a student is unable to repay as the student usually does not have employment on vacating their student post through failure of nursing examinations.

It would be beneficial to explore the factors affecting success in Anatomy and Physiology in first year nursing students. Knowledge of more accurate predictors of success in Anatomy and Physiology may assist in improving the pass rate in this subject and consequently increase the annual number of nursing graduates. With the high unemployment rate in South Africa, dropouts from the nursing diploma programme have a bleak future as they must compete with high school, college and university graduates for employment. Previous international studies addressed student attrition in relation to a single variable (Carrick 2011:78-83; Crow, Hartman and McLendon 2009: 317-323; Newton and Moore 2009: 273-278; Olsen 2012: 26-32; Starr 2009: 478-486; Wells 2003: 230-236; Wilson-Strydom 2010: 313-325; Wold 1991: 1-21). Such a variable needs to be determined within a South African context.

1.3 Aim of the study

This study aims to determine the factors contributing to the success rate of students in Anatomy and Physiology in their first year of studies towards a diploma in the College of Nursing in the province of KwaZulu-Natal. Information emanating from the study will be made available to KZNCN to address the success rate of students in Anatomy and Physiology in their first year of study.

1.4 Problem statement

The research problem is that despite students gaining entry into the KZNCN nursing diploma programme by having met the specific admission criteria, the attrition of students is high at 22%, due to challenges they experience academically with Anatomy and Physiology in their first year of training (KZNCN May statement of results: 2012). This study explored factors relating to the student's success in Anatomy and Physiology during this period in their first year. This success rate will be correlated to their matriculation results as well as various social and demographic factors to establish the variables impacting on success in Anatomy and Physiology in first year nursing students in KwaZulu-Natal.

1.5 Research question

The research question is "What are the factors that contribute to success in Anatomy and Physiology in first year students in the KZNCN nursing diploma programme?"

1.6 Objectives

1. To compare the success rate of nursing students between Anatomy and Physiology I and Anatomy and Physiology II from groups 7/2012 and 1/2013.
2. To compare the data and final symbols on the matriculation certificate to the student's performance in Anatomy and Physiology I and II.
3. To identify the knowledge, attitudes and perceptions of first year nursing students in Anatomy and Physiology, and the variables that may affect these, namely: English as a second language (ESL), first generation students (FGS), stressors, orientation and lack of knowledge related to the course.

1.7 Research assumptions

Research assumptions obtained from previous studies include:

- Good past academic grade marks are a useful indicator for future academic success (Newton and Moore 2009: 277).
- Students studying with English as a second language experience greater difficulty succeeding academically in tertiary education (Scheele, Pruitt, Johnson and Xu. 2011: 244-246; Starr 2009: 483-485).
- FGS are less knowledgeable of factors that impact on academic success (Mehta, Newbold and O'Rourke 2011: 20).
- Various stressors that students experience may negatively impact on student academic success (Starr 2009: 481; Timmins and Kaliszer 2002: 204-209).
- A poor personal and academic aptitude towards the course they are pursuing has a negative impact on nursing student academic success (Newton and Moore 2009: 273).
- A lack of prior knowledge related to the course negatively impacts on students' academic success (Watkins, Roos and Van der Walt 2011: 5D).

1.8 Operational definitions

First generation students: Students who are the first in their family to pursue tertiary education.

English second language: Students who pursue tertiary education in a medium where the course is taught in the English language which is not the student's mother tongue but their second language.

R425 of 22 February 1985: Regulations relating to the approval of and the minimum requirements for the education and training of a Nurse (General, Psychiatric and Community) and Midwife leading to registration (South African Nursing Council Regulations).

1.9 Conclusion

In this chapter the basic background that triggered the need to embark on this study was discussed. The significance, problem statement, aim, objectives and research assumptions have been outlined. The study will be arranged in four chapters. Chapter 2 focuses on the review of literature on this topic, Chapter 3 the methodology, Chapter 4 the result and Chapter 5 discussion, conclusion and recommendations of the research report.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

The success rate of nursing students in their Anatomy and Physiology examinations in their first year of nursing motivated a review of the literature related to students in their first year of tertiary study as well as the success of students generally and in nursing both nationally and globally. According to the Florence Nightingale International Foundation and the International Council of Nurses there is an acute shortage of nurses worldwide (Anonymous 2006: 268; Buchan and Aicken 2010: 1) as well as in South Africa (Mokoka, Oosthuizen and Ehlers 2010: 01; Rispel 2012: 616). This phenomenon results in an escalating urgency to retain nursing students so that they can qualify as professional nurses (Griffiths, Bevil, O'Connor and Wieland 1995: 61).

Globally there is a high rate of attrition of nurses in their first year of nursing education (Crow Hartman and McLendon 2009: 317; Newton and Moore 2009: 274-276). Many academic institutions recognise the need to reduce attrition with regard to nursing students, so as to meet the quotas required to stem the shortage of nurses in practice (Hampton 2005: 254). Internationally the predominant themes in the literature surveyed regarding impact on student success in their first year of study include:

- English as a second language (ESL)(Scheele et al. 2011: 244-246; Starr 2009: 483-485);
- First generation students (FGS) (Mehta, Newbold and O'Rourke 2011: 20);
- Various stressors impacting on students (Starr 2009: 481; Timmins and Kaliszer 2002: 204-209);
- Personal and nursing aptitude for the course they are pursuing (Newton and Moore 2009: 273);
- Lack of orientation to the course (Watkins, Roos and Van der Walt 2011: 5D); and
- English and Math proficiency (Newton and Moore 2009: 274).

2.2 Global entry requirements into nursing

Tertiary institutions, including nursing training institutions, usually experience a higher failure rate in first year students than in the latter years of study. This may be due to the applicant not possessing the academic and personal resources to cope with the course (Potolsky, Cohen and Saylor 2003: 246-250; Griffiths et al.1995: 61). Studies show that students with potential skills for the course as well as good academic grades in secondary education are a positive indicator for future academic success (Newton and Moore 2009: 277). Shulruf et al. (2011: 727-723) used linear regression models to identify the best predictors for student success in the first year of an undergraduate nursing programme. The information used included student demographics, final year secondary school marks, university admission marks as well as the success of students in their first year of the nursing programme. They found that the best predictor for nursing students in their first year was the final marks obtained in secondary school followed by the university admission ranking scores. International studies indicate these challenges and factors generally impact on student success in their first year of tertiary education because students are not academically prepared to attend college (Griffiths et al. 1995: 61; Paulynice 2011: 3). Students may also have chosen the wrong career, and did not realise the large amount of work required for success in the nursing course (Paulynice 2011: 3).

2.3 Personal and nursing aptitude for the nursing course

Students accessing the nursing course in America identified as the Bachelor of Science in Nursing are required to take a pre-nursing course at university prior to applying for and commencing with the nursing course similar to the R425 nursing course offered in South Africa (Griffiths et al. 1995: 62; Jeffreys 2007: 410; Newton and Moore 2009: 273-278; Peterson 2009: 411-417).

Admission criteria for applicants into the Bachelor of Science in Nursing differ in different countries as well as amongst institutions. However, most institutions require competency from students in specific subjects at particular levels. These assessments include evaluation of the student's grade point averages at different stages of study. A suitable grade point average from high school is required for admission to university for a pre-nursing course where specific subjects are taken. The content of the pre-nursing course includes subjects such as reading, writing and mathematics as well as success in a series of pre-nursing courses such as communications, psychology, anatomy and physiology and pharmacology. Entry to the nursing course requires appropriate grade point averages from this pre-nursing course as well as the student passing a standardised pre-admission examination into the nursing programme (Perin 2006: 659). The pre-admission examination usually includes testing the prospective students' aptitude for nursing. Nursing institutions may make use of commercially available standardised nursing aptitude tests, such as a Test of Essential Academic Skill (TEAS) (Newton and Moore 2009: 273). International studies have found that higher levels of aptitude for nursing as well as higher grades from secondary education results in increased academic success for students in their first year of nursing (Newton and Moore 2009: 273).

Newton and Moore (2009) conducted a study of first year nursing students. They used an explorative descriptive design to describe the relationships between scholastic aptitude (pre-nursing grade point averages), nursing aptitude (competency in English, mathematics, science and reading comprehension), nursing attrition before the end of the curriculum, and student readiness for the programme. They found that students who did not perform well in the first two years of their course had presented with significantly lower high school and prerequisite course grades. Potolsky, Cohen and Saylor (2003: 250) found that pre-nursing scholastic aptitude and first trimester nursing success were indicative of readiness to proceed into the nursing programme.

An analysis of institutional data over three years was used in a study in America by Perin (2006: 657- 670) involving a group of prospective student nurses that were predominantly of Black and Hispanic ethnicity (94% of the student group).

This group of students had approximately the same academic preparedness as students doing other courses in the same institution and although they were assessed as being more skilled in writing and mathematics only a few of these students completed the nursing programme and graduated. In comparison with other courses the nursing programme is known to be particularly difficult as it is science intensive and students apply for nursing training with insufficient reading, writing and mathematics skills to cope, especially minority students (Perin 2006: 657-670).

Prerequisite science course performance in students was found to be a reliable predictor of academic performance in the nursing course. Potolsky, Cohen and Saylor (2003: 250) suggested that the required grade point averages for the prerequisite pre-science courses those students take should be set at a higher mark and those students that performed poorly be refused entry into the nursing programme. Jeffreys (2007: 415-416) notes that success for students in the first nursing course, the introductory nursing course that establishes the foundation for future courses, is a significant predictor for future success in the nursing programme.

Many countries recognise the importance of competency in mathematics and science prior to commencing nursing courses. The standard of education for science and mathematics for South African students is poor, which is a major concern in this regard. According to the World Economic Forum (WEF) Global Information Technology Report (2014), the quality of South Africa's mathematics and science education has been ranked last in the world (Jones 2014: 1). Jansen (2012), the Vice Chancellor for the University of the Free State reported that only 18.5% of all the matriculants who wrote mathematics in 2011 passed, which was 8.3% of the total number who sat for the national examinations (Jansen 2012). The poor standard of education delivered could be due to the capability of teachers, the numbers of qualified teachers available, as well as language issues (Mtshali 2013: 1).

According to Cambell (Chief Executive of Zenex Foundation, an independent specialist grant making agency) and Prew (an independent education specialist), learners writing their National Senior Certificate (NSC) are able to pass their examinations but without depth of knowledge, and this gap is only discovered when the students enter tertiary education (Campbell and Prew 2014: 2).

2.4 Changing demographics of nursing students

Over the last 30 years, due to political influence and policy changes in countries, the demographic and academic characteristics of applicants coming into nursing programmes has changed, and worldwide the quality of students has declined (Allen, Higgs and Holloway 1988: 113). Griffiths et al. (1995: 61) reported that fewer students are enrolling at nursing colleges and that the demographic and academic profile of those entering nursing programmes is changing over recent years. A study conducted by Bednarz, Schim and Doorenbos (2010: 253-260) addressed the changing demographics of nursing students as well as the aspects that make teaching this changed group of students difficult within the culture of nursing education. Their study also looked at teaching approaches that can be used to improve the effectiveness of educating this group of students. Jeffreys (2007: 406-419) studied the change in demographics from what was considered “traditional” to “non-traditional” students. Traditional students were identified as being young, unmarried females who were studying for the first time after completing high school. Non-traditional students, which now make up the current student body, are distinguished as including more applicants who are older than 25 years of age, have dependants, are doing their tertiary studies with English as a second language, travel to the institution where they study and there are a larger number of males in the student group. Griffiths et al. (1995: 63) identified older students whose high school grades were used as entry points into the nursing course as being unreliable in predicting success in the nursing programme.

2.4.1 Racial and language distribution in South Africa

According to the Census (2011) the racial distribution of people in South Africa is, Black African 79.2%, Whites 8.9%, Coloureds 8.9%, Indian/Asian 2.5% and others: 0.5%. The racial distribution of people in KwaZulu-Natal is Blacks 86.8%, Whites 4.2%, Coloureds 1.4%, Indian 7.4% and others 0.3% (Statistics South Africa: 2012).

The distribution of languages in South Africa is isiZulu 22.7%, Xhosa 16%, English 9.6%, Afrikaans 13.5% and other 37.8%. The language distribution in KwaZulu-Natal is isiZulu 77.8%, Xhosa 3.4%, English 13.2%, Afrikaans 1.6% and other 3.6% (Statistics South Africa: 2012).

South Africa is a multilingual country with 11 official languages comprising English, Afrikaans and nine recognised indigenous languages. The majority of South Africans speak a language from one of the two main language branches represented in South Africa, the Sotho Tswana branch including: Sotho, Northern Sotho and Tswana or the Nguni branch including isiZulu, Xhosa, Swati and Ndebele. For each of these two groups, the languages within that group are mostly understood by a native speaker of any other language within that group.

According to the South African Nursing Council, in 2006 the gender proportion of professional nurses in South Africa was 94.1% female and 5.8% male, while for student nurses it was 79.7% female and 20.2% male (Wildschut and Mqolozana 2008:13-14). The racial groupings of student nurses in South Africa are Black African (89.7%), Coloured (3.9%), White (3.4%) and Indian/Asian (3%) (Wildschut and Mqolozana 2008:13-14). There is an indication that gender transformation is happening as can be seen from the number of male learners in recent student groups (Wildschut and Mqolozana 2008:13-14).

The majority of the students attending the R425 diploma course in KwaZulu-Natal are Black African students with English as a second language. They are however studying an historically English based curriculum.

2.5 The South African education system

The South African education system is neither functioning efficiently nor preparing students for tertiary study (Prince and Yeld 2012: 1). Students “pass” and matriculate with marks giving them entry into tertiary study but without the cognitive or personal skills to be successful at a tertiary level (Hoffman 2008). Hoffman (2008) states that of the 1.2 million black students who started in the educational system in South Africa in 1996, only 278 000 (23.1%) matriculated, and of those only 42 000 (15.1%) were “functionally literate”. Bloch, an author and educational policy specialist, states that 80% of schools in South Africa are “dysfunctional” (Lapper 2010).

The above should be considered within the political context of South Africa. Since dramatic political change in 1994, there has been vast restructuring of legislation and policy at all levels in an effort to redress inequalities of the past and build a democratic country. South Africa moved from domineering, apartheid racial divide to democracy and political restructuring over a short period of time (Wilson-Strydom 2010: 313-325). The minority white population was privileged and had a standard of living equivalent to first world countries (Hoogeveen and Özler 2005: 1-4). The majority of the black population was poor and experienced a standard of living similar to developing countries (Myer, Ehrlich and Ezra 2004: 112-114).

Education for the nation was divided along lines of racial segregation, neglect and significant under provision for the black majority, yet the white minority received a quality and privileged education (Gardiner 2008: 7-30). From 1994 previously “white only” tertiary institutions had an open policy implementing affirmative action in order to provide opportunity for previously disadvantaged races (Jaffer, Ng’ambi, and Czerniewicz 2007: 131-142; Wilson-Strydom 2010: 312-325). The major changes effected in the education system resulted in a change in student demographics. Predominantly Black African students speaking English as a second language entered historically White nursing institutions where western nursing science was taught in the medium of English.

The bulk of nursing recruits is currently more representative of the racial and cultural mix of the country (Statistics South Africa: 2012). Over the last twenty years, as a result of the political and national policy changes, previously under represented racial groups now have the opportunity to attend previously Whites only nursing institutions (Wilson-Strydom 2010: 313-325).

Changes in policy post-1994 resulted in restructuring of resources and insufficient numbers of qualified teachers in schools. In September 2013, the Department of Basic Education employed 7 076 unqualified teachers who have only a matriculation certificate. There are also 2 642 under-qualified teachers who have not yet completed their tertiary education. KwaZulu-Natal, which is predominantly rural, has the most unqualified teachers in South Africa with more than 85% of all the unqualified teachers employed in the country (6 050 with only a matriculation certificate) (Hawker 2013).

South Africa was recently ranked last in the world for its level of science and mathematics education (Jones 2014). Research indicates that primary school children do not receive a solid grounding in mathematics which impacts on their progressive development in this subject. Most learners also take the easier choice of Mathematics Literacy as a subject for matriculation as they have more of a chance of passing it than pure mathematics (Chipangura 2013).

2.6 The medium of instruction in schools

In 1992 the National Education Policy in South Africa initiated a model where English was introduced into certain subjects over a number of years. The recommendation was for children to be taught in their mother tongue during the initial formative years of schooling and a second language was only to be introduced from grade four or five once children had developed the necessary language and cognition skills. This would make provision for a strong foundation in language on which to build future learning (National Department of Education 1992).

Prior to political change in 1994, English and Afrikaans were used as official languages in South Africa. After 1994, the Bill of Human Rights (section 31) stated that all people in South Africa have the right to use the language of their choice, thus also promoting multilingualism in tertiary institutions. The South African Language Policy indicates that individuals have the right to choose which language or languages in which to study and to use as the medium of instruction during their studies. It was suggested by Pandor (2005), the Minister of Education at that time, that English would be an optional medium of study once African languages had developed sufficient resources to play this role. Currently English and Afrikaans remain the only two languages used in tertiary institutions as the medium of instruction for students to progress at a tertiary level (Tshotsho 2006: 27). The proposed changes in the language of instruction in education have not taken place due to financial and resource constraints in implementing the proposed policy (Tshotsho 2006: 26-29).

A study conducted on primary school education in South Africa and Tanzania focused on the effectiveness of the language in which students are taught by assessing the students' ability to express themselves through writing in both English and their mother tongue (Pitman, Majhanovich and Brock-Utne2010: 1-11). English is the dominant global language (Tshotsho 2006: 2) and is the main reason that parents of students at school seek schools where English is the medium of instruction (Pitman, Majhanovich and Brock-Utne 2010: 1-5; Tshotsho 2006: 28-29). English is considered the way to escape poor socioeconomic conditions as through education, better job opportunities arise with resultant improvements to socioeconomic conditions in the home (Pitman, Majhanovich and Brock-Utne 2010: 1-5). It has been documented that students are disadvantaged by being taught in their second language as there is a difference between learning a language as a subject and using that language as a medium of instruction where it then becomes a barrier to accessing information. Students have difficulty understanding what is being said by the teacher and are unable to express themselves in the language of instruction and this therefore limits them in the learning all subjects being taught (Pitman, Majhanovich and Brock-Utne 2010: 4).

Teachers are often insufficiently skilled in the English language themselves to be able to use it as a medium of instruction. The researchers found that very little, if any, English was being spoken in the classroom except for rote learned exercises written on the blackboard (Pitman, Majhanovich and Brock-Utne 2010: 4-13; Williams 2004: 35). Research indicates that education, seen as adequate literacy and numeracy skills, is more easily attained in a language that the student understands (Williams 2004: 35). Rural students, especially females, are disadvantaged in being taught in their second language (Williams 2004: 35). Due to there being 11 official languages in South Africa, adequate resources (competent teachers and learning material) to teach effectively in a students' mother tongue are currently not feasible (Pitman, Majhanovich and Brock-Utne 2010: 3).

Research carried out by Tshotsho (2006: 248-253) assessed the poor standards of academic writing amongst black students pursuing their tertiary education in English as their second language at a Technikon in South Africa. The researcher found that these students have a limited ability in English to prepare, plan, draft, revise, organise and edit work written in English. The contextualization or thematic development of written work was the most problematic for students (Tshotsho 2006: 248-253).

2.7 Transition from high school to tertiary education

Students' transition from high school to tertiary education may be affected by the English medium of the lectures as many students are English second language speakers (ESL) (Starr 2009: 478-485). A large number of students are also FGS i.e. previous generations from their families did not attend tertiary education. This has been reported to negatively affect students' tertiary studies as the support for these studies is not available from family members (Wilson-Strydom 2010: 315).

Bowles et al (2011: 61-71) conducted a study in Australia using a mixed method approach. In-depth qualitative focus groups were conducted which contributed to a questionnaire targeting students in their first few weeks of attending tertiary study. Results indicated seven areas that impacted on students during this transitional process:

- Study – students skills at studying including their management of time, willingness to seek help and guidance – especially from academic staff;
- Effort – motivation to work hard and interact with others;
- Orientation – knowledge about the course prior to starting the course;
- Learning opportunity – related to using university resources in the transition phase from secondary school to university;
- Cultural – a feeling of belonging and familiarity with the values and culture of the institution;
- Suitable facilities – as infrastructure supporting their transition; and
- Social opportunity – to develop friendships and network (Bowles et al. 2011: 61-71).

A study conducted in America also noted that students indicated that some teachers speak too fast and do not speak clearly in class and this makes it difficult for students to understand the content taught in class (Paulynice 2011: 7).

A study carried out in South Africa by Wilson-Strydom (2010: 313-325) used a qualitative approach based on Conley's model of four themes relating to students transition to university (Conley 2008: 6) as an interpretative framework. The study recognised the transition from high school to tertiary education as difficult for most students and emphasised the need for tertiary institutions to focus on easing the transition and for this preparation to begin while the student was still in high school (Wilson-Strydom 2010: 313-325). In a background to the study, Wilson-Strydom (2010: 313-316) acknowledges the South African circumstances of political change and transformation. This study indicated that whilst students were often eligible to study at university, they were not

adequately prepared to commence with study at a university level. Schooling no longer prepares students for tertiary study and the greatest challenge is that of prospective student's knowledge of academic behaviour required for tertiary study and their "university knowledge". It is worrying that students are increasingly accepting academic failure and poor grade marks (Wilson-Strydom 2010: 313-325).

A South African study by Janse van Rensburg and Surujlal (2013) indicated that as students move from school to tertiary education they develop autonomy and become independent as they move away from the authority and supervision of their parents. This period is stressful as students become independent, changing and adapting to their new environment and social groups. They may be influenced through peer pressure to adopt unhealthy lifestyles like abusing alcohol, being inactive and eating excessively which exacerbate other stressors prevalent in students in their first year of tertiary education. A benefit of exercise is that it reduces levels of stress. These new behaviours and lifestyle patterns formed during university life are likely to be continued into adulthood. This study indicated that female students binged on food and experienced more stress than male students and more male students consumed alcohol (Janse van Rensburg and Surujlal 2013)

An article on the North Carolina State University website offers pertinent information and advice to parents and prospective students on common changes to be aware of regarding students' transition from school to tertiary education. The information recognises students' increased personal freedom as well as the responsibility that accompanies this freedom. There may be an increased need for students to manage their time more efficiently due to increased responsibilities and demands as well as adjusting to new experiences and environments. Students may experience changing relationships with friends and family with the introduction into new social circles (N C University website 2014).

2.8 Entry criteria to the R425 Nursing Programme

The health system in South Africa experienced inequalities in the quality and quantity of health care between races, with the focus moving from expensive curative first world technology for the minority to preventive medicine and primary health care to reach the larger majority population (Cooper et al. 2004: 70-85). The majority of students entering the KZNCN nursing diploma programme speak English as a second language and their mother tongue is isiZulu. Currently, nursing and academic aptitude tests are not taken by prospective applicants entering the KZNCN four year comprehensive nursing diploma programme (R425 programme).

This is in accordance with the South African Nursing Council regulation, R425 of February, 1985, as amended, which laid down conditions under which nursing colleges should be established. The entry criteria into the four year nursing diploma programme were adjusted in 2010 (Department of Health Human Resource Circular 27 of 2010), due to changes made to the national matriculation certificate and also due to poor examination results in Anatomy and Physiology in the KZNCN programme (KZNCN Principals Committee Meeting 2010:8.4.2). The task team appointed by KZNCN management adjusted the admission criteria from 20 to 25 cumulative points. However it must be noted that points are calculated differently for students that matriculated before and after 2008 because the matriculation examination format changed after that date. Post 2008, the matriculation examination has been referred to as the National Senior Certificate (NSC) and points for this examination are calculated as follows:

- 80-100% - 7 = 7 points
- 70-79% - 6 = 6 points
- 60-69% - 5 = 5 points
- 50-59% - 4 = 4 points
- 40-49% - 3 = 3 points
- 30-39% - 2 = 2 points
- - 29% - 1 = 1 point

In addition to obtaining a minimum of 25 cumulative points, English as a first or second language is required at a minimum of 4 points (50-59%). A pass in an additional language is required, but no score has been specified. The student is also required to have Physical Science or Life Sciences with at least 3 points (40-49%), Mathematics or Mathematics Literacy with a minimum of 3 points (40-49%) and any two other subjects from a designated list. This list includes Accounting, Agricultural Science, Business Studies, Dramatic Arts, Economics, Engineering, Graphics and Design, Geography, History, Consumer Studies, Information Technology, Languages, Music, Religion Studies and Visual Arts. A compulsory seventh subject of Life Skills is necessary, yet this mark is not included in the accumulated points (Department of Health Human Resource Circular 27 of 2010: 1-3).

The senior certificate (S.C.) was issued before 2008 and only subjects on higher and standard grade were considered. A minimum of an “E” symbol (40-49%) in English higher grade or a “D” (50-59%) on standard grade was required. Biology or any other natural science subject (Physics, Mathematics, Physiology or Chemistry) was required with a minimum of an “E” on higher grade or a “D” on standard grade). The minimum accumulated points needed were 25. The first six highest relevant subjects are used to calculate the score (Department of Health Human Resource Circular 27 of 2010: 1-3).

Globally there is a high rate of attrition of nurses in their first year of nursing education (Crow, Hartman and McLendon. 2009: 317; Newton and Moore 2009: 274-276). Many academic institutions recognise the need to reduce attrition of nursing students in order to meet the number of nurses required by healthcare institutions (Hampton 2005: 254). International studies have indicated that ESL has a negative effect generally on student success in the first year of nursing education (Scheele et al. 2011: 244-246; Starr 2009: 483-485). Other factors that have a negative effect on success in the first year of study are FGS (Mehta, Newbold and O’Rourke 2011: 20); poor personal and nursing aptitude (Newton and Moore 2009: 273); lack of orientation to the course (Watkins, Roos and Van der Walt 2011: 5D); lack of English and Math proficiency (Newton and Moore

2009: 274) as well as stressors affecting first year nursing students (Starr 2009: 481; Timmins and Kaliszer 2002: 204-209). These are discussed in more detail below.

2.9 Anatomy and Physiology

The subject of Anatomy and Physiology is integral to the teaching of nursing as they are core components in nursing that underpin a scientific knowledge of the human body and as a result its response to illness. This knowledge is essential for nursing students to understand what they observe clinically as they need this information to intervene with appropriate nursing care. Students approach Anatomy and Physiology with apprehension as they experience difficulty with the many new and complicated terminology and concepts to be learnt and there is a high failure rate in these subjects (Johnston 2009: 226). A study conducted in Australia identified clinical exposure to human specimens as the most effective method of teaching nursing students Anatomy and Physiology as it integrated theory with clinical practice (Johnston 2009: 224-225).

In the United Kingdom a study by White and Sykes (2012: 1) indicated that of all the subjects taken by nursing students, Anatomy and Physiology was the most challenging. Students experienced most difficulty in applying its theory into practice. The study found that a mixed teaching approach for students, who make use of online learning as well as face to face contact with lecturers, was a more effective teaching method for Anatomy and Physiology than the traditional lecture method. Students found this interactive style of online learning and a mixed approach more stimulating and motivating than the traditional lecture method (White and Sykes 2012: 1).

In the United Kingdom, the pre-nursing course assesses an applicant's aptitude for nursing in order to reduce attrition due to failure in this course. Adequate grade marks in Anatomy and Physiology are used as a prerequisite for commencing with the nursing programme in the United Kingdom (White and Sykes 2012: 1).

An American study indicated that interactive teaching of Anatomy and Physiology as opposed to rote learning has produced a better understanding of the principles of the human body's structure and function (Silverthorne 2006: 135-140). With the change in technology over the last 30 years more interactive methods of teaching are available and these are of benefit when teaching science subjects to students (Silverthorne 2006: 135-140).

Historically in the R425 programme, Anatomy and Physiology were taught as separate subjects with Anatomy in the first year and Physiology in the second year of study. Anatomy is the study of the structure and relationship between body parts, whereas Physiology is the study of the function of these body parts and also the function of the body as a whole. The two subjects have now been linked so as to avoid repetition in the curriculum between first and second year. Currently, Anatomy and Physiology are taught together, thus emphasizing the interaction between the two disciplines.

The South African, Nursing Act (Act 33 of 2005) is the legislative mandate that governs the training of nurses. Regulation R425 is the directive for the four year diploma programme. The KZNCN offers the four year diploma in nursing which is referred to as R425. The curriculum includes the subject Anatomy and Physiology which is taught over two semesters in the first year of study. The syllabus includes histology and cytology that run throughout instruction on the different systems of the human body. The curriculum of Anatomy and Physiology I includes the musculoskeletal, cardiovascular, respiratory and digestive systems whereas Anatomy and Physiology II deals with the nervous system, special senses, urinary, endocrine and reproductive systems. The Anatomy and Physiology I examination is the only examination written after six months of enrolling into the Nursing programme. Previously, students that failed this first semester examination were unable to continue into the second semester but were permitted to join the next group of students that commenced the first semester at mid-year. This extra six months provided consolidation for those who may have experienced academic difficulty. However, due to student petitioning, students are now permitted to "carry" Anatomy and Physiology I and write this examination at the end of the year along with Anatomy and Physiology

II, Community Nursing Science, Social Sciences I, Fundamental Nursing Science and Fundamental Nursing Science Objective Structured Clinical Examination (OSCE). If a student fails more than two subjects at one examination period, that student is not allowed to proceed into the following semester. Each student has a maximum of five years within which to complete the R425 course. Following three unsuccessful attempts at examinations the student has no choice but to exit the programme.

2.10 English second language

English Second Language (ESL) is defined as the language of English, which may be the second language of students, but is not the language spoken in their home, that is, English is not their "mother tongue". Black nursing students in South Africa are in the majority in KZNCN student groups and also make up the majority of ESL students. Approximately four to eight years of conversing in a second language is necessary for most students to become sufficiently competent in that language in order to gain academic success (Abriam-Yago, Yoder and Kataoka-Yahiro 1999: 143, as cited by Scheele et al. 2011: 244). Due to differences in culture and language barriers, some ESL nursing students are not able to reach their full academic potential either during their training or upon reaching their career goals (Scheele et al. 2011: 244-246; Starr 2009: 483-485).

A study conducted by Olsen (2012: 26-32) on ESL students identified that they have difficulty with reading speed and comprehension in language. Reading is further complicated as it takes time for students to translate between English and the student's home language. Student writing is also difficult as students struggle with technical vocabulary, grammar and syntax. There is also a lack of speaking and listening proficiency which may be detrimental to students' academic success. ESL students are hesitant to speak in class due to feeling self-conscious about their accents and also due to a fear of not being understood.

Listening in English is demanding with students having difficulty understanding verbal directions and terminology from lecturers. Additionally, fast paced lectures are difficult to follow. Multiple choice questions have been identified as extremely problematic for ESL students as this type of assessment is designed to test critical thinking and decision making. It is also a test of translation and reading ability for the ESL student (Olsen 2012:26-32).

Culturally, Black African students tend to experience inconsistency between their cultural values and beliefs versus the White Anglo Saxon culture of Western medicine. This is mainly due to teaching methods being inflexible and not adjusting to differences between cultures (Olsen 2012: 26-32). Studies have also indicated that ESL students have personal barriers which often negatively impact on their studies (Olsen 2012: 26-32). These include a lack of finance and the different social roles a student nurse may need to play. Family obligations, for example, may be detrimental to students' academic success especially in male dominated households where females have many household responsibilities that are not shared. Social roles may include being a daughter, wife, mother, student nurse, church member, aunt and sister (Olsen 2012: 26-32). Family support, however, was seen as a positive factor where this was available such as when family members assisted with family responsibilities such as child care, cooking and laundry (Olsen 2012: 26-32).

An American study indicated that ESL students have poor college preparation, differing expectations of the nursing programme, insufficient time in the day to complete required tasks, study workload (more than for non-ESL students), poor study skills, a need for study groups, and reading and writing difficulties (Starr 2009: 481-482). They also have more financial difficulties and family responsibilities such as obligations at home. Additionally, they have a lack of family support as the family is culturally not familiar with the demands of tertiary study in a western setting (Starr 2009: 481-482). Due to being exposed to a culturally different environment, ESL nursing students may feel awkward and out of place, with the feeling they should not be in the programme (Scheele et al. 2011: 244-249).

A South African study conducted by Tshotsho (2006: 24-25) identified black students from rural areas as being more disadvantaged than urban students since they do not have exposure to spoken English or the opportunity to use the language outside the classroom. This drawback, particularly for rural students results from a lack of contact with the English language with people, television, radio or books. They also do not always have good English teachers or functional school buildings (Gardiner 2008: 7; Tshotsho 2006: 24-25).

2.11 First generation students

FGS are defined as students who do not have close family members (a family member or mentor) that attended tertiary education (Mehta, Newbold and O'Rourke 2011: 20; Wilson-Strydom 2010: 316). FGS are less successful in tertiary studies as they have not had the opportunity of being orientated and guided to the customs and traditions of the academic system by close members of their families (Mehta, Newbold and O'Rourke 2011: 20; Paulynice 2011: 3; Starr 2009: 481). As the student feels strange and unfamiliar with what is expected, there is a feeling of not belonging to the programme (Mehta, Newbold and O'Rourke 2011: 20; Paulynice 2011: 3; Starr 2009: 481). Family members are not familiar with the environment their student child/sibling/spouse is exposed to, and are less supportive and encouraging as they do not understand the time and energy the student needs to sacrifice in order to be academically successful (Mehta, Newbold and O'Rourke 2011: 20; Paulynice 2011: 3; Starr 2009: 481). Students may not study enough as they do not understand the quantity of work required to be successful (Mehta, Newbold and O'Rourke 2011: 20; Paulynice 2011: 3; Starr 2009: 481). FGS are less prepared for the academic environment and need to work longer hours than their colleagues to complete academic tasks. They also report that they do not have enough time in their day to complete all the tasks expected of them (Mehta, Newbold and O'Rourke 2011: 20). Larger numbers of this category of student do not graduate and their academic performance differs from students who come from families where at least one family member completed tertiary education. These students enter the programme with more aspects they find stressful, higher levels of stress, especially financial, which they are unable to manage as their parents

earn less money than students' parents who attended tertiary education (Mehta, Newbold and O'Rourke 2011: 20; Starr 2009: 481).

FGS may utilise reactive responses such as exercising or playing on cell phones to alleviate their stress. They often need to study harder to achieve academic success and may also look for social support from others (Mehta, Newbold and O'Rourke 2011: 3). FGS are more likely to live away from the tertiary institution, less likely to be involved with social activities at the institution or with fellow students and may isolate themselves from others when stressed (Mehta, Newbold and O'Rourke 2011: 8; Paulynice 2011: 7). FGS are less likely to use social coping strategies such as going out drinking and partying to manage their stress (Mehta, Newbold and O'Rourke 2011: 8). These students are more likely to take time off work when stressed (Mehta, Newbold and O'Rourke 2011: 12-13).

2.12 Stress factors

Timmins and Kaliszer (2002: 203-204) conducted a study in Ireland to explore the stressors that nursing students experience. In their capacity as student nurses they are not official hospital employees and are supernumerary to the work force. However, they also interact with staff and patients and are exposed to the same stressors as the professional nurses. In addition, they have many academic commitments which may exacerbate the stress (Timmins and Kaliszer 2002: 203-204). Stress factors hinder students' academic potential by distracting their focus off their studies (Starr 2009: 481). Academic stressors include learning of new material, examinations, work assignments, and contact with staff. Relationship stressors are recognised as students' association with both academic as well as clinical staff, difficulties with interpersonal relationships which result in stress for students. Most stress is however related to a lack of finances (Timmins and Kaliszer 2002: 204-209).

Watkins, Roos and Van der Walt (2011: 5D) used a qualitative, explorative and contextual design to explore the different dimensions of well-being described by student nurses in their first and third year of study. Under the theme of “feeling under pressure” students identified that emotional aspects, a lack of time, difficulties with time management and academic pressures make them feel stressed and that they are not coping with the programme (Watkins et al. 2011: 7D).

Nursing students describe having high levels of stress and anxiety during their training and feelings of pressure because of the long hours and heavy workload. The loss of control and pressure experienced by students, especially during their first year, may impact on their self-worth and make them particularly vulnerable to stressful events. Students also state that they feel a loss of control and that high demands are made on them especially during the early stages of their training. Unsupportive staff and a lack of support available for students resulted in stress for students. Students indicated a need for lecturers to be available in the clinical area to link theoretical information with clinical practice as there was a difference between how students were taught to do something and how it was actually done in the clinical area. Despite the pressures, many students indicated they had a positive attitude and a continued desire to pursue a career in nursing (Watkins et al. 2011: 15D). Social support from friends and family members as well as close friendships they develop with nursing friends, are a source of comfort and support for students when stressed (Watkins et al. 2011: 5D). Many students reported that they had to move away from their families in order to pursue their studies, and were not able to visit their homes frequently but appreciated maintaining regular contact with family members, especially their mothers, via various forms of communication (Watkins, Roos and Van der Walt 2011: 5D).

An additional stressor impacting on the health and wellbeing of nursing students and their families in KwaZulu-Natal is the prevalence of HIV/AIDS, which, in this province, is amongst the highest in the world (Nel, Mabude, Smit, Kotze, Arbuckle, Wu, Van Niekerk, and van der Wijgert 2012).

The impact of HIV/AIDS in South Africa is having a significant negative effect on the motivation and performance of its health workforce (Tawfic and Kinoti 2006).

2.12.1 Coping with stress

A local study on South African university students indicated that females exercised more frequently than male students, and exercise reduces levels of stress (Janse van Rensburg and Surujlal 2013). However, female students experience more stress than male students. Furthermore, a higher number of females than males consume liquor and binged on food in order to alleviate stress (Janse van Rensburg and Surujlal. 2013). A study conducted in the United Arab Emirates identified that most students used positive coping strategies such as religion/prayers, planning of their work schedule, active coping, self-distraction and looked for practical support to resolve problems (Gomathi, Ahmed and Sreedharan 2013).

2.12.2 Sources of support

The students in Murray-Harvey's (1999) study indicated that the social support they already had from family and friends from home are important sources of support. In addition, the support of friends and colleagues at university was particularly important when students moved away from home to attend training. The study also identified the training institution as an important support system for students, especially the teaching staff being supportive during clinical teaching (Murray-Harvey 1999). Students in first year tended to look for more emotional support from others than those in subsequent years of training (Gomathi, Ahmed and Sreedharan 2013).

2.13 Lack of orientation to the course

Students entering tertiary education for the first time present with a lack of preparedness, appear unaware of what their proposed course entails, and are not academically equipped to cope with the programme, resulting in them being unprepared (Watkins, Roos and Van der Walt 2011:5D). Some students are not

aware of the demands of study at a tertiary level (O'Donnell 2010: 54-55). Educational institutions do not appear to know which qualities in students are necessary for them to be successful at tertiary level (Wilson-Strydom 2010:313).

Students reported being disillusioned as they had no prior knowledge of what the nursing profession entailed. Students in their first year reported that the nursing science course did not fulfil their expectations of nursing as a profession and they were disappointed at choosing a study course different from what they had expected (Watkins, Roos and Van der Walt 2011: 5D). One study addressed many authors' findings on attrition in college students. Factors identified were: not being academically prepared to attend college; lack motivation; are the first persons from their families to attend college; have financial problems; stress or anxiety and that they may have chosen the wrong career (Paulynice 2011:1-10).

2.14 Conclusion

Related literature illustrates that first year students involved in tertiary studies globally experience challenges related to specific variables associated with their circumstances, namely, social and economic stressors, lack of orientation and knowledge as to what the course entails, FGS and scholastic aptitude. The situation in South Africa is then compounded by the poor secondary education system and the majority of students who experience the difficulty of attending tertiary study in the medium of English as a second language.

Few studies have assessed the impact of a larger number of variables on nursing students' academic success in their first year. No research studies were found addressing variables associated with first year student nurse training success in Anatomy and Physiology in South Africa and/or more specifically, in KwaZulu-Natal.

CHAPTER 3: METHODOLOGY

3.1 Introduction

This chapter focuses on the research methodology used in this study. The research design will be discussed under the headings of the research approach and design. The research methodology will be described under the headings of the population and sample, questionnaire development, the pilot study, data collection and the validity and reliability of the tool and study.

3.2 Research design

A research design can be defined as the researcher's overall plan for obtaining the answers to the research question, including the requirements that add to the study's integrity. It identifies in advance the strategies the researcher should adhere to in order to develop information that is accurate and easily understood (Burns and Grove 2009:41).

A quantitative descriptive survey design was used to investigate factors that impact on the success of first year student nurses in Anatomy and Physiology using a survey questionnaire (Annexure 1).

3.2.1 Quantitative approach

Quantitative research is described as a set of logical steps used to answer the research question (Polit and Beck 2010: 236). A quantitative research design specifies the methods to be used to recruit respondents, collect and analyse data as well as interpret the results. The research design was chosen to suit the purpose and financial constraints of the study (Polit and Beck 2010: 236).

3.2.2 Descriptive design

The descriptive design was selected as it is a process which facilitates the description of peoples' daily experiences, their knowledge, attitudes, perceptions and behaviour relating to their lives (Burns and Grove 2009: 45-46). Descriptive research explains concepts and the relationships between these suggest the foundation for future studies (Burns and Grove 2009: 45). This study explored the knowledge, attitudes and perceptions of respondent's experience relating to the subject of Anatomy and Physiology as well as being a first year student nurse in the KZNCN programme.

3.2.3 Survey tool

A survey requires the use of a formal structured questionnaire to obtain data from a large enough sample of selected people to ensure that a representative sample has been taken (Burns and Grove 2009: 245-246). This study used a self-administered survey questionnaire (Annexure 1) targeting approximately half the population of first year student nurses training in KZNCN. The tool used was effective and efficient in sampling a large population and obtained the required information from the respondents. By using this method of research a wide variety of information was obtained regarding respondents' demographic factors and the four main themes associated with the independent variables used in the study.

3.3 Research methodology

3.3.1 Study population

The study population is all the elements that meet the particular criteria to be of relevance to the study (Burns and Grove 2009: 42). The study population for this research was all 524 first year student nurses in the KZNCN training programme. Sampling was achieved by selecting a specified portion of the whole population so that it remained a true representation of that group of first year student nurses (LoBiondo-Wood and Haber 2010: 221).

3.3.1.1 Setting

KZNCN operates as the Head Office of Student Nurse training for the nursing diploma programme in KwaZulu-Natal for the Department of Health. First year students (n = 248) were recruited from five of the nine different campuses of KZNCN which comprised of a total of 524. The study participants completed a self-administered questionnaire (Annexure 1). The participants' matriculation certificates and Anatomy and Physiology results were accessed in order to correlate responses from the questionnaire to scores obtained in Anatomy and Physiology examinations. The matriculation marks were also correlated with those obtained in Anatomy and Physiology examinations.

3.3.1.2 Sampling and sample size

A probability sample of students from five campuses was randomly chosen from the total number of nine campuses available (Burns and Grove 2009: 42). The sample was chosen from students in their first year of nursing in the KZNCN programme. As a probability sample, this group of students from 7/2012 and 1/2013 were identified as the ideal groups from which to take the sample as they would recently have completed their Anatomy and Physiology I and II semesters. These two groups of students commenced their training in July 2012 and January 2013 respectively.

A statistician was consulted with regard to the sample size to ensure the sample would be representative of the first year student nurse population in the KZNCN programme. Cochrane's formula using a total population of 524 first year student nurses required a minimum of 222 students with an additional 20% added to that number for non-response or unusable questionnaires, resulting in a total target group of 267. The distribution of the sample size is indicated in the time frame. This was approximately 50% of the total student population in the first year of training at KZNCN at the time.

There were three stages in obtaining the student nurse sample:

- Stage 1: Five campuses were randomly selected from the nine campuses (Port Shepstone Nursing Campus excluded from the study) using the “goldfish bowl” technique. The campuses drawn from the goldfish bowl were Benedictine Nursing Campus, Edendale Nursing Campus, Greys Nursing Campus, Madadeni Nursing Campus and R. K. Khan Nursing Campus.

- Stage 2: The total population of students from these five campuses from groups 7/2012 and 1/2013 was used. The number of students in the sample was 267.

- Stage 3: If the required sample of 267 was not reached then a sixth campus would have been chosen from the bowl to reach the minimum sample size of 267.

The method involved placing slips of paper representing the nine campuses, numbered 1 to 9 into a bowl. Five of these numbers were then randomly picked out of the bowl and linked to the campuses that were numbered one to nine. The student numbers (both intakes) at these five campuses totalled 267. The target group was invited to participate in the study and received a questionnaire package. Participation was voluntary and no student was coerced into being involved in the study. Most students agreed to participate after reading the information letter and signing the consent form (Annexure 5). The matriculation certificate and Anatomy and Physiology marks were obtained for each of the students who handed in a completed questionnaire (Annexure 1).

3.3.1.3 Inclusion criteria

Only first year nursing students that had been exposed to the Anatomy and Physiology curriculum in the R425 training programme in KZNCN for a period of approximately seven months or more were able to offer relevant information to this study (Burns and Grove 2009: 245). At this time the study pertained to students from Groups 7/2012 and 1/2013 writing Anatomy and Physiology I and II in their first year of the KZNCN nursing diploma programme at the five campuses selected. The study included students who read and understood the information letter and had signed the consent form.

3.3.1.4 Exclusion criteria

Students from Port Shepstone Nursing campus were excluded from the study for ethical reasons as the researcher had contact with these students in another discipline.

3.3.2 Development of the instrument

Utilising questionnaires proven valid through use in previous studies facilitates correlation of similar studies (Polit and Beck 2010: 345); however an appropriate tool was not available for the purposes of this study resulting in the formulation of the questionnaire used in this study. Initially a review of the literature was performed to establish the variables related to nursing students' performance and to explore student failure/success in Anatomy and Physiology. The researcher's understanding of the concepts of the study guided the formulation of the questionnaire tool (Burns and Grove 2009: 43). The researcher developed the questionnaire using four common themes/variables that emanated from previous international and local studies conducted that related to this study topic.

The dependant variable in this study was the success of first year students in Anatomy and Physiology in the KZNCN Programme. There were four independent variables. These included:

1. English as a second language (ESL);
2. First Generation Student (FGS);
3. Stressors possibly experienced by students:
    a. Academic challenges;
    b. Long working hours;
    c. Time constraints;
    d. Domestic responsibilities;
    e. Financial difficulty;
    f. Illness (personal and family);
4. Lack of knowledge and orientation to the programme and what to expect from the profession of nursing.

The themes incorporated into the questionnaire consisted of approximately five items per area and were mostly of a Likert type structure. Other questions included simple dichotomous questions for the demographic data as well as rating and ranking scales (Polit and Beck 2010: 344). A combination of different types of questions increased the reliability and validity of the tool (Burns and Grove 2009: 407).

Once constructed, the questionnaire was initially interrogated by an expert/focus group and then piloted for validity and reliability prior to its use to survey study participants.

3.3.3 Validity of the instrument

Validity is the ability of a measurement tool to accurately measure what it is intended to measure (Burns and Grove 2009: 409). Initially a review of the literature was performed to establish the variables related to nursing students' performance and to explore student success in Anatomy and Physiology in a global and South African context.

Two judgements on the validity of content of the questionnaires were sought from the expert/focus group–whether each item adequately measured the extent of the variables and also whether the set of items actually represented all aspects of the variables to be measured.

A group of experts in nursing education were invited to judge each item within the questionnaire using a four point rating scale and addressing each of the following aspects:

1. Relevance;
2. Clarity;
3. Simplicity; and
4. Ambiguity.

Items that did not adequately meet the above criteria were discarded and removed from the questionnaire or adjusted until found to be acceptable.

3.3.4 Reliability of the instrument

Reliability is the extent that a research tool is able to give the same results repeatedly in similar situations (Polit and Beck 2010: 373). If the results of tests are found to be similar the tool can be considered to be consistent (Cullum, Ciliska, Haynes and Marks 2008: 69). A questionnaire is considered a valuable and reliable instrument for measurement in research (Polit and Beck 2010: 378).

3.3.5 Pilot study

The constructed questionnaire was piloted with respondents who were not included in the sample group, prior to data collection, on the 29th August 2013 (Burns and Grove 2009: 44). Five student nurses from Group 1/2013 from Port Shepstone Nursing campus completed questionnaires as this nursing campus was excluded from the study for ethical reasons.

The purpose of the pilot study was to detect flaws and establish the usefulness of questions and if necessary amend the questions to best fit the sample population so as to meet the objectives of the study. No changes were made to the questionnaire at this stage as the pilot study population indicated understanding of the questions and experienced no difficulty with the questionnaire. On assessment, the questionnaire was effective in capturing the information required for this study.

3.4 Data collection

Data collection refers to the systematic collecting of information necessary for the purpose of the research (Burns and Grove 2009: 43). Data was collected in a consistent manner as all the questionnaires were delivered and retrieved by the researcher from each campus on the day of completion (Burns and Grove 2009:441) and the researcher remained on the premises during that day. Data collection techniques were adopted to ensure confidentiality and voluntary participation by respondents.

The procedure for data collection was as follows:

- Data was collected by the researcher visiting each campus using a formal self-administered questionnaire over a period of 10 weeks.
- Photocopies were made of the matriculation certificates of the sample group of students from their campus records.
- Anatomy and Physiology examination results of the sample group of students from groups 7/2012 and 1/2013 were captured.

3.4.1 Time frames

Dates that students from the assigned sample of nursing campuses completed the questionnaires were as follows:

1. R. K. Khan Campus, 4th September 2013 (n = 29) from Groups 1/13 (n = 29) and 7/12 (n = 18).
2. Greys Campus, 7th October 2013, from Group 1/13 (n = 35).
3. Greys Campus, 6th September 2013, from Group 7/12 (n = 36).
4. Benedictine Campus, 21st October 2013 from Groups 1/13 (n = 23) and 7/12 (n = 24).
5. Madadeni Campus, 22nd October 2013 from Group 1/13 (n = 26.)
6. Madadeni Campus, 18th November 2013 from Group 7/12 (n = 26).
7. Edendale Campus, 11th November 2013 from Group 7/12 (n = 27) and Group 1/2013 (n = 4).

3.4.2 Data collection procedure

The questionnaires were delivered by hand by the researcher to each campus between the 4th of September and the 18th of November 2013 whilst the students were on campus for the theory component of the programme. Prior to each visit a lecturer from each campus was identified by the campus principal to be available to distribute the questionnaire package to the specified sample of students in a classroom. The designated lecturer remained in the classroom to be available to discuss the letter of information with the students and to answer any queries that the students may have had. The researcher was available in a nearby room to answer any queries by respondents if necessary. She was not in the classroom in an effort to prevent students feeling obligated to participate in the study. The research package for the prospective respondents contained an information letter (Annexure 5) pertaining to the study with an attached consent form, and a self-administered questionnaire (Annexure 1). The information/consent letter provided the researchers' details as well as specific information related to the study. Students were required to read and understand the information letter prior to signing consent to participate in the study to ensure an informed consent was given by the student. The students gave

consent for their matriculation certificates to be photocopied for research purposes. Following completion of the questionnaires the documents were given to the researcher.

3.5 Data analysis

Data analysis involves streaming data into understandable patterns and relationships (Burns and Grove 2009: 450). By analysing data, relationships between variables and ideas become clearer, and patterns are identified in the data that are either the same or different from others which makes it easier to understand the meaning of the information (Burns and Grove 2009: 461).

The researcher captured data electronically from each questionnaire. Data for this quantitative study was captured in a numerical form (Burns and Grove 2009: 43). Descriptive statistics in the form of tables and figures were used to describe the data. In addition, measures of central tendency, including means and modes, as well as a measure of spread using the standard deviation were calculated, where appropriate. In order to test for significant trends in the data, inferential statistics were applied. These included Pearson's correlation, t-tests, ANOVA and chi-square tests. Where the conditions were not met for the application of these tests, non-parametric equivalent tests were applied.

Linear regression was applied to assess the relative importance of the focus themes to the success/failure of Anatomy and Physiology students.

Throughout, a p-value < 0.05 was used to indicate significance. The analysis of data was carried out using SPSS (Statistical Package for Social Sciences) Version 17. The validity of results depended on the correct and appropriate use of statistical tests such that assumptions drawn regarding patterns were correctly inferred.

Content validity index was important as the questionnaire was constructed by the researcher; measuring the validity of the tool was important to establish the degree to which the tool covered the content it is supposed to measure.

3.5.1 Data processing and statistical analysis

Data was captured by the researcher on a document and interpreted on SPSS version17 by the statistician.

3.6 Ethical considerations

When conducting a research study it is important for the researcher to uphold the rights of others and to be aware of the study impacting negatively on the sample population. This consideration may include a number of moral principles generally accepted in research committees in all disciplines (Burns and Grove 2009: 61).

3.6.1 Permission to conduct the study

Prior to conducting the study the research proposal and student questionnaire, information letter and consent document was submitted for ethical approval by the DUT Institutional Research Ethics Committee (IREC reference number REC 14/13) (Annexure 2) following ethical guidelines. Permission to conduct the study in the KZNCN campuses was requested from the Acting Principal of KwaZulu-Natal College of Nursing and granted (Annexure 4). Permission to conduct the research in the KwaZulu-Natal Department of Health was requested and approved by the KwaZulu-Natal Health Research Committee (Annexure 3). Contact was made with all five of the principals of the campuses concerned to access the two student groups of 7/2012 and 1/2013. Written permission was obtained from two principals and verbal telephonic permission from the remaining three. Permission was requested and granted from the principal of Port Shepstone Nursing campus for the pilot study to be conducted. (See Annexures 6-12).

3.6.2 Self determination

The information letter (Annexure 5) given to students prior to completing the questionnaire gave accurate information on the research and its purpose. The provision of the researcher's details and contact numbers gave the students credible information to empower them with personal choice as to whether they would like to participate in the study (Burns and Grove 2009: 189-190). The autonomy of prospective respondents was respected as they were required to volunteer their participation in the study by signing an informed consent document prior to commencing with the questionnaire (Burns and Grove 2009: 189-190).

3.6.3 Avoidance of coercion

The researcher holds a position as a lecturer and Head of Department in Psychiatric Nursing Science and Social Sciences, teaching students from first year at Port Shepstone Nursing Campus in KZNCN. As the researcher teaches the students in their first year, this campus was omitted from the study as prospective respondents may have felt intimidated and coerced into participating in the study as the researcher is in a position of authority within the campus infrastructure (Burns and Grove 2009: 190).

3.6.4 Confidentiality

Care has been taken to ensure the privacy of respondent's information (Burns and Grove 2009: 196). Data relating to students associated with KZNCN is protected to ensure confidentiality. The following measures have been taken to ensure confidentiality regarding respondents' information. Immediately following completion of the questionnaires, the researcher removed the documents from the respective campus to ensure completed questionnaires were not viewed by others. Respondents' names on the questionnaires were coded with numbers to ensure confidentiality.

Data collected will be locked in a steel cupboard for a period of fifteen years following which the documents will be shredded. Electronic data captured will be deleted from technological devices once the study is complete.

3.7 Conclusion

This chapter discussed the research design and methodology and the compilation of the questionnaire as the research instrument to conduct the study. The validity and reliability of the tool to gather relevant data was discussed. The method of data collection from the different campuses and the ethical principles incorporated into the research was explained. Methods of data analysis to obtain the results from the captured data were included in this chapter.

CHAPTER 4: RESULTS

4.1 Introduction

The results of the study are presented in this chapter. The purpose of this study was to establish the factors contributing to success in Anatomy and Physiology in the first year of nursing in a South African context. Data pertaining to the variables related to student success in Anatomy and Physiology I and II for students registered in the second semester of 2012 (7/2012) and those registered in the first semester of 2013 (1/2013) are included.

The objectives of the study were firstly to compare the success rate of nursing students between Anatomy and Physiology I and Anatomy and Physiology II from groups 7/2012 and 1/2013. Secondly, to compare the symbols on the matriculation certificate with the student's performance in Anatomy and Physiology I and II. Finally, to identify the knowledge, attitudes and perceptions of first year nursing students in Anatomy and Physiology, and variables that may impact on the students Anatomy and Physiology results namely, English as a second language, first generation students, stressors, orientation and lack of knowledge related to the course.

4.2 Demographic characteristics

The population in this study comprised 248 first year students, of which 131 were from group 7/2012 and 117 were from group 1/2013. Two hundred and sixty seven questionnaires were distributed with a response rate of 92.8%.

4.2.1 Participant distribution

Data was obtained from both groups 7/2012 and 1/2013 from five different identified campuses. Each grouping of students (two groups from each of the five campuses) was allocated a number from 1-10 for data capturing purposes. The campuses in chronological order are 1: R. K. Khan Group 7/2012; 2: R. K. Khan Group 1/2013; 3: Greys Group 7/2012; 4: Greys Group 1/2013; 5: Benedictine Group 7/2012; 6: Benedictine Group 1/2013; 7: Madadeni Group 7/2012; 8: Madadeni Group 1/2013; 9: Edendale Group 7/2012 and 10: Edendale Group 1/2013. The distribution of participants from the different campuses is illustrated in Figure 4.1.

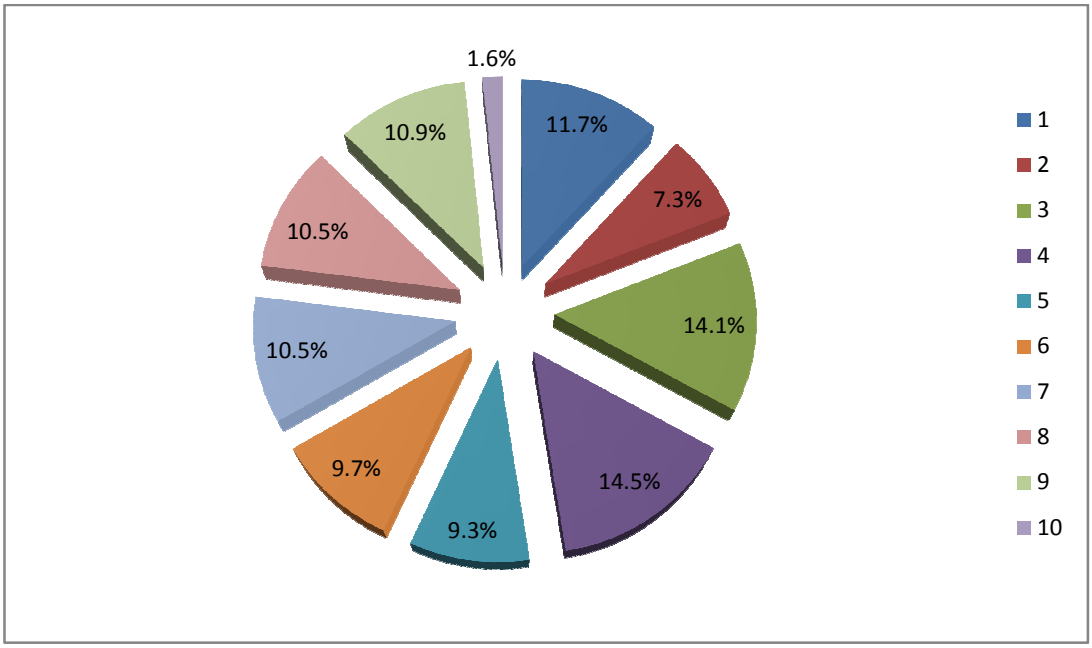

Figure 4.1: Participant distribution at the different campuses

4.2.2 Gender

Figure 4.2 depicts the gender of the 248 respondents who completed the questionnaire, 74 (29.8%) were males and 174 were females (70.2%).

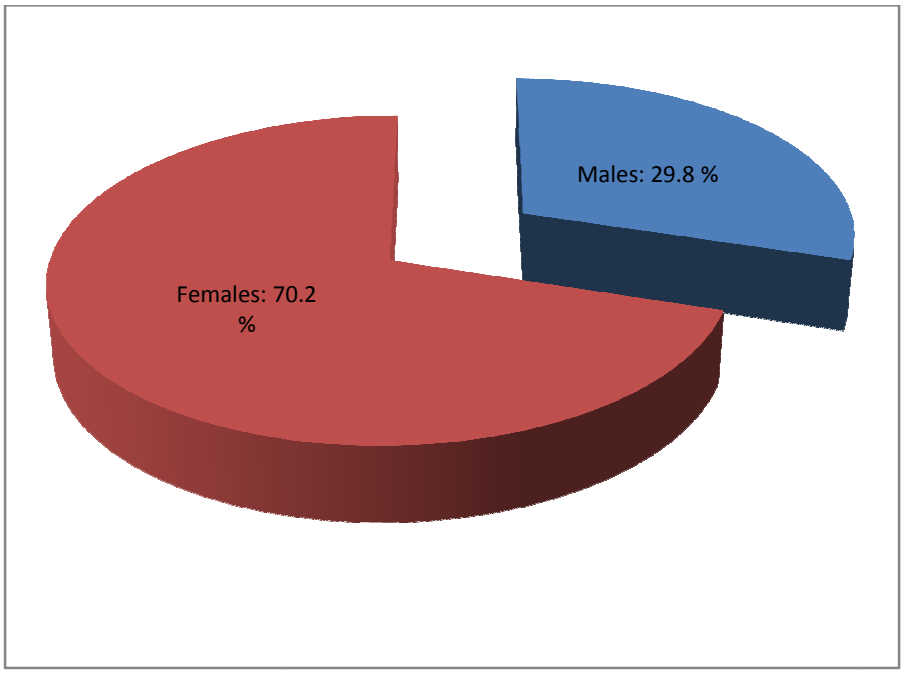

Figure 4.2: Gender

4.2.3 Age

The respondents were categorised into five age groups, namely, 19-20years, 21-22 years, 23-24 years, 25-26 years and above 26 years. Most respondents, 69.6% (n = 75), were below the age of 26 and 30.4% (n = 75) were above 26 years of age. Of all the respondents, 16.5% (n = 41) were in the 19-20 year age group, 16.9% (n = 42) in the 21-22 age group, 19.4% (n = 48) in the 23-24 age group, 16.5% (n = 41) in the 25-26 age group and 30.2% (n = 75) were above 26 years of age. One respondent did not answer this question. The age distribution is illustrated in Figure 4.3.

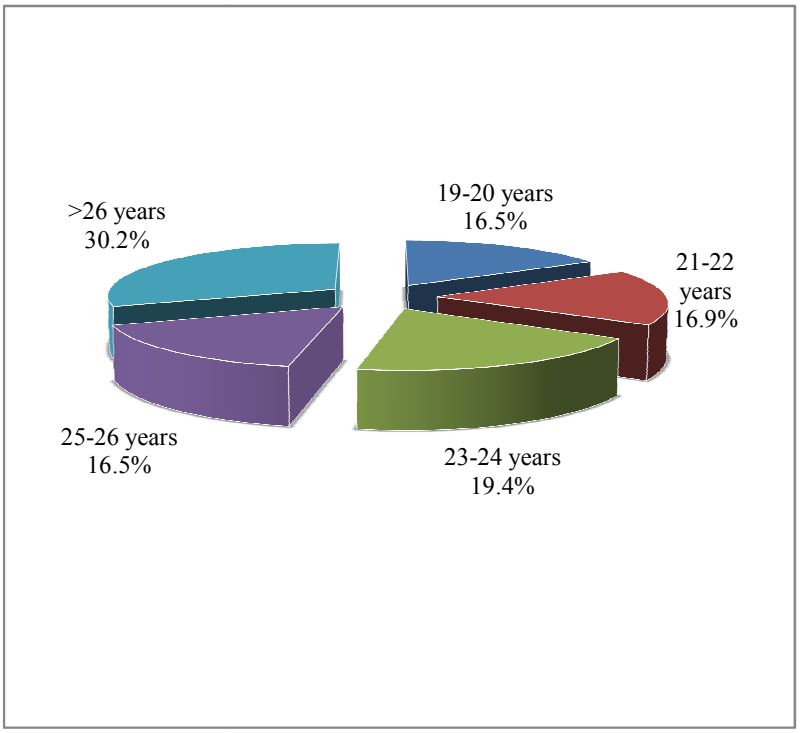

Figure: 4.3: Age of respondents

4.2.4 Race

The majority of respondents were Black and comprised 86.7% (n = 215) of the study population. Indians made up 8.9% (n = 22), Coloureds, 4% (n = 10) and Whites 0.4% (n = 1), as depicted in Figure 4.4.

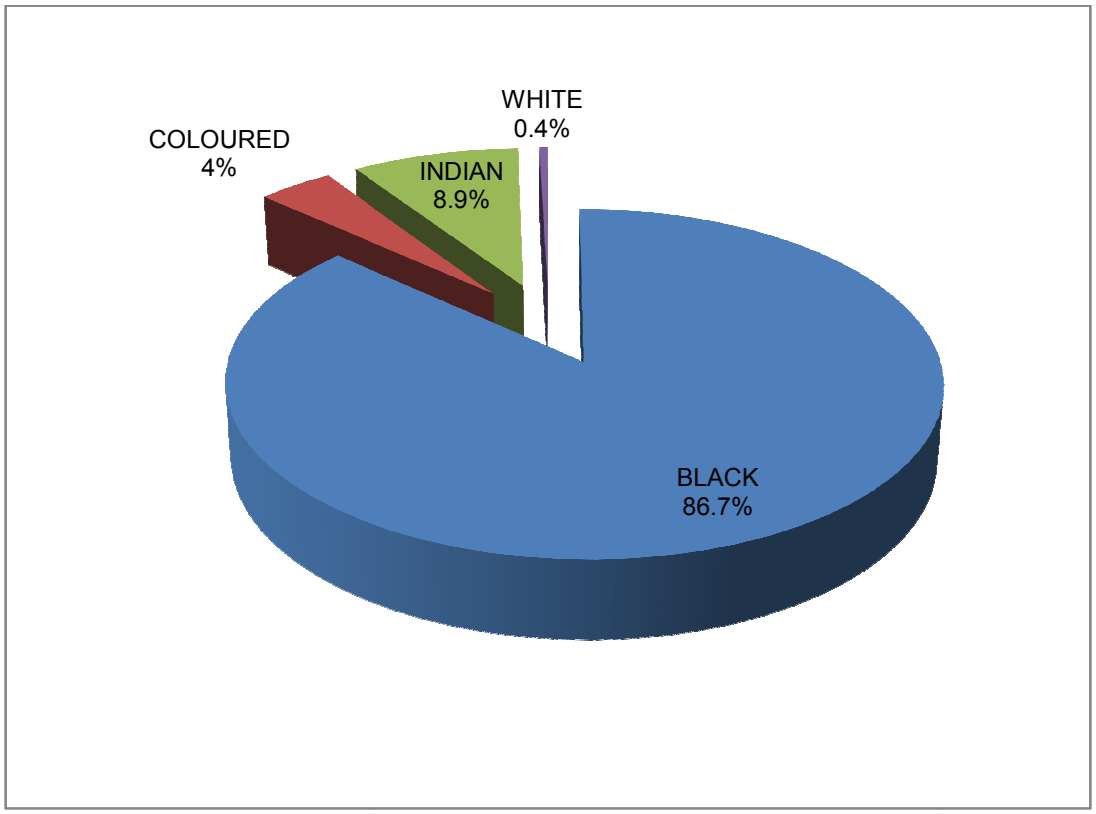

Figure 4.4: Race of respondents

4.2.5 Language

The majority of respondents, 78.6% (n = 195) speak isiZulu in their homes. Respondents speaking other African languages as their mother tongue made up 4.8% (n = 12) of the study population. Thus 86.6% of respondents speak English as their second language and 13.3% of respondents speak English as their first language. The home language of the respondents is illustrated in Figure 4.5.

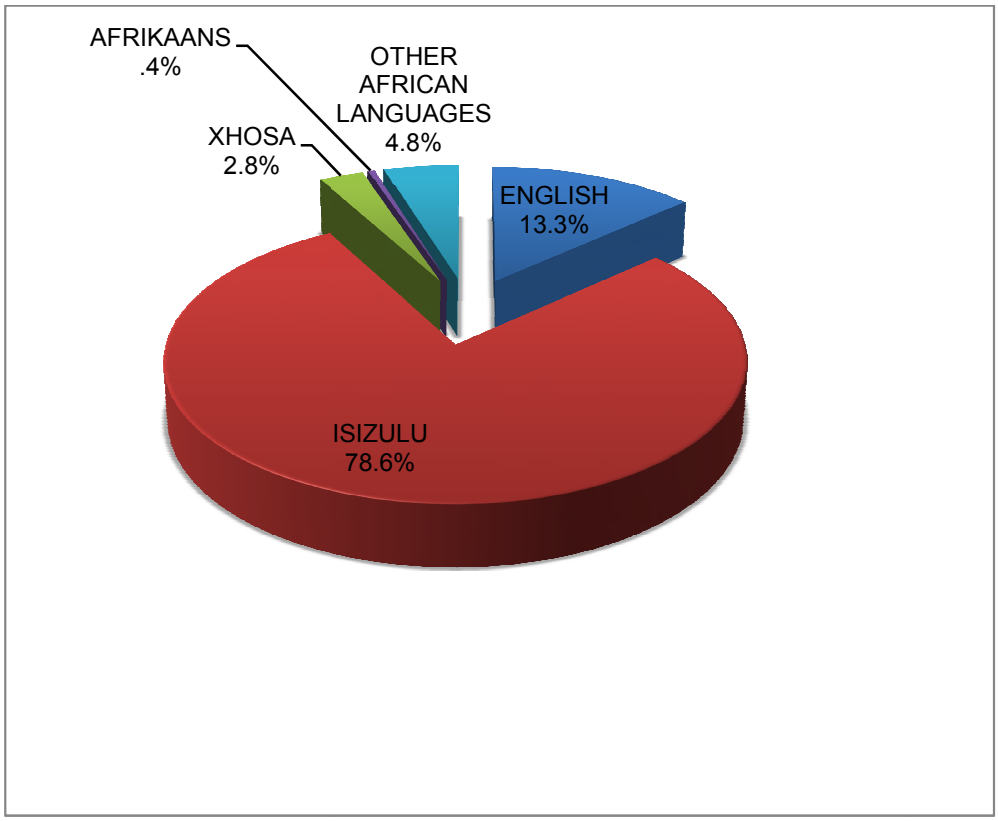

Figure 4.5: Language spoken in the home

4.2.6 Necessities related to upbringing

The concept of “necessities” relate to an individual’s basic need of having the use of electricity, clean water, adequate food and a home. Most respondents, 52.4% (n = 130) had these necessities, but nothing extra, whilst 18.5% (n = 46) often did not have these basic necessities. Some respondents, 23% (n = 57), always had the necessities and a little money over for more that they needed and only a few respondents, 4.4% (n = 11), always had everything that they wanted in their homes. This means that a significantly large number of respondents, 72.2% (n = 91), either did not have the necessities or had nothing extra. Four respondents did not answer this question. Figure 4.6 graphically depicts the respondent’s perception of their experience of necessities during their upbringing.

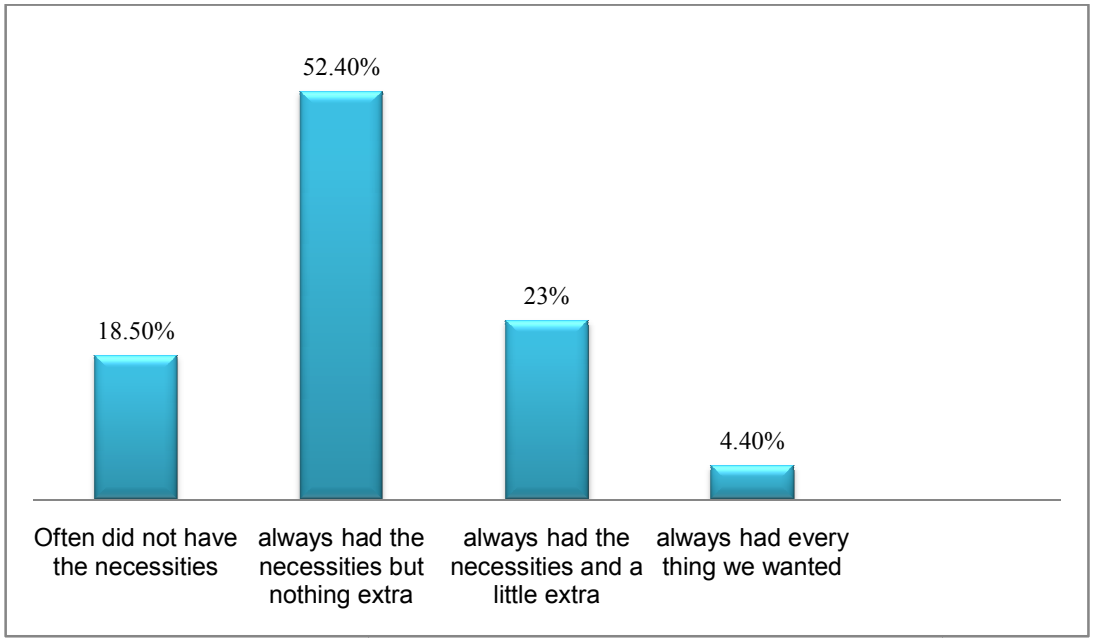

Figure 4.6: Necessities related to respondents upbringing

4.2.7 Areas respondents were raised in

Fewer respondents, 38.7% (n = 96) were raised in urban areas than rural areas, 61.3% (n = 152) as indicated in Figure 4.7. A Mann-Whitney test revealed that the respondents who grew up in urban areas scored significantly higher marks in their final matriculation examination for both English first (n = 66; p = 0.05) and second language (n = 182; p = 0.03) than respondents who were raised in rural areas.

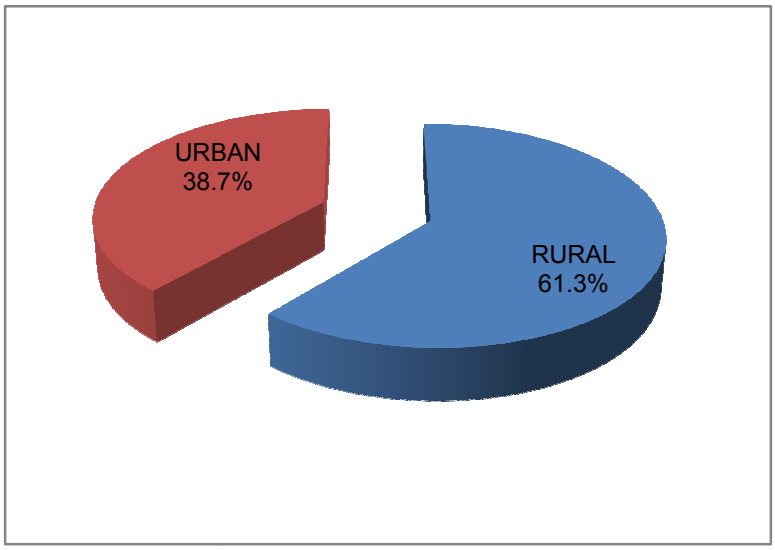

Figure 4.7: Areas respondents were raised

4.2.8 Persons responsible during upbringing

A chi-square goodness of fit test indicated that significantly more respondents were raised by their own parent(s) ($n = 175$; 70.6%; $p < 0.001$) as opposed to being raised by family members, a child headed household or in a Social Welfare Home. See Figure 4.8 below.

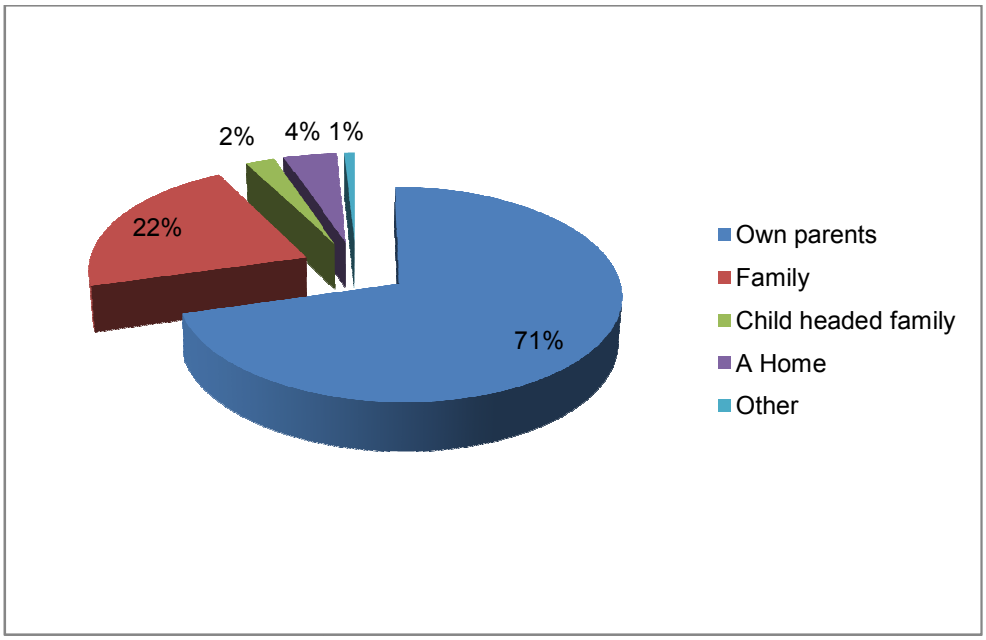

Figure 4.8: Persons responsible for upbringing

4.3 Education

The following aspects of education, namely, upbringing during high school, type of school attended and parental level of education were explored to identify whether there was any significant relationship between them and respondents success in Anatomy and Physiology I and II.

4.3.1 Respondents' schooling

Figure 4.9 indicates the geographical location within which respondents schooled. Most respondents, 46.4% (n = 115; $p < 0.001$) attended a rural government school. Others, attended government schools in a city or town, 26.6% (n = 66), a government school in a township, 22.2% (n = 55) or a private school, 4.8% (n = 12).

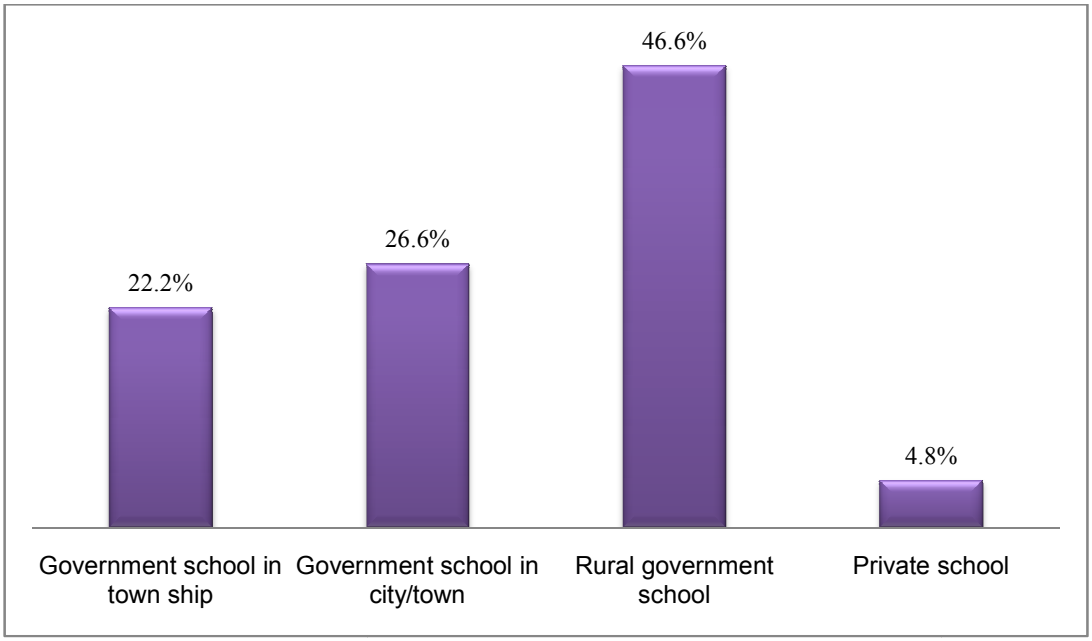

Figure 4.9: Location of schooling

4.3.2 Parental education

The respondents indicated that 25% (n = 62) of the mothers and 20.6% (n = 51) of the respondent's fathers had some secondary education. Only 17.7% (n = 44) of participants' mothers and 19.4% (n = 48) of participants' fathers matriculated. A few parents had only primary school education, 16.1% (n = 40) of mothers and 14.1% (n = 35) of fathers. Some mothers 12.1% (n = 30) and fathers 9.3% (n = 23) had no formal education. There were 10.1% (n = 25) maternal graduates of diploma's and 7.7% (n = 19) paternal diploma graduates. A small number of parents had graduated with university Bachelor degrees; i.e. 5.2% (n = 13) of mothers and 6% (n = 15) of fathers. There were 3.6% (n = 9) mothers and 2.8% (n = 7) fathers of respondents with post graduate degrees.

Significantly more than expected of the mothers of 'rural children' have either no education or some primary education, while more than expected of the mothers of "urban children" have a matriculation certificate or a higher degree (n = 245; = 21.141, p = 0.007). Significantly more than expected of the fathers of "rural children" had some primary education while significantly more than expected of the fathers of "urban children" had a degree, diploma or higher degree (n = 220; = 21.425, p = 0.006). Using a chi-square test of independence, the results indicated that for respondents mothers (n = 245; $p < 0.001$) and fathers (n = 220; $p < 0.001$) whose home language is English, more often than expected have better qualifications than for those whose home language is not English.

Three (1.2%) respondents did not complete the section for their mother's education and 11.3% (n = 28) of respondents did not complete the section relating to their father's education. Figure 4.10 denotes the level of schooling achieved by respondent's parents.

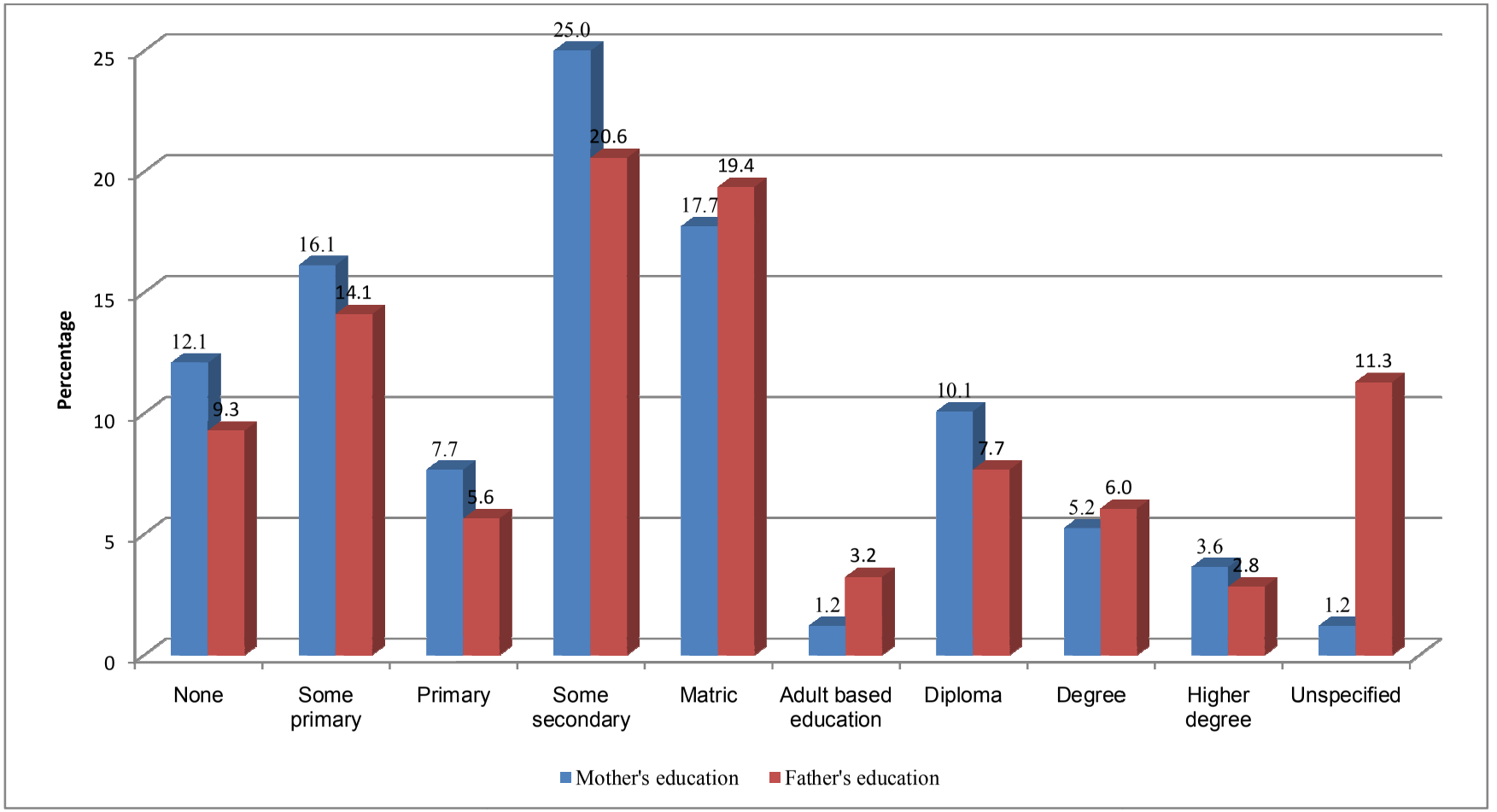

Figure 4.10: Level of Parents' Education

4.4 Anatomy and Physiology results

Success rate of respondents as first year nursing students in Anatomy and Physiology I and Anatomy and Physiology II.

An objective of this study was a comparison of the success rate of nursing students between Anatomy and Physiology 1 and Anatomy and Physiology 11 from groups 7/2012 and 1/2013 which comprised of the first year cohort of nursing students at the respective campuses. The individual specific percentage of each respondent was coded into the categories below for statistical purposes (for example 52% coded to 50-59%).

4.4.1 Anatomy and Physiology I results for groups 7/2012 and 1/2013

Table 4.1: Frequency table showing distribution of results for the respondents from Groups 7/2012 and 1/2013 Anatomy and Physiology I and II examinations.

	Anatomy and Physiology I		Anatomy and Physiology II	
	Frequency	**Percent**	**Frequency**	**Percent**
< 50%	16	6.5	39	15.7
50-59%	57	23.0	47	19.0
60-69%	77	31.0	75	30.2
70-79%	69	27.8	45	18.1
80-89%	16	6.5	21	8.5
90-100%	1	0.4	6	2.4
No DP	1	0.4	4	1.6
No record	11	4.4	11	4.4
Total	248	100	248	100

Table 4.1 shows the results of the Anatomy and Physiology I examinations for groups 7/2012 and 1/2013. Of the 248 respondents, there was no record of examination results for 4.4% (n = 11) of the participants. The campus administration was unable to provide this information as students did not sit for the examination. Reasons for this are that some students may not have obtained a duly performed certificate (DP), which represents the minimum the average assessment mark that must be obtained during the semester in order for the student to qualify to write the examination. Other students were either on maternity or sick leave and thus did not write the examination.

Most of the respondents, 31% (n = 77), obtained between 60 and 69% for the Anatomy and Physiology 1 examination. The highest mark was between 90 and 100% (n = 1). Sixteen participants (n = 16) failed Anatomy and Physiology1 and their marks were below 50%.

4.4.2 Anatomy and Physiology II results for groups 7/2012 and 1/2013

There were no records of examination results for 6% (n = 15) of students in the Anatomy and Physiology II examinations. It was noted that 1.6% (n = 4) did not obtain a DP as an entry requirement to write the examinations, but reasons for the remaining 4.4% (n = 11) of respondents not writing the examination were not specified. As depicted in Table 4.1, most respondents, 30.2% (n = 75), obtained between 60 and 69%, with the highest marks ranging between 90 and 100%. Six (2.4%) of respondents obtained marks within this range. The number of respondents who failed the examination with marks below 50%, is 15.7% (n = 39)

4.4.3 Anatomy and Physiology I rewrite results for groups 7/2012 and 1/2013

Twenty eight respondents (11.3%) rewrote Anatomy and Physiology I as indicated in Table 4.2. Most of these, 50% (n = 14), obtained between 50 and 59%. Two respondents (7.1%) attained marks between 80 and 89% and 17.9% (n = 5) obtained marks below 50% and thus failed the rewrite.

Table 4.2: Rewrites of groups 7/2012 and 1/2013 in Anatomy and Physiology I and II

	Rewrite Anatomy and Physiology 1		Rewrite Anatomy and Physiology II	
	Frequency	**Percent**	**Frequency**	**Percent**
< 50%	5	2.0	3	1.2
50-59%	14	5.6	6	2.4
60-69%	6	2.4	11	4.4
70-79%	1	0.4	9	3.6
80-89%	2	0.8	1	0.4
90-100%	Nil	N/A	Nil	N/A
No DP	28	11.3	30	12.1
Not writing	220	88.7	218	87.9
Total	248	100	248	100

4.4.4 Anatomy and Physiology II results for groups 7/2012 and 1/2013

In Table 4.2 it can be seen that a total of 12.1% (n = 30) respondents, rewrote Anatomy and Physiology II. Of these, most respondents, 36.6% (n = 11) obtained between 60 and 69%. One respondent (3.3%) obtained the highest mark between 80 and 89%, and 10% (n = 3) of respondents failed with a mark below 50%.

4.4.5 Results of respondents in Anatomy and Physiology I and II

As shown in Table 4.3, the examination results of the first year nursing students indicate that groups 7/2012 and 1/2013 obtained an average mark of 64.47%. The marks ranged between 33% and 92% (n = 236). The Anatomy and Physiology II examinations produced an average of 62.73%, with the range between 16% and 93% (n = 233). Of the twenty eight respondents that rewrote their Anatomy and Physiology I examination, the average mark was 55.89%, the minimum mark was 25% and the highest mark 89%. Thirty respondents rewrote the Anatomy and Physiology II examination, the average mark was 63.80%, the lowest mark was 28% and the highest 80%. Three respondents' marks were not available on the record.

Table 4.3: Results of respondents in Anatomy and Physiology I and II

	N	Minimum	Maximum	Average	Std. Deviation
Anatomy and Physiology 1	236	33	92	64.47	11.03
Anatomy and Physiology II	233	16	93	62.73	13.72
Rewrite I	28	25	89	55.89	13.02
Rewrite II	30	28	80	63.80	11.79

4.4.6 Comparison of marks between the different groups.

An independent samples t-test was used in order to test whether the average marks for Anatomy and Physiology was significantly different between the two groups of students.

Table 4.4: Total average marks for Anatomy and Physiology 1 and 11 for both groups

Subject/Course	Groups	N	Average	Std. Deviation
Anatomy and Physiology 1	7/2012	130	64.21	10.29
	1/2013	106	64.80	11.92
Anatomy and Physiology II	7/2012	129	61.05	12.38
	1/2013	104	64.83	15.02

Average marks for the two groups, as indicated in Table 4.4, were not significantly different between the two groups that wrote Anatomy and Physiology I; however, there was a significant difference in the average marks obtained between the two groups for Anatomy and Physiology II. The average Anatomy and Physiology II mark for group 1/2013 was 64.83% (± 15.02; n = 104), which is significantly higher than 61.05% (± 12.38; p = 0.040) for group 7/2012 (n = 129).

4.4.7 Comparison between Anatomy and Physiology I and II marks

For group 7/2012 the marks for Anatomy and Physiology II (61.09% ± 12.47) were significantly lower than those of Anatomy and Physiology I (64.63% ± 9.93; n = 126; $p < 0.001$) as indicated in Table 4.5.

Table 4.5: Comparison between Anatomy and Physiology I and II marks for group 7/2012

GROUP	SUBJECT	Average	N	Std. Deviation
1/2012	Anatomy and Physiology 1	64.63	127	9.93
	Anatomy and Physiology II	61.09	127	12.47

For group 1/2013 the marks for Anatomy and Physiology I (65.81%; ±11.57) were not significant from those for Anatomy and Physiology II (65.81; ± 11.57) as evident in Table 4.6.

Table 4.6 Comparison between Anatomy and Physiology I and II marks for group 1/2013

GROUP	SUBJECT	Average	N	Std. Deviation
7/2013	Anatomy and Physiology 1	65.81	97	11.571
	Anatomy and Physiology II	65.82	97	14.077

4.4.8 Comparison of success rate of respondents between Anatomy and Physiology I, Anatomy and Physiology II and matriculation subjects.

There was also a positive correlation between total matriculation points and Anatomy and Physiology I (n = 236; r = 0.211; p = 0.001). Thus, the higher marks obtained in Biology in the matriculation examination, the better the performance in Anatomy and Physiology 1. There was also a positive correlation between the total matriculation points and the Anatomy and Physiology 1 results (n = 236; r = 0.211; p = 0.001). There was no correlation between Anatomy and Physiology I results and the marks obtained in other matriculation subjects i.e. English (first or second language), mathematics, mathematical literacy and physical science. Some respondents wrote pure mathematics (n = 132; 53%); mathematics literacy (n = 38; 15.3%) and Physical Science (n = 116; 46.8%) when matriculating.

However there was a correlation between Anatomy and Physiology II results versus English Additional Language (n = 172; r = 0.56; p = 0.022), Biology/Life Sciences (n = 220; r = 0.237¯; p = 0.001) and Mathematics Literacy (n = 31; r = 0.377; p = 0.036). Additionally, there was a correlation between overall total matriculation points and Anatomy and Physiology II results (n = 233; r = 0.175; p = 0.007).

4.5 English second language

The third objective was to identify the knowledge, attitudes and perceptions of nursing students in Anatomy and Physiology and the variables that affect these namely, English as a second language, first generation students, stressors, orientation and lack of knowledge in relation to the course. See Figure 4.11.

4.5.1 English Second language

Results from a Wilcoxon Signed Ranks test indicated that respondents do not have difficulty with English as the language of instruction for the course. Respondents indicated that interactive group work ($n = 244$; $p < 0.001$) and study groups ($n = 246$; $p < 0.001$) are beneficial. The respondents did not think that their grades would improve if the course was given in another language ($n = 246$; $p < 0.001$), they understand the English spoken by lecturers ($n = 246$; $p < 0.001$) and are not afraid to speak in class in case they are not understood ($n = 245$; $p < 0.001$). The lecturers do not speak too fast for the respondents in class ($n = 245$; $p < 0.001$). Figure 4.11 is a graphical presentation of respondent's interpretation of the impact of English as the medium of language for this programme.

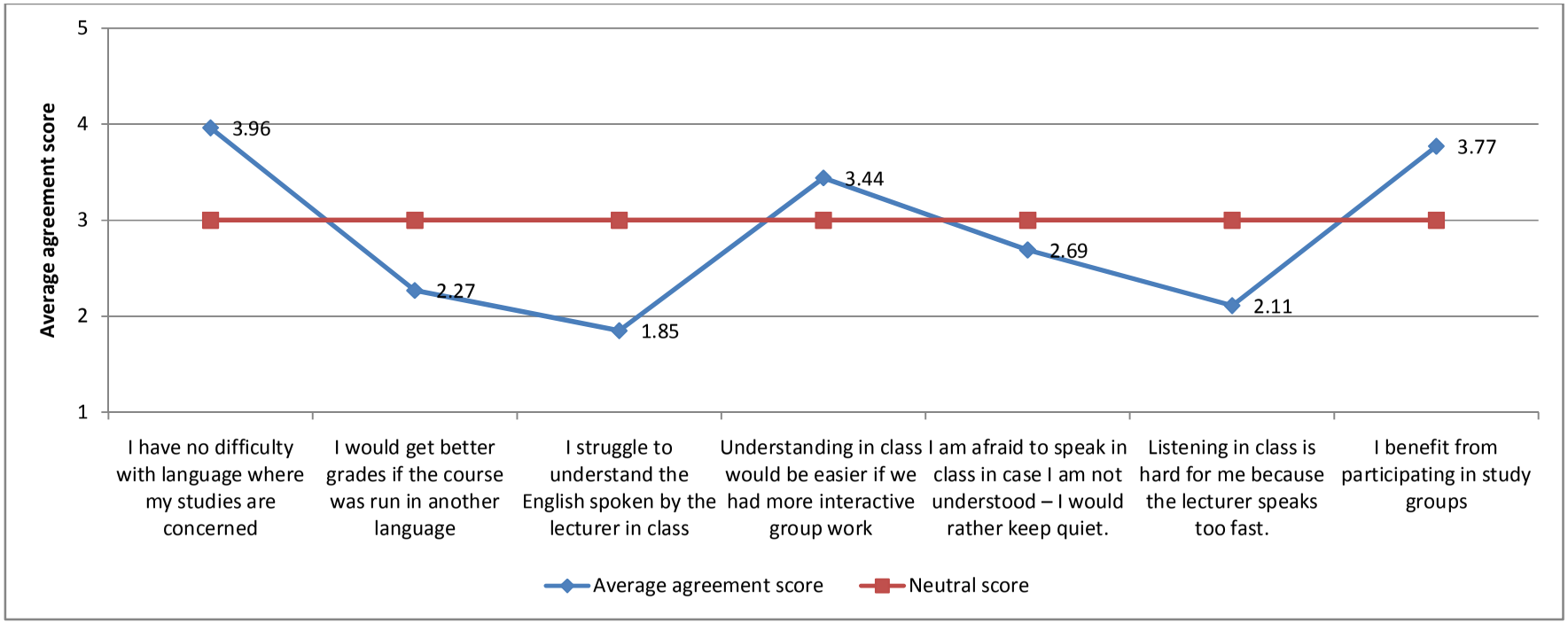

Figure 4.11: English second language

4.5.2 Self rating on English

The academic programme that the respondents are enrolled in is taught in English. Since 78.6% (n = 196) of the respondents speak English as a second language, the respondent's perception of their own competence with regard to reading, writing, understanding and comprehension of English was assessed using a self-rating scale.

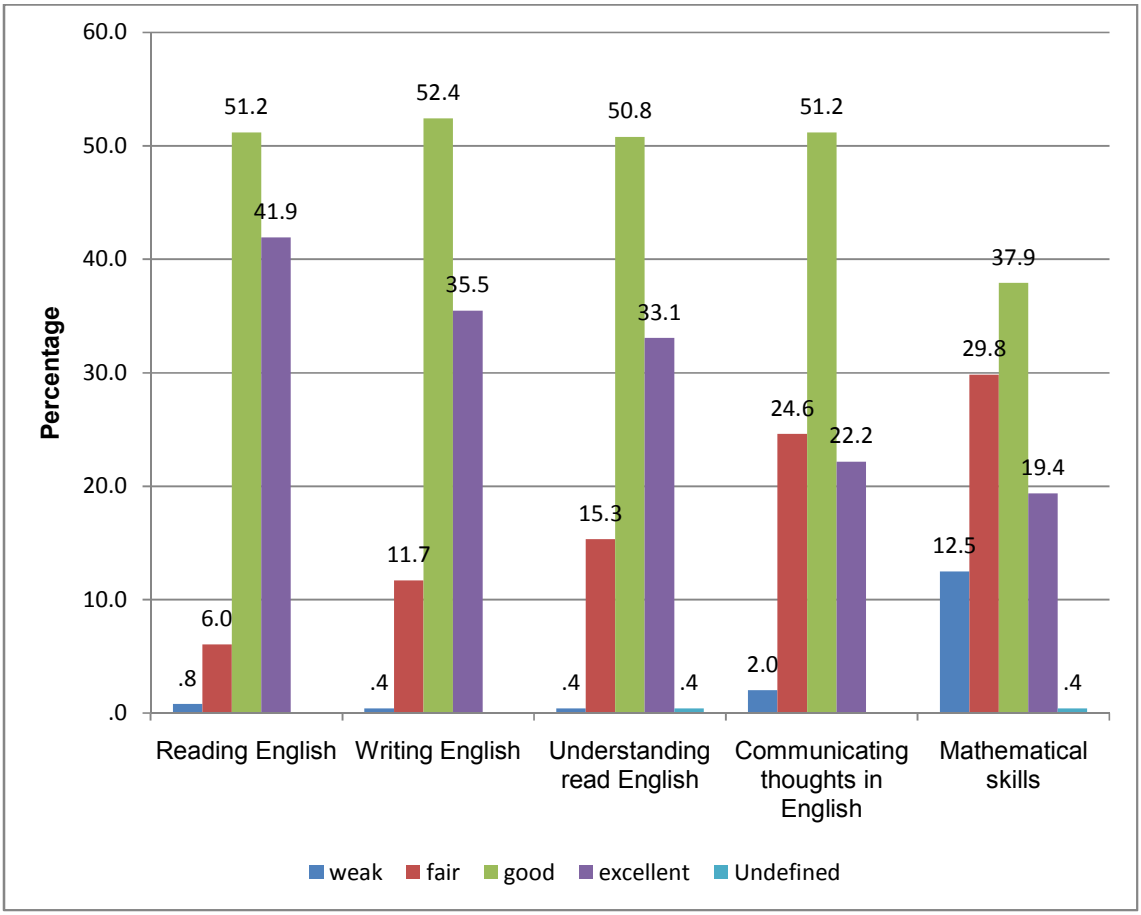

Figure 4.12:Self-assessment on proficiency in the English language and Mathematics

Figure 4.12 is a graphical presentation on self-assessment on the proficiency in the English language. Results from a chi-square goodness of fit test on communication in English, showed that significantly more respondents felt their ability at reading English was "excellent" or "good" (n = 245; $p < 0.001$); that their writing of English was "good" (n = 248; $p < 0.001$), their understanding of English as "good" (n = 247; p

< 0.001) and that their comprehension of English is “good” (n = 247; p < 0.001). They also felt that their mathematical skills are “good” (n = 247; p < 0.001).

4.6 First generation students

Figure 4.13 depicts results of respondent’s exposure to tertiary study as first generation students. A significantly higher proportion of respondents, (57.7%, n = 143), were not the first member of their family to embark on tertiary studies (p < 0.001) whilst 37.5% percent (n = 93) were the first in their family to attend tertiary education. Results from a chi-square goodness of fit test showed that significantly more respondents, 74.2% (n = 184), had close friends (p < 0.001) that had previously embarked on tertiary education. Many also had close family members such as brothers, sisters, parents or grandparents (59.7%, n = 148; p < 0.001) and extended family such as aunts, uncles and cousins (62.9%, n = 156; p < 0.001) that had previously tended tertiary education.

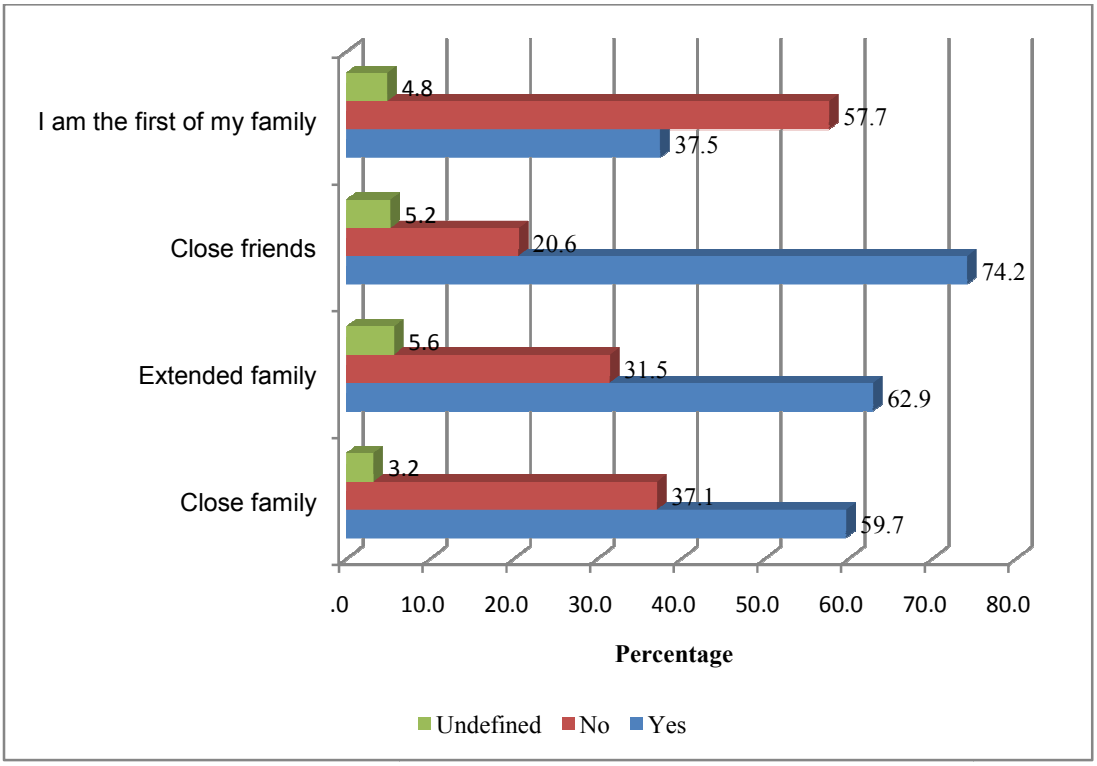

Figure 4.13 First generation students

4.7 Stressors

4.7.1 Stressors experienced as a first year nursing student

The response to the stressors impacting on respondent's studies is graphically presented in Figure 4.14. Wilcoxon Signed Ranks tests indicated that significantly more respondents felt that they did not have enough time to complete all the tasks required for their studies ($n = 247$; $p < 0.001$). A significantly larger number also indicated that stress affected their grades negatively ($n = 247$; $p < 0.001$). They also indicated that there is family pressure to pay for necessities at home ($n = 248$; $p < 0.001$) and that there is insufficient money to pay for textbooks for their studies ($n = 247$; $p < 0.001$). Respondents also indicated that they feel that they need to study longer hours than their classmates ($n = 248$; $p < 0.001$). Most of the respondents have the opportunity to live in a nurses residence ($n = 248$; $p < 0.001$). The respondents feel that their families understand the time and energy they need to put into their studies to be successful ($n = 248$; $p < 0.001$) and they feel like they chose the correct career in studying this nursing programme ($n = 247$; $p < 0.001$).

Respondents indicated that they feel they experience similar stressors to those of their fellow students.

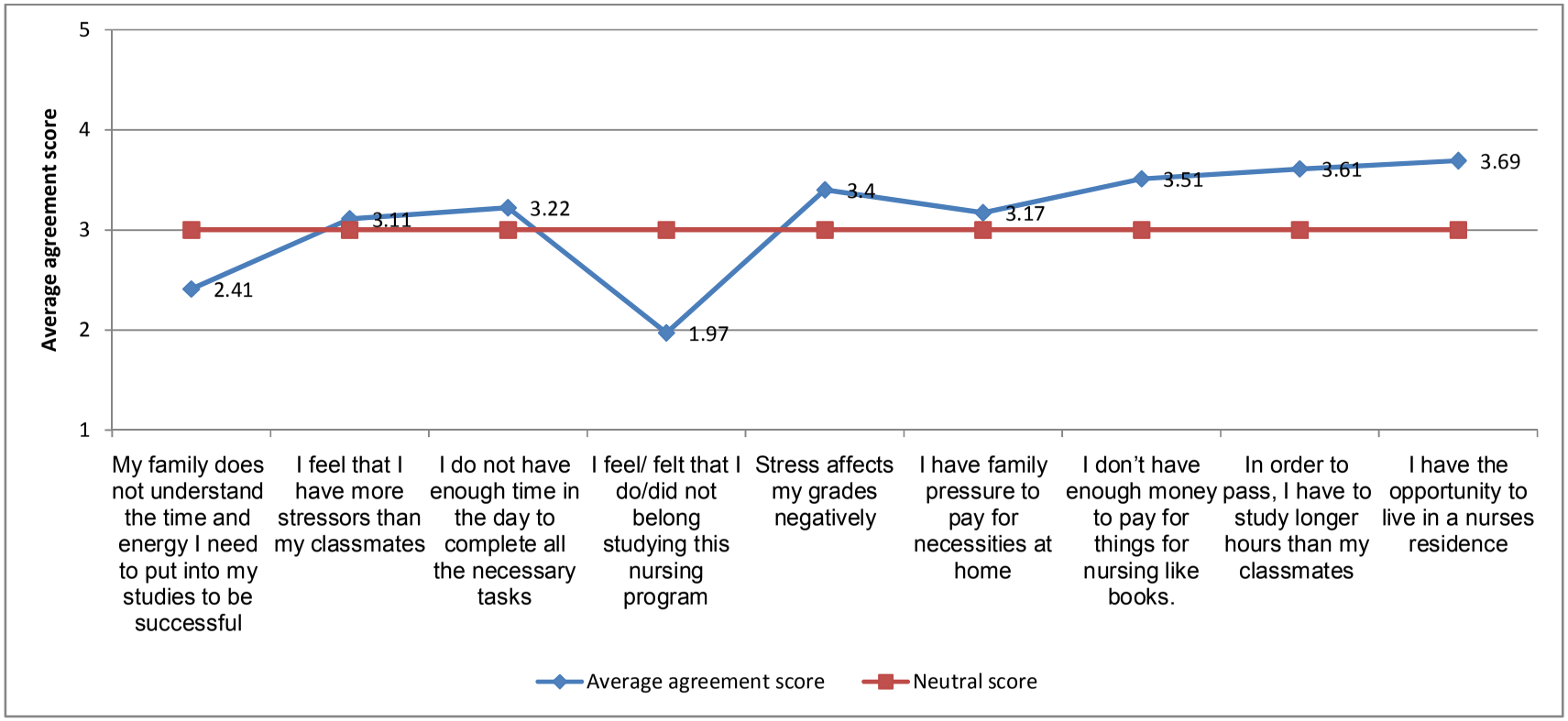

Figure 4.14: Stressors impacting on their studies

4.7.2 Stressors impacting on academic success

The response to stressors impacting on the respondents' studies is graphically presented in Figure 4.15, where stressors are graded from "very stressful" to "not at all stressful". The chi-square goodness of fit test was used to assess which stressors impacted on academic success. Significantly more respondents found the academic workload to be very stressful 41.5% (n = 103; $p < 0.001$). The response options between "stressful and very stressful" were chosen by 84.1% (n = 207) of respondents for this question. Two respondents did not answer this question.

Most respondents, 53.6% (n = 133; $p < 0.001$) found the long working hours very stressful. One respondent did not answer this question. The majority of respondents found the difficulty of academic work stressful (n = 83; $p < 0.001$) and six did not respond to this question. Significantly more respondents indicated that their poor study methods caused stress (n = 68; $p < 0.001$). Four respondents did not answer this question. Few respondents felt their academic assignments were not at all stressful (n = 13; $p < 0.001$), most (57.3%, n = 141) found them to be stressful or a little stressful. Two respondents did not answer this question.

A significant number of respondents revealed that they found personal illness only a little stressful, 27.8% (n = 69) and 26.6% (n = 66; $p < 0.001$) found it not at all stressful. Three respondents did not answer this question. Significantly more of the 246 respondents who answered this aspect of the question on stress, indicated that they experienced family illness as either stressful or very stressful, 55.6% (n = 138) whereas significantly few respondents found family illness to be only rather stressful (n = 14; $p < 0.001$).

Problems experienced at home were very stressful 27.1% (n = 67; $p < 0.001$) for many respondents. One respondent did not answer this question. Significantly more respondents were only a little stressed by living away from home during the programme 27.8% (n = 69), and 23.8% (n = 59) found it not at all stressful. Significantly few respondents, 2% (n = 19; $p < 0.001$), felt that living away from home was rather stressful. Five respondents did not answer this question. Significantly

more respondents, 50.8% (n = 126; p < 0.001), indicated that a lack of finances were very stressful. One respondent did not answer this question.

Of note, the stressors most commonly identified as “very stressful” were financial stressors (50.8%, n = 126), long working hours (53.6%, n = 133) and academic workload (41.5%, n = 103). The potential stressors identified as “not at all stressful” were living away from home (27.8%, n = 69) and personal illness (26.6%, n = 66). Figure 4.14 is a graphic presentation where stressors are graded from “very stressful” to “not at all stressful”.

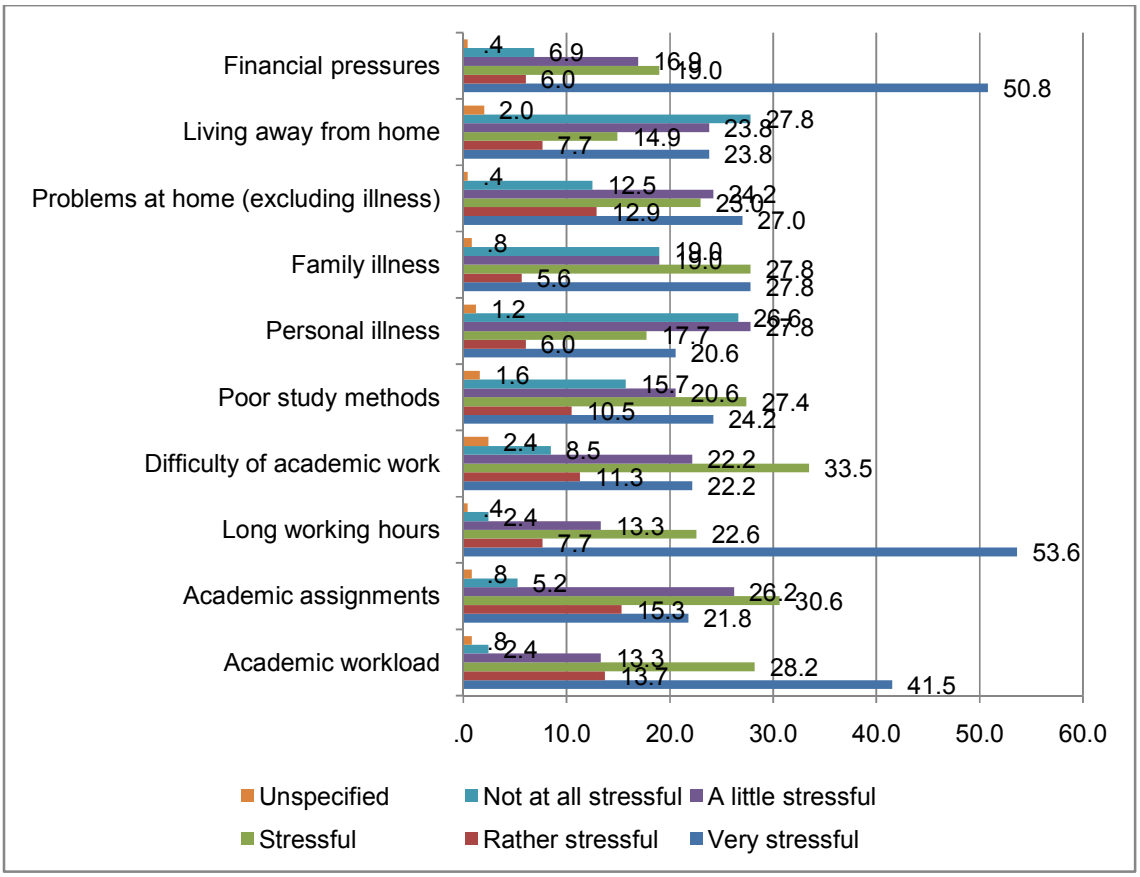

Figure 4.15: Stressors impacting on respondent’s academic success

4.7.3 Coping mechanisms related to relieving stress

Using a Likert analysis of 1 – 5, coping mechanisms to relieve stress were assessed. A significantly large proportion of respondents played with their cell phones (scale of 3.24; n = 247; p < 0.001) or socialised with their friends (scale of 3.53; n = 245; p <0.001) to relieve themselves of stress. On the other hand, eating (scale of 2.54; n = 247; p <0.001), consumption of alcohol/partying (scale of 1.69; n = 245; p <0.001) and staying home from work (scale of 2.07; n = 247; p < 0.001) were not used as stress relievers. Notably few respondents reported drinking to relive stress. Figure 4.16 is a graphical presentation of coping mechanisms related to relieving stress.

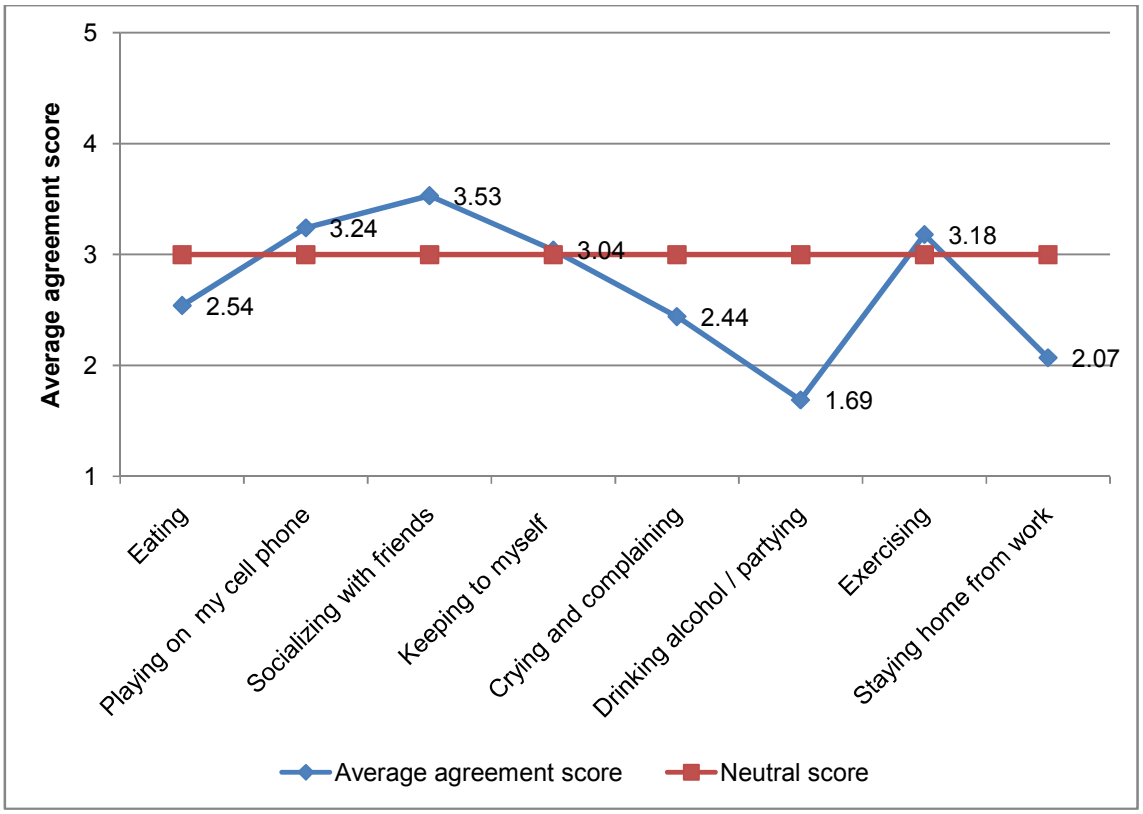

Figure 4.16: Coping mechanisms used to relieve stress

The Mann-Whitney U test indicated that when stressed, significantly more males than females exercise (n = 247; = -4.994; p < 0.001). Conversely significantly more females than males binge eat (n = 247; = -3.482, p < 0.001) to relieve themselves of

stress. Chi square tests showed no significance between how FGS and non-FGS behave with regard to stressors.

4.7.4 Sources of support

Respondents were asked to use a Likert rating from 1 to 5 to rate the support they received from specified sources regarding both their studies as well as the demands of tertiary study, where a rating of 1 equals “not at all” and 5 equals “a great deal”. An average score of three was calculated as shown on Figure 4.17. Most respondents felt their lecturers (scale of 4.17; n = 246; ± 1.27), parents (scale of 4.00; n = 241; ±1.52) and friends who are fellow nursing students (scale of 3.78; n = 246; +- 1.44) were a source of support. To a lesser extent respondents identified their siblings (scale of 3.22; n = 245; ±1.70), friends from school (scale of 3.06; n = 245; ± 1.61) and close relatives (scale of 2.63; n = 246; ±1.63) as a source of support.

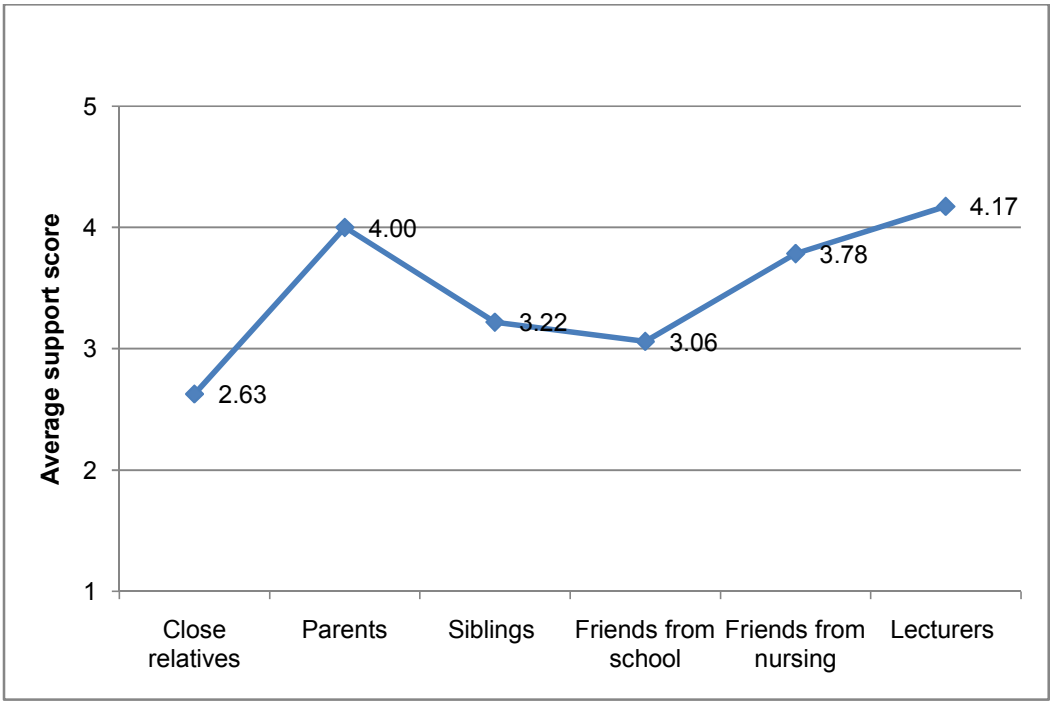

Figure 4.17: Sources of support

4.8 Orientation to the programme

The respondent's prior knowledge of what to expect in the upcoming course and attending an orientation programme had a positive impact on their success. A Wilcoxon Signed Ranks Test indicated that a significant number of respondents felt that they did not know what they were getting into before starting the nursing course ($n = 247$; $p < 0.001$). The respondents felt that nursing was not what they expected ($n = 246$; $p = 0.038$), and had anticipated the nursing programme to be more practical than theoretical ($n = 246$; $p < 0.001$). Most respondents also expected "nursing to be an easy practical job" ($n = 246$; $p < 0.001$). The choice of another course at university did not take precedence over the nursing course ($n = 246$; $p < 0.001$). Most respondents indicated that they were not only studying nursing in order to get the monthly salary ($n = 246$; $p < 0.001$). These results are illustrated in Figure 4.18.

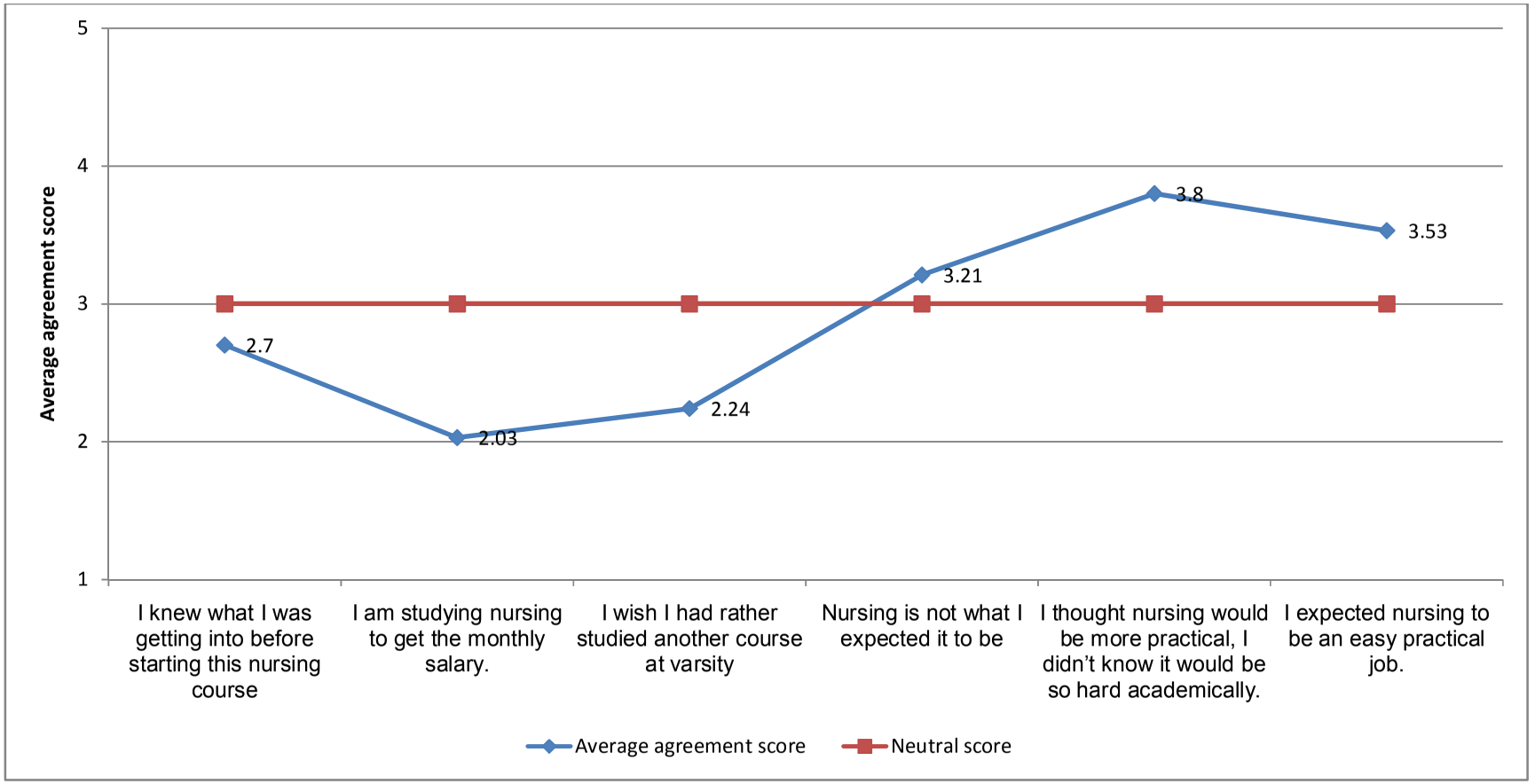

Figure 4.18: Orientation to the nursing programme

4.9 Transition from secondary school education to tertiary education

As denoted in Figure 4.19, a Wilcoxon Signed Ranks Test indicated that respondents found the transition from secondary school to tertiary education difficult ($n = 247$; $p < 0.001$). They find it more difficult to achieve high academic results in the nursing programme ($n = 247$; $p < 0.001$). The respondents felt that in the nursing programme there is a lot more work to do in a short space of time ($n = 247$; $p < 0.001$) and that there was great academic responsibility on the student ($n = 247$; $p < 0.001$). There was also agreement that the method of teaching is different and faster ($n = 247$; $p < 0.001$). One respondent omitted this question.

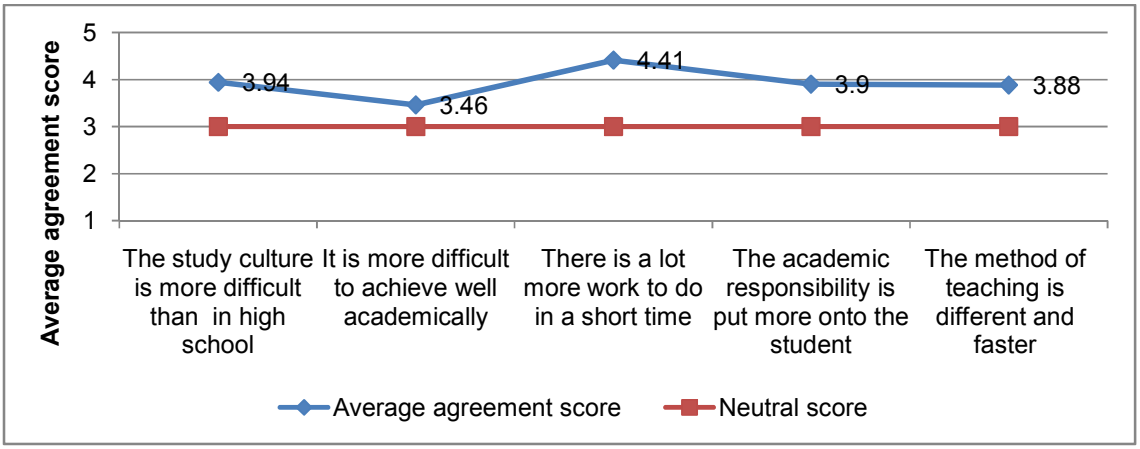

Figure 4.19: Transition from secondary education to tertiary education

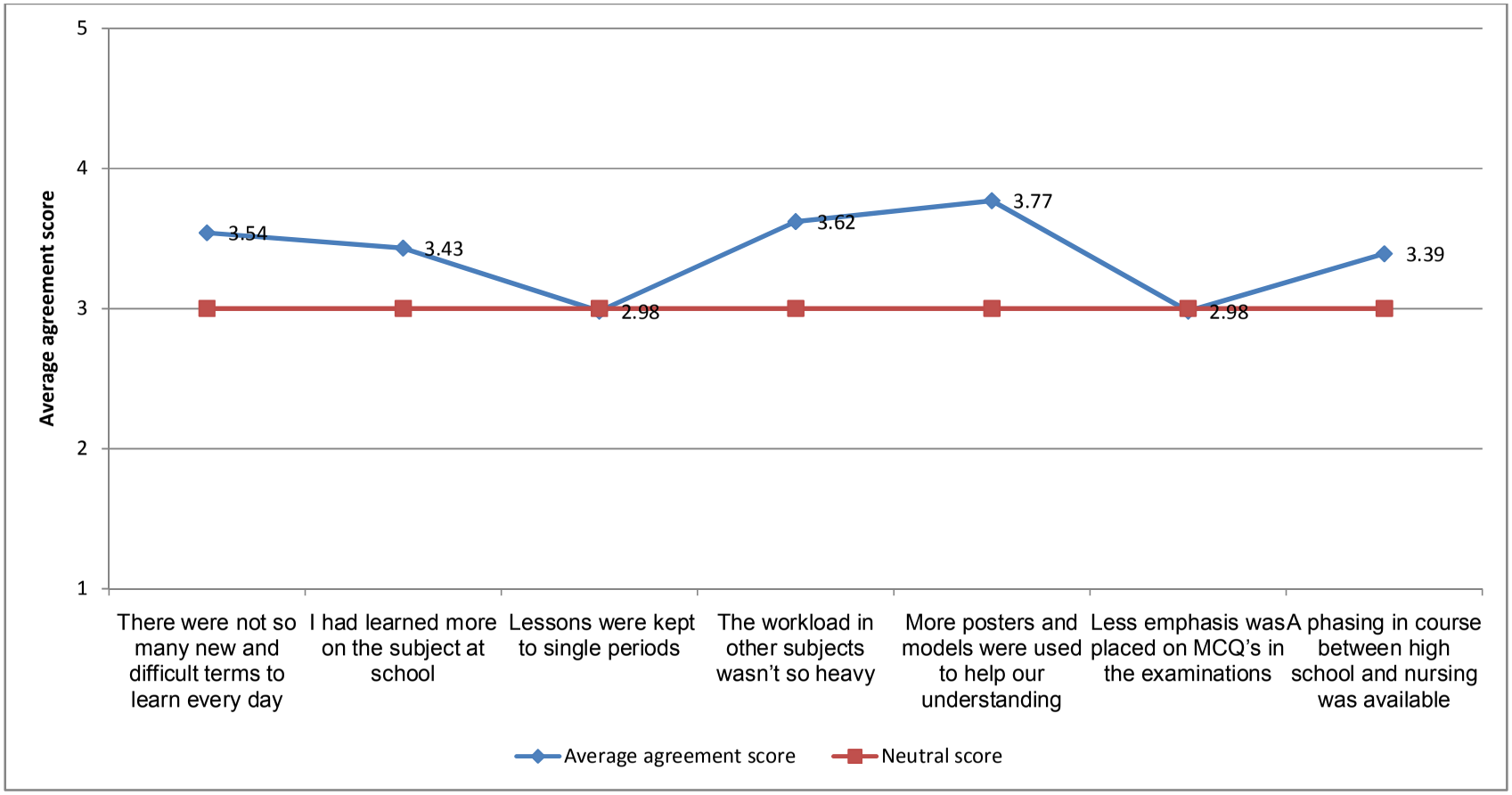

Figure 4.20: Views related to Anatomy and Physiology

4.10 Anatomy and Physiology

Figure 4.20 is a graphical presentation of the respondents' views related to Anatomy and Physiology. The respondents indicated that that they would have performed better in Anatomy and Physiology if they had learned more about this subject at school ($n = 246$; $p < 0.001$). The respondents experienced difficulty in learning many new concepts and terminology in Anatomy and Physiology on a daily basis ($n = 246$; $p < 0.001$). Pearson's correlation indicated that respondents who agree that they struggle to understand the English spoken by the lecturer in class significantly agree they would perform better in Anatomy and Physiology if they were not required to learn so many new and difficult terms every day ($n = 66$; $p = 0.18$). The respondents also felt that they would do better in Anatomy and Physiology if the workload in other subjects was not so extensive ($n = 246$; $p < 0.001$) and if more posters and models were used during instruction to help their understanding of this subject ($n = 247$; $p < 0.001$). They also felt that the availability of a phasing in course between high school and nursing would be beneficial to their success in Anatomy and Physiology ($n = 246$; $p < 0.001$). Whilst some respondents indicated that they would perform better in the subject if the delivery of lessons were kept to single periods, the majority did not agree with this ($n = 244$; $p = 0.774$). Slightly more respondents indicated a preference for structured questions than for multiple choice questions in the examinations ($n = 246$; $p = 0.887$).

4.11 Regression analysis: factors affecting respondents' performance

Regression Analysis was applied to assess the impact that various factors may have on performance in Anatomy and Physiology I and II.

The dependant variable in this study was the success/failure rate of first year students in Anatomy and Physiology in the four year nursing programme at KZNCN. The independent variables that may have an impact on the dependant variables were ESL, FSG, stressors experienced by students, and a lack of knowledge and orientation to the programme.

A stepwise regression indicated that respondents with English as a first language get significantly higher marks in Anatomy and Physiology 1 than those who do not speak English in their home ($p = 0.003$). However, there was no correlation between English first language and examination results obtained in Anatomy and Physiology II. There was also no correlation between Anatomy and Physiology I and II examination results with FSG, stressors experienced by students and a lack of knowledge / orientation to the programme.

There was a positive correlation between Anatomy and Physiology I examination results and those of Anatomy and Physiology II, i.e. respondents with high scores in Anatomy and Physiology I score significantly higher in Anatomy and Physiology II compared to those with low scores in Anatomy and Physiology I ($p < 0.001$).

Results from a stepwise regression showed that none of the independent variables used above were significant predictors of Anatomy and Physiology II.

4.12 Conclusion

This chapter indicated the findings and statistical analyses of data. The findings included the demographic characteristics, success rate of first year nursing students in Anatomy and Physiology I and II, comparison of the success rate of first years' knowledge, attitudes and perceptions of first year nursing students in Anatomy and Physiology. It included demographic information and the background of respondents. The study explored aspects that may impact on respondents success in Anatomy and Physiology such as respondents entering the programme having English as a second language, stressors related to their student status, the course medium of English, as well as to the subject of Anatomy and Physiology. The study further looked at student's prior orientation to the programme as well as the respondents possibly being the first in their family to be exposed to tertiary study.

CHAPTER 5: DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter will conclude and provide a brief overview of the study which focused on factors contributing to success in Anatomy and Physiology in first year students in the KZNCN nursing diploma programme. A quantitative approach was utilised using a descriptive time dimensional design. The target group consisted of student nurses in the R425 nursing programme with KZNCN and data was collected using a questionnaire and data from student records. Conclusions were drawn. In this chapter, the findings, conclusions, recommendations, limitations and areas for further research will be presented.

5.2 Discussion of findings

The discussion focuses on the following aspects:

- Demographic characteristics of the respondents;
- Success rate of group 7/2012 and 1/2013 nursing students in Anatomy and Physiology I and II;
- Students' performance in Anatomy and Physiology I and II; and
- Overview of the knowledge, attitudes and perceptions of first year students in Anatomy and Physiology and the variables English as a second language, first generation students, stressors, orientation and lack of knowledge related to the course.

5.2.1 Demographic characteristics

The findings in this study of the male and female ratio indicate an increase in the number of male students (29.8%) in comparison to the national count of 20.2% in 2006 (Wildschut and Mqolozana 2008:13-14).

This finding indicates a larger percentage of female student nurses, with a higher percentage of male student nurses than originally expected. Nationally the percentage of professional nurse males in 2006 was 5.8%, this indicates that gender transformation is happening from the level of learners with recent student groups including larger numbers of males at a professional level (Wildschut and Mqolozana 2008:13-14).

The findings revealed that most of the respondents (69.6%) were below the age of 26 and 30.4% were above 26 years of age. These demographics positively address the problem identified in the Department of Labour Framework for Identifying and Monitoring Scarce Skills in South Africa (2009), where an aging workforce in the category of professional nurses would result in a scarcity of skills in the country (George, Quinlan and Reardon 2009: 7-8, 34).

The majority of respondents in the study were Black African (86.7%) and this is in line with the racial distribution at provincial level of 86.8% Black African in KwaZulu-Natal (Statistics South Africa: 2012). This study showed that a greater percentage of the respondents speak isiZulu as a first language and English as their second.

The factors related to upbringing indicated that 52.4% had the necessities regarding basic needs which included the use of electricity, clean water nearby, adequate food and a home and nothing extra, in comparison to 18.5% who often did not have these basic necessities. Therefore a notably large number of respondents either did not have the necessities or anything extra, which indicates a measure of socioeconomic difficulty whilst students were being raised. This finding corroborates with a South African study reporting KwaZulu-Natal as having high levels of poverty with higher than the national

average unemployment and poverty rates. More than a third of the population in KwaZulu-Natal live under the United States two dollars a day poverty line and two fifths of this population is unemployed (Tarwireyi and Fanadzo 2013: 5833; Thurlow, George and Gow 2009: 1-15)

The areas in which the respondents were raised impacted on their academic performance. The respondents who grew up in urban areas scored significantly higher marks in their final matriculation examination for both English first and second language than respondents who were raised in rural areas. In South Africa research studies have identified major shortcomings in the system of basic education, especially rural areas, where school children are educated in a foreign language (Pitman, Majhanovich and Brock-Utne 2010: 1-11; Williams 2004: 35).

The results revealed that parents of respondents whose home language was English had better qualifications than those whose home language was not English. The findings showed that significantly more parents of respondents from rural areas had no or some primary education whilst significantly more parents from urban areas than expected had matriculated, a diploma or higher degree. These findings corroborate with studies which indicate that parents of FGS are more likely to be less educated and earn less money than parents who attended tertiary education (Mehta, Newbold and O'Rourke 2011: 20; Paulynice 2011: 3). Most respondents attended rural government schools and these respondents' parents mostly had only some secondary education.

5.2.2 Success rate in Anatomy and Physiology I and II

The findings of this study indicate a positive correlation between Anatomy and Physiology I and Matriculation Biology/Life Sciences results or symbols. The respondents, who obtained higher marks in Biology/Life Sciences in their matriculation certificate, achieved higher marks in Anatomy and Physiology 1. These findings are supported by other studies done internationally where competence in a prescribed pre-nursing course is a prerequisite for entry into the nursing programme as it assesses an

applicant's academic aptitude for nursing. Adequate grade marks in Anatomy and Physiology are expected from students in these prerequisite courses which are used as assessments for commencing with the nursing programme. These assessments contribute towards reducing student attrition from academic failure, as the nursing course is very demanding academically. Of all the subjects taken by nursing students, Anatomy and Physiology has been identified as the most difficult (White and Sykes 2012: 1). Prerequisite science course performance in students was found to be a reliable predictor of academic performance in the nursing course. It was suggested that the required grade point averages for the prerequisite prescience courses be set at a higher mark and that students that performed poorly in these courses be refused entry into the nursing programme (Potolsky, Cohen and Saylor 2003: 250). This cohort of respondents differs from the national matriculants statistics (8.3%) (Jansen 2012) in that a significantly larger proportion of respondents have pure mathematics (53.2%) as opposed to mathematics literacy (15.3%) (Chipangura 2013).

Group 7/2012 performed poorly in comparison with group 1/2013 in that they obtained significantly lower marks than group 1/2013 for Anatomy and Physiology II as well as obtaining significantly lower marks for Anatomy and Physiology II than for Anatomy and Physiology I. The reason for this may relate to the difficulty of the examination, different markers or students from group 1/2013 may have a higher aptitude for nursing.

In the South African context, prospective nursing students entering the R425 nursing programme have less stringent screening procedures in the science disciplines prior to admission. The entrance requirement prior to 2008 was a matriculation certificate with the following subjects, Biology or any other natural science subject with a minimum of an "E" symbol on higher grade or a "D" on standard grade. Post 2008, the entrance requirement changed to either one or both the subjects of Physical Science or Life Sciences at a score of level 3 (40-49%) or more, and Mathematics or Mathematic Literacy scored at a minimum of level 3 (40-49%).

There was also a positive correlation between total matriculation points and the results in Anatomy and Physiology I. The higher the respondents overall points on their matriculation certificate, the more successful they were in their Anatomy and Physiology 1 examination. This finding is in agreement with international studies (Newton and Moore 2009: 273-277; Shulruf et al. 2010: 727-723). Griffiths et al. (1995: 61) established that the best predictor for nursing success in a student's first year of nursing was their final marks from secondary school.

In this study, the majority of respondents speak English as their second language. English second language was used as a possible variable impacting on respondents' success in Anatomy and Physiology.

5.2.3 Students' performance in Anatomy and Physiology I and II

The results of this study showed that the more successful a respondent was in English additional language, Biology/Life Sciences, Mathematics Literacy and overall total matriculation points, the better they performed in Anatomy and Physiology II. These findings are supported by Newton and Moore (2009: 273-277), whose study concluded that students with a higher aptitude for nursing as well as higher grades from secondary education were more likely to be successful in their first year of nursing.

Other factors that need to be considered are the large numbers of unqualified teachers educating the school children in South Africa, and in particular Kwazulu-Natal (Hawker 2013), as well as the ranking South Africa has of being last in the world regarding science and mathematics education (Jones 2014). Chipangura (2013) indicates that primary school children do not receive a solid grounding in mathematics which impacts negatively on their accumulative development in this subject. Most learners opt for the easier option of Mathematics Literacy as a subject for matriculation as they have a higher chance of passing (Chipangura 2013).

5.2.4 Knowledge, attitudes and perceptions of first year nursing students in Anatomy and Physiology and the variables

The respondents gave input on their perceptions of their proficiency in the English language as well as the impact being taught in English had on them. They gave feedback on their views regarding the challenges and their response to the subject of Anatomy and Physiology and factors that may promote their understanding of the subject. They responded to stressors they experienced regarding their student experience and study workload in their first year of training, including aspects related to English second language. Most respondents also indicated that a lack of orientation to the nursing programme as well as their transition from high school to tertiary training were additional stressors to the challenges they faced in their first year of training.

5.2.4.1 English second language (variable)

Most respondents assessed themselves as being “good” at reading, writing, understanding and communicating in English on a four point rating of their competency in the English language. Respondents who grew up in urban areas scored significantly higher in both English first language and English second language in their matriculation certificate. This finding is in line with South African studies that identified Black African students from rural areas as being more disadvantaged regarding access to proficiency in the English language than those from urban areas (Tshotsho 2006: 29). Black African students from rural areas are more disadvantaged with regard to hearing the English language spoken well as they have reduced contact with learning opportunities via media such as television, radio and books as well as effective teachers (Tshotsho 2006: 24-25).

Although respondents in this study felt they did not experience any difficulty with English as the language of instruction for the course, they benefited from interactive group work and the study groups. A need for study groups was identified in a study relating to ESL students (Starr 2009: 481-482). The benefit of interactive group work in promoting a

better understanding of basic principles in science lectures was illustrated in an article by Silverthorne (2006: 135-140). It was also reported in White and Sykes (2012: 1) study that students found an interactive teaching style involving online learning and face to face contact in a mixed teaching approach as a more effective teaching method for Anatomy and Physiology than the traditional lecture method.

Those respondents who indicated that they struggle to understand the English spoken by their lecturer in class agreed that they would do better in Anatomy and Physiology if there were not as many new and difficult terms to learn every day. Literature indicates that students approach the discipline of Anatomy and Physiology with apprehension, as they experience difficulty with the many new and complex terms and concepts that have to be learnt (Johnston 2009: 226). Furthermore, in a study conducted by Olsen (2012: 26-32) on the challenges related to ESL students, English was considered to be demanding for students as they experience difficulty understanding verbal directions and terminology from lecturers (Olsen 2012: 26-32).

Students who have schooled in South Africa with English as a second language have been disadvantaged academically (Pitman, Majhanovich and Brock-Utne 2010: 1-11; Tshotsho 2006: 248-253; Williams 2004: 35). The majority of the students at KZNCN are in this category and should be considered within the context of studies done in this area.

The ESL respondents would be in their first year of tertiary education and in their first year of experiencing an increased exposure to English as a language. They would not yet have benefitted from an increased level of communicating in this language. According to Abriam-Yago et al. (1999: 143), as cited by (Scheele et al. 2011: 244), approximately four to eight years of conversing in a second language is necessary for most students to become sufficiently competent in that language to gain academic success. Due to differences in culture and language barriers, some ESL nursing students are not able to reach their full academic potential, either during their training or upon reaching their career goals (Scheele et al. 2011: 244-246; Starr 2009: 483-485).

Olsen (2012: 26-32) identified difficulties experienced by ESL students as being in the areas of language, culture, academic and personal need areas. Also relating to language is a lack of speaking and listening proficiency which may be detrimental to students' academic success (Olsen 2012: 26-32).

ESL students are predisposed to experiencing a heavier study workload (Olsen 2012: 26-32; Scheele et al. 2011: 244-246; Starr 2009: 483-485) which originates from difficulties related to understanding the work content because of problems with language, reading and writing, as well as poor study skills (Starr 2009: 481-482). Students may also feel workload pressure as they experience having insufficient time with the addition of obligations and responsibilities at home (Starr 2009: 481-482).

5.2.4.2 First generation students (variable)

Although a small percentage of respondents (37.5%) indicated that they were FGS, most participants indicated that family and persons close to them had exposure to tertiary education. There was no significant difference in Anatomy and Physiology results between respondents identified as FGS and other students.

FGS are historically less successful in tertiary studies as they have not had the opportunity of being orientated and guided as to the customs and traditions of the academic system by close members of their families. As the student feels strange and unfamiliar with what is expected of them, they have a feeling of not belonging to the programme. Family members are not familiar with the environment their child/sibling/spouse is exposed to, and are less supportive and encouraging as they do not understand the time and energy the student needs to sacrifice in order to be academically successful. Students may not study enough as they don't understand the quantity of work required to be successful (Mehta, Newbold and O'Rourke 2011: 20; Paulynice 2011: 3; Starr 2009: 481). FGS are less prepared for academia and need to work longer hours than their colleagues to be academically successful. FGS are more likely to report that they don't have enough time in their day to complete all the tasks

expected of them (Mehta, Newbold and O'Rourke 2011: 20). Larger numbers of this category of student do not graduate and their academic performance differs from students who come from families where at least one family member completed tertiary education. These students enter the programme with more stressors, especially financial, and are less capable of managing their stressors (Mehta, Newbold and O'Rourke 2011: 20; Starr 2009: 481).

The parents of FGS are more likely to be less educated and earn less money than students' parents who attended tertiary education (Mehta, Newbold and O'Rourke 2011: 20; Paulynice 2011: 3). FGS have more dependants and greater financial responsibility to contribute financially at home (Mehta, Newbold and O'Rourke 2011: 20; Paulynice 2011: 3).

In dealing with stressors, FGS may utilise reactive responses to "escape stressors" such as exercising or playing on cell phones. Active problem solving responses to stress are considered to be more effective in resolving stress, these may include behaviours such as studying harder to achieve academically; or looking for social support from others. If students are not able to actively cope with stressors it may impact negatively on their performance with their studies (Mehta, Newbold and O'Rourke 2011: 3). To seek social support is considered an active form of coping and a significant predictor of academic success (Mehta, Newbold and O'Rourke 2011: 8; Paulynice 2011: 7). FGS are more likely to live away from the tertiary institution and are less likely to be involved socially with the institution and their fellow students. They may isolate themselves from others when stressed (Mehta, Newbold and O'Rourke 2011: 8; Paulynice 2011: 7). FGS are less likely to use social coping strategies such as going out drinking and partying to manage their stress (Mehta, Newbold and O'Rourke 2011: 8). These students are more likely to take time off work when stressed (Mehta, Newbold and O'Rourke 2011: 12-13)

FGS have the additional difficulty of being unfamiliar with what is expected of them in the tertiary environment (Mehta, Newbold and O'Rourke 2011: 20; Paulynice 2011: 3; Starr 2009: 481) and being less prepared for the academic environment, resulting in a need to work longer hours than their colleagues to be academically successful (Mehta, Newbold and O'Rourke 2011: 20). FGS are more likely to report that they do not have enough time in their day to complete all the tasks expected of them (Mehta, Newbold and O'Rourke 2011: 20) adding to the pressures associated with their workload.

5.2.4.3 Stressors (variable)

The findings of this study revealed that most of the respondents did not have enough time to complete all the tasks required for their studies. A significantly larger number indicated that stress affected their grades negatively. They also indicated that there was family pressure to pay for necessities at home from the bursaries they received and that there was insufficient money to purchase textbooks for their studies. The respondents also felt that they needed to study for longer hours than their classmates. The majority of the respondents have an opportunity to live in the nurses' residence. The respondents felt that their families understand the time and energy that is needed to put into their studies to be successful. They felt that they chose the correct career in studying this nursing programme. The respondents also felt that the nursing programme was the correct choice for a career.

Nursing is recognised as a stressful occupation (Timmins and Kaliszer 2002: 203-204) and although student nurses are supernumerary to the workforce, their well-being is important as they interact with staff and patients. Nursing students are exposed to the stressors associated with this occupation and their stressors should be taken into account by nurse educators (Timmins and Kaliszer 2002: 203-204). Stress factors impede students' academic potential by distracting their focus off their studies (Starr 2009: 481). Students have many academic and clinical commitments that may exacerbate stress or are the sources of stress (Timmins and Kaliszer 2002: 203-204).

In this study the majority of respondents experienced difficulties with the academic workload which they described as very stressful. Johnston's (2009: 226) study reported that students approach Anatomy and Physiology with caution as there is a known high failure rate. Students have difficulty with the many new and complex terms and concepts to be learnt (Johnston 2009: 226). The response options between "stressful" and "very stressful" were chosen by the majority of respondents for this question. Research studies identified factors pertaining to students in their first year of tertiary study, as well as the difficulties that face nursing students generally, as resulting in students feeling pressured by the workload. Students acknowledged experiencing a heavy study workload (Starr 2009: 481) and feeling under pressure due to a lack of time, and of experiencing difficulties with time management and academic pressures to the point that they are unable to cope with the programme (Watkins, Roos and Van der Walt 2011: 7D). Anatomy and Physiology is the most difficult subject undertaken by nursing students and students experienced the most difficulty in applying its theory into practice (White and Sykes 2012: 1).

Significantly more respondents than expected indicated that their poor study methods caused stress. A study by Starr (2007: 481-482) identified stressors related to ESL students as poor college preparation and poor study skills.

Most respondents in this study found the long working hours to be very stressful. The respondents felt they did not have enough time to complete tasks related to their studies. Other studies conducted indicate that a lack of time contributes to students feeling stressed (Watkins, Roos and van der Walt 2011: 7D).

Nursing students at the KZNCN in the R425 programme receive a bursary of R3000 per month throughout the duration of their training, yet 50% found their financial affairs very stressful. These respondents are predominantly from a rural upbringing in KwaZulu-Natal where socioeconomic conditions are poor and families experience financial stressors.

Stressors relating to personal and family illness were included in this study as the prevalence and incidence of HIV in KwaZulu-Natal is amongst the highest in the world (Nel et al. 2012). The impact of HIV/AIDS on the health workforce in South Africa is having a significant negative effect on their motivation and performance (Tawfic and Kinoti 2006). In this study, some respondents (27.8%) indicated that they were very stressed by illness experienced by family members, problems at home, personal illness, and were stressed by living away from home.

The stressors that were most heavily weighted as “very stressful” were financial stressors; long working hours and academic workload

If students are not able to actively cope with stressors it may impact negatively on their performance in their studies (Mehta, Newbold and O’Rourke 2011: 3). A significantly larger proportion of respondents socialised with their friends to relieve themselves of stress. This result concurs with findings in literature, where active problem solving responses to stress are considered more effective in resolving stress and include behaviours such as looking for social support from others (Mehta, Newbold and O’Rourke 2011: 3). To seek social support is considered an active form of coping and a significant predictor of academic success (Mehta, Newbold and O’Rourke 2011: 3).

This study found that the respondents are more likely to be involved socially with the institution and their fellow students. These findings do not concur with comparable research which indicates that FGS are reported as isolating themselves from others when stressed (Mehta, Newbold and O’Rourke 2011: 8; Paulynice 2011: 7).

The findings revealed a significant proportion of respondents played with their cell phones as a way of dealing with stressors. The respondents indicated that they did not turn to eating and consumption of alcohol / partying as stress relievers. In a local study conducted on South African students at a university it was found that based on exercise sessions per month, females exercised more frequently than male students. Female students experience more stress than male students. More females than males

consume liquor and binged on food (Janse van Rensburg and Surujlal 2013: 1) and FGS are less likely to use social coping strategies such as going out drinking and partying to manage their stress (Mehta, Newbold and O'Rourke 2011: 8). Significantly more male than female respondents exercise ($n = 247$; $p < 0.001$) to relieve stress. Conversely, significantly more female than male respondents binge eat ($n = 247$; $p < 0.001$) to relieve themselves of stress. There was no significant difference between how FGS and non-FGS behave with regard to stressors.

Respondents rated their lecturers, parents and friends who are fellow nursing students as sources of support regarding their studies and the demands of tertiary study. This result is in line with literature, which reports that active problem solving responses in nursing students are considered to be more effective in resolving stress, and is a significant predictor of academic success and this includes behaviours such as looking for social support from others (Mehta, Newbold and O'Rourke 2011: 3).

5.2.4.4 Orientation to programme (variable)

Prior knowledge of what to expect in the upcoming course and attending an orientation programme has a positive impact on students academic success (O'Donnell 2010: 54-55; Watkins, Roos and Van der Walt 2011: 5D; Wilson-Strydom 2010: 313).

Most respondents reported a lack of orientation to the nursing programme. A significant number indicated that they did not know what they were getting into before starting the nursing course. They felt that nursing was not what they had expected as they had anticipated the nursing programme to be more practical than and not as intensive theoretically as they had experienced. Most respondents also expected their nursing experience to be "an easy practical job".

Literature indicates that students entering tertiary education for the first time present with a lack of preparedness, they appear unaware of what their proposed course entails, and are not academically equipped to cope with the programme, resulting in

them being unprepared (Watkins, Roos and Van der Walt 2011: 5D). Some students are not aware of the demands of study at a tertiary level (O'Donnell 2010: 54-55) and educational institutions appear unclear as to what qualities in students are necessary for them to be successful at a tertiary level (Wilson-Strydom 2010: 313). Students would benefit by being orientated about the course prior to commencing their nursing training (Paulynice 2011: 7).

Students report being disillusioned with the nursing profession; by not knowing enough about it beforehand they were not prepared for what the nursing profession and the training entailed. Students in their first year reported that the nursing science course did not fulfil their expectations of nursing as a profession and were disappointed at choosing a study direction they experienced as different from what they had expected (Watkins, Roos and Van der Walt 2011: 5D). One study addressed many authors' findings on attrition in college students and identified that students were not academically prepared to attend college, that they may be the first persons from their families to attend college and that students may have chosen the incorrect vocation (Paulynice 2011: 1-10).

The choice of another course at university did not take precedence over the nursing course. Most respondents indicated that they were not only studying nursing in order to receive the monthly bursary of R3000.

5.2.5 Transition from secondary school to tertiary education

Respondents indicated that the transition from secondary school to tertiary education was difficult. They found it harder to achieve high academic results in the nursing programme than in high school. The respondents felt that in the nursing programme there is a lot more work to do in a shorter space of time and that there was greater academic responsibility on the student. There was also agreement that the method of teaching is different and faster. These findings corroborate findings from other studies that the transition from high school to tertiary education is difficult for most students

(Wilson-Strydom 2010: 313-325). In general, students experience difficulty in the transition from school to tertiary education as they are exposed to an increase in personal freedom and need to take responsibility that accompanies this freedom. They may feel pressures in managing their time in relation to the demands being made on them as well as adjusting to new experiences and environments (N C University website 2014).

In South Africa emphasis was placed on the need for tertiary institutions and schools to collaborate more so as to lessen the gap and to possibly commence the preparation of students for tertiary institutions earlier, possibly at school level (Wilson-Strydom 2010: 313-325).

Within the South African context a deficit between schools and universities has been identified; students who are eligible to study at university are not being adequately prepared to commence with study at a university level. The difficulties faced by FGS further disadvantages students as they have not been orientated into the norms of tertiary education and schooling no longer achieves this (Wilson-Strydom 2010: 313-325).

In this study, respondents not only had to contend with a period that is difficult for all students in the world as they adjust to change in their progress from school to tertiary education. These respondents were further disadvantaged as the majority attended rural schools in KwaZulu-Natal and were raised in rural areas speaking English as a second language. Studies report that students from under resourced rural schools are educationally disadvantaged and ESL students are further compromised academically by being taught at school in a language which is not their mother tongue. In South Africa, Black African nursing students approach the western based culture of nursing education and are taught in their second language which further complicates the learning experience of these students (Olsen 2012: 26-32).

5.2.6 Views related to Anatomy and Physiology

The respondents indicated that they would have performed better in Anatomy and Physiology if they had learned more about this subject at school. The respondents also felt that they would do better in Anatomy and Physiology if the workload in other subjects was not substantial and if more posters and models were used during instruction to help their understanding of this subject. They also felt that the availability of a phasing in course between high school and nursing would be beneficial to their success in Anatomy and Physiology The majority of respondents did not agree they would perform better if Anatomy and Physiology lessons being kept to single periods.

The Anatomy and Physiology I and II examinations are made up 50% multiple choice and 50% structured questions. Slightly more respondents indicated that they preferred structured questions. This finding does not concur with previous studies conducted with ESL students regarding difficulties experienced by ESL students in the academic area where it was found that multiple choice questions were extremely problematic for ESL students as this type of assessment is designed to test critical thinking and decision making. It is also a test of translation and reading ability for the ESL student (Olsen 2012: 26-32).

The respondents who agreed that they struggle to understand the English spoken by the lecturer in class, also significantly agreed that they would do better in Anatomy and Physiology if there were not so many new and difficult terms to learn every day.

5.2.7 Regression analysis on factors affecting participants' performance

Respondents with English as a first language achieved significantly higher marks in Anatomy and Physiology 1 than those who do not speak English in their home. However, there was no correlation between English first language and examination results obtained in Anatomy and Physiology II.

There was also no correlation between Anatomy and Physiology I and II examination results with FGS, stressors experienced by students and a lack of knowledge / orientation to the programme.

There was a positive correlation between Anatomy and Physiology I examination results and those of Anatomy and Physiology II, i.e. respondents with high scores in Anatomy and Physiology I score significantly higher in Anatomy and Physiology II compared to those with low scores in Anatomy and Physiology I

5.3 Recommendation

South Africa is experiencing challenges where the matriculation certificate has an unreliable link with academic performance at a tertiary education level and especially where this exists with factors such as ESL, FGS, inadequate schooling, stressors and demographic variables such as race and socio-economic status (Wilson-Strydom 2010: 313-325).

The gap that is identified between students leaving school without the depth of knowledge required to be successful at a tertiary level should be addressed by relevant decision making bodies such as KZNCN and Senate in association with the South African Nursing Council.

It is recommended:

- That the Department of Higher education and the Department of Basic Education should possibly align standards of education more, as evidence indicates that the marks and pass rate of matriculants is improving, yet there is a gap as students are less able to achieve success at a tertiary level (Alfreds 2014; Wilson-Strydom 2010: 313-325).

- To introduce Biology/Life Sciences as a prerequisite matriculation subject (currently Biology/Life Sciences is an optional subject) as well as the required grade of this subject be set higher than the level currently required.

- To raise the matriculation grade entry points from 25 to 30 as this study corroborates international studies which report that students with good academic grades in secondary education are a positive indicator for future academic success in nursing studies.

- To structure a two week workshop organised by KZNCN prior to the commencement of their training programme to orientate prospective students into the norms and values of the nursing programme.

- To facilitate mentoring and/or support groups for all first year students. This may assist in promoting a positive academic experience for these students.

- That KZNCN organises awareness programmes in secondary schools about nursing and the nursing profession.

- That support groups and services be provided to students by their training institutions throughout the four year programme in order to assist and counsel them in identifying and managing their stressors.

5.4 Future research

This study was useful in identifying the gaps related to factors impacting on student success in Anatomy and Physiology in the R425 programme; however it may be beneficial to explore each of the variables independently. Separate studies may obtain more information in these areas, such as:

- Students obtain a bursary of R3000 per month towards maintaining themselves during the period of their studies yet respondents in this study experienced finances as very stressful.
- Students consider themselves proficient in the English language yet results from this study indicate that respondents with English as a second language are less successful than those with English as a first language.
- Rural/urban schooling, the English marks and the impact on students' tertiary academic success.

5.5 Limitations of the study

Although respondents identified themselves as proficient in their usage of the English language and indicated their preference for being taught in English, the results indicate that respondents with English as a first language are more successful in Anatomy and Physiology. Thirty eight point three percent of respondents identified themselves as being FGS, yet there was no significant correlation between FGS and the specified variables.

However, despite these limitations, the results of this study appear to concur with results from previous studies relating to this topic. In South Africa, correlations with international studies which involve FGS and ESL are different in that the students of interest in those geographical areas are usually from minority ethnic groups. Due to the political reform and promotion of racial equity over the last twenty years the majority of ESL and FGS in this country are from the majority ethnic group.

5.6 Conclusion

Most of the respondents were Black African, from rural areas of KwaZulu-Natal and doing their training in English as a second language after schooling in disadvantaged conditions in rural schools. The prerequisite requirements for entry into the R425 nursing programme are not as stringent in Kwazulu-Natal as those of many other international countries despite the subject of Anatomy and Physiology being acknowledged as the most difficult discipline in the nursing programme and resulting in the highest failure rate for students. Respondents suggested teaching approaches for Anatomy and Physiology that may facilitate the learning of the subject and given the technology and resources (financial and personnel) available in KZNCN this is an option that could be explored. Most respondents indicated they did not fall into the category of FGS and felt they were coping well being taught Anatomy and Physiology in English as their second language, yet many responses they gave suggest they experience stress that the literature review indicates are similar to difficulties experienced by FGS and ESL students in South Africa and internationally. The high level of financial stress experienced by the respondents could be at an increased level due to the socioeconomic conditions in rural Kwazulu-Natal as well as the increased domestic responsibilities of FGS and the increasing numbers of “non-traditional” students (see 2.4.0). Respondents training in the province experiencing the highest levels and incidence of HIV/AIDS in the country are also experiencing high levels of stress in relation to family illness at home. Sufficient effort has not been made to orientate respondents into what the nursing programme involves further exacerbating the challenges respondents face whilst doing their nursing training in Kwazulu-Natal.

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ANNEXURE 1: Student Questionnaire

QUESTIONNAIRE NO.	

DATE: _____ Student Name: _____

Section A: Demographic Data

Please complete the following by placing an X against the option that applies to you. Select one option only unless otherwise instructed.

1. Gender

Male	
Female	

2. Age

Less than 19 years	
19 – 20 years	
21 – 22 years	
23 – 24 years	
25 – 26 years	
Over 26 years	

3. Race

Black	
Coloured	
Indian	
White	
Other: please specify _____	

4. Home language (spoken MOST often)

English	
Zulu	
Xhosa	
Afrikaans	
Other (please specify)_____	

5. If you understand "necessities" to mean having the use of electricity, clean water nearby, adequate food and a home.
Select the **ONE** option that best describes your upbringing:

We often did not have the necessities	
We always had the necessities but nothing extra	
We always had the necessities and a little extra for luxuries	
We always had everything we wanted	

6. How would you classify the area in which you grew up?

Rural	
Urban	

Section B: Education

7. Select the **ONE** option that best describes the type of high school you last attended.

Private school	
Rural Government school	
Government school in town/city	
Government school in township	

8. Select **ONE** option that best describes your upbringing during high school

During high school…	
I was raised by my own parents	
I was raised by family	
I was raised in a child headed household	
I was raised in a home	
Other: PLEASE specify: _____	

9. Select **ONE** option only for each parent to indicate his/her highest level of education.

	No formal education	Some primary education	Completed Primary school	Some Secondary education	Matric	Adult based education	Diploma	Degree	Higher degree
9.1 Mother									
9.2 Father									

10. Indicate the extent of your agreement with the following statements by choosing **ONE** response for each statement:

		Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
10.1	I have no difficulty with language where my studies are concerned					
10.2	I would get better grades if the course was run in another language					
10.3	I struggle to understand the English spoken by the lecturer in class					
10.4	Understanding in class would be easier if we had more interactive group work					
10.5	I am afraid to speak in class in case I am not understood – I would rather keep quiet.					
10.6	Listening in class is hard for me because the lecturer speaks too fast.					
10.7	I benefit from participating in study groups					

11. How would you rate yourself in the following areas?

		weak	fair	good	excellent
11.1	Reading English				
11.2	Writing English				
11.3	Understanding English that I read (comprehension)				
11.4	Communicating my thoughts in English (talking to others)				
11.5	Mathematical skills				

Section D: First Generation students

A First Generation Student is defined as a student that comes from a family where neither parent/guardian had the opportunity of graduating from tertiary education.

12. Indicate who, amongst your family and close friends, has studied further after matriculating.

		Yes	No
12.1	Close family (brother/s, sister/s, parents, grandparents)		
12.2	Extended family (aunts, uncles, cousins)		
12.3	Close friend/s		
12.4	I am the first of my family to embark on tertiary education		

Section E: Stressors

13. Select the **ONE** option that best describes your response to the following statements:

		Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
13.1	My family does not understand the time and energy I need to put into my studies to be successful					
13.2	I feel that I have more stressors than my classmates					
13.3	I do not have enough time in the day to complete all the necessary tasks					
13.4	I feel/ felt that I do/did not belong studying this nursing program					
13.5	Stress affects my grades negatively					
13.6	I have family pressure to pay for necessities at home					
13.7	I don't have enough money to pay for things for nursing like books.					
13.8	In order to pass, I have to study longer hours than my classmates					
13.9	I have the opportunity to live in a nurses residence					

14. Indicate how stressful you find the following items:

		Very stressful	Rather stressful	Stressful	A little stressful	Not at all stressful
14.1	Academic workload					
14.2	Academic assignments					
14.3	Long working hours					
14.4	Difficulty of academic work					
14.5	Poor study methods					
14.6	Personal illness					
14.7	Family illness					
14.8	Problems at home (excluding illness)					
14.9	Living away from home					
14.10	Financial pressures					

15. Indicate your agreement with the following items regarding stress dealing mechanisms:

	I deal with stress by…	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
15.1	Eating					
15.2	Playing on my cell phone					
15.3	Socializing with friends					
15.4	Keeping to myself					
15.5	Crying and complaining					
15.6	Drinking alcohol / partying					
15.7	Exercising					
15.8	Staying home from work	.				

16. Rate from 1 to 5, where **1 = not at all** and **5 = a whole lot**, how much the following people support you both in your studies and with the demands of tertiary study.

		Rating
16.1	Close relatives	
16.2	Parents	
16.3	Siblings	
16.4	Friends from school	
16.5	Friends from nursing	
16.6	Lecturers	

Section F: Orientation into tertiary study

17. Indicate the extent of your agreement with the following statements.

		Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
17.1	I knew what I was getting into before starting this nursing course					
17.2	I am studying nursing to get the monthly salary.					
17.3	I wish I had rather studied another course at varsity					
17.4	Nursing is not what I expected it to be					
17.5	I thought nursing would be more practical, I didn't know it would be so hard academically.					
17.6	I expected nursing to be an easy practical job.					

18. Indicate your agreement with the following statements regarding the difference between high – school and nursing college:

	At nursing college…	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
18.1	The study culture is more difficult than in high school					
18.2	It is more difficult to achieve well academically					
18.3	There is a lot more work to do in a short time					
18.4	The academic responsibility is put more onto the student					
18.5	The method of teaching is different and faster					

Section F: Anatomy and Physiology

19. Indicate **ONE** response only for each of the following statements on the subject of Anatomy and Physiology:

	I would do better in Anatomy and Physiology if…	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
19.1	There were not so many new and difficult terms to learn every day					
19.2	I had learned more on the subject at school					
19.3	Lessons were kept to single periods					
19.4	The workload in other subjects wasn't so heavy					
19.5	More posters and models were used to help our understanding					
19.6	Less emphasis was placed on MCQ's in the examinations					
19.7	A phasing in course between high school and nursing was available					

Thank you for taking part in the study.

ANNEXURE 2: Permission letter from DUT IREC

DURBAN UNIVERSITY of TECHNOLOGY

INSTITUTIONAL RESEARCH ETHICS COMMITTEE (IREC)

17 July 2013

IREC Reference Number: **REC 14/13**

Mrs E M Langtree
86 Svea Avenue
Uvongo
4270

Dear Mrs Langtree

Factors contributing to success in Anatomy and Physiology in first year students in the KZNCN nursing diploma program

I am pleased to inform you that Full Approval has been granted to your proposal REC 14/13.

The Proposal has been allocated the following Ethical Clearance number IREC 052/13. Please use this number in all communication with this office.

Approval has been granted for a period of one year, before the expiry of which you are required to apply for safety monitoring and annual recertification. Please use the Safety Monitoring and Annual Recertification Report form which can be found in the Standard Operating Procedures [SOP's] of the IREC. This form must be submitted to the IREC at least 3 months before the ethics approval for the study expires.

Any adverse events [serious or minor] which occur in connection with this study and/or which may alter its ethical consideration must be reported to the IREC according to the IREC SOP's. In addition, you will be responsible to ensure gatekeeper permission.

Please note that any deviations from the approved proposal require the approval of the IREC as outlined in the IREC SOP's.

Please note that you may continue with validity testing and piloting of the questionnaire. Research on the proposed project may not proceed until IREC reviews and approves the final questionnaire. If there are no changes to the questionnaire kindly notify IREC in writing.

Yours Sincerely

[redacted]

Prof J K Adam
Chairperson: IREC

ANNEXURE 3: Permission letter from DoH KZN Health Research Committee

health
Department:
Health
PROVINCE OF KWAZULU-NATAL

Health Research & Knowledge Management sub-component
10 – 103 Natalia Building, 330 Langalibalele Street
Private Bag x9051
Pietermaritzburg
3200
Tel.: 033 – 3953189
Fax.: 033 – 394 3782
Email.: hrkm@kznhealth.gov.za
www.kznhealth.gov.za

Reference : HRKM237 /13
Enquiries: Mrs G Khumalo
Telephone: 033 – 395 3189

15 August 2013

Dear Mrs E M Langtree

Subject: Approval of a Research Proposal

1. The research proposal titled**'Factors contributing to success in Anatomy and Physiology in first year students in the KwaZulu-Natal College of Nursing (KZNCN) nursing diploma program'** was reviewed by the KwaZulu-Natal Department of Health.

The proposal is hereby **approved** for research to be undertaken at the KwaZulu-Natal College of Nursing.

2. You are requested to take note of the following:
   a. Make the necessary arrangement with the identified facility before commencing with your research project.
   b. Provide an interim progress report and final report (electronic and hard copies) when your research is complete.

3. Your final report must be posted to **HEALTH RESEARCH AND KNOWLEDGE MANAGEMENT, 10-102, PRIVATE BAG X9051, PIETERMARITZBURG, 3200** and e-mail an electronic copy to hrkm@kznhealth.gov.za

For any additional information please contact Mrs G Khumalo on 033-395 3189.

Yours Sincerely

[redacted]

Dr. E Lutge
Chairperson, KwaZulu-Natal Health Research Committee
Date: 21/08/2013

ANNEXURE 4: Permission letter from Acting Principal of KwaZulu-Natal College of Nursing

health
Department:
Health
PROVINCE OF KWAZULU-NATAL

KWAZULU- NATAL COLLEGE OF NURSING
P/Bag X9089, Pietermaritzburg, 3200
Tel.: (033) 264 7800, Fax: (033) 394 7238
e-mail: joan.makhathini@kznhealth.gov.za
www.kznhealth.gov.za

Enquiries: Mrs. S. Maharaj
Telephone: 033 – 264 7806
Date: 06 August 2013

Principal Investigator:
Ms EM Langtree
C/O Durban University of Technology

Dear Madam

RE: PERMISSION TO CONDUCT RESEARCH AT THE KZN COLLEGE OF NURSING

TITLE: **FACTORS CONTRIBUTING TO SUCCESS IN ANATOMY AND PHYSIOLOGY IN FIRST YEAR STUDENTS IN THE KWAZULU-NATAL COLLEGE OF NURSING DIPLOMA PROGRAMME**

I have the pleasure in informing you that permission has been granted to you as per the above request by the Acting Principal of the KZN College of Nursing

Data Collection sites:

Campuse(s)		
Prince Mshiyeni Memorial	Addington	Charles Johnson Memorial
Greys	Edendale	Benedictine
Ngwelezana	RK Khan	Madadeni

Please note the following:

1.1 Please ensure that you adhere to all policies, procedures, protocols and guidelines of the Department of Health with regards to this research.
1.2 This Research will only commence once this office has received confirmation of approval from the Provincial Health Research Committee in the KZN Department of Health.
1.3 Please ensure this office is informed before you commence your research.
1.3.1 Permission is therefore granted for you to conduct this research at all the KZN College of Nursing Campuses
1.4 The KwaZulu-Natal College and its NEI's will not provide any resources for this research.
1.5 You will be expected to provide feedback on your findings to the Principal of the KwaZulu-Natal College of Nursing.

Thanking You

[redacted]
Ms JT Makhathini
Acting Principal: KwaZulu-Natal College of Nursing

ANNEXURE 5: Information Letter and Consent Form

INSTITUTIONAL RESEARCH ETHICS COMMITTEE (IREC)

LETTER OF INFORMATION

Welcome to all students.
Title of the Research Study:
Factors contributing to success in Anatomy and Physiology in first year students in the KZNCN nursing diploma program.

Principal researcher: Eleanor Margaret Langtree, B Cur Nursing.
Supervisor/s: Doctor Ayisha Razak, PhD.
Co Supervisor: Firoza Haffejee, M. Sc.

Brief Introduction and Purpose of the Study:

There is currently a crisis in the shortage of nurses in the country. As a nursing college, KwaZulu-Natal College of Nursing (KZNCN) is tasked with training professional nurses for the workforce to meet increasing patient numbers in our public sector. It appears that a large number of nurses leave nursing in their first year of training. The purpose of this research is to find out more about factors that affect the success of you as students in this first year of your programme in Anatomy and Physiology. This research study will look at why student nurses end up leaving from failing Anatomy and Physiology in their first year and information from this study can be used to try and ensure the best success rate possible for future students in Anatomy and Physiology.

Outline of the Procedure: This study involves a survey which is open to a sample of students in the KZNCN program from groups 7/2012 and 1/2013. Your role in the study is to fill out a questionnaire only. I will bring the questionnaires to your campus, after I have been given permission from Head Office (KZNCN) and your own Principal to do this study with you. One of your lecturers will hand the questionnaires out to you in your classroom and answer questions you may have. If you would like to ask me any questions I will your campus that day and will also be available to answer questions.
You should be able to complete the questionnaire in about 10 to 15 minutes.

If you agree to participate in the study we will also need to obtain a copy of your matriculation certificate. The matriculation certificate may have a bearing on student success in Anatomy and Physiology. This would be obtained from your campus.
There are no follow ups and no possible risk or discomfort to you.

Students included: students from Group 7/2012 and 1/2013 in the nursing diploma program in KZNCN.

Students excluded: students in other programs at your campus.

Benefits:
Your participation in this study is voluntary.
There is no remuneration for anyone involved in this study.

A peer reviewed publication for the researcher and the awarding of a Masters' degree. Knowledge gained from the study that pertains to the success of students in Anatomy and Physiology in their first year of nursing in KZNCN will add to the current body of knowledge on the subject.

Confidentiality:
I do need to keep a record of the participants in the study for a specified period of time, but your name will be given a code number to ensure confidentiality. All data will be kept in a secure place and no one except the research team will have access to original questionnaires. The documents will be shredded after the specified time.

Persons to Contact in the Event of Any Problems or Queries:

Supervisor: Dr A. Razak, telephone no: 031 3732606

Co Supervisor: Mrs F. Haffejee, telephone no: 031 373 2606

Researcher: Mrs E. Langtree, telephone no: 031 3155322, or the Institutional Research Ethics administrator on 031 373 2900. Complaints can be reported to the DVC: TIP, Prof F.Otieno on 031 373 2382 or dvctip@dut.ac.za.

General:
Although this study may not benefit you directly, the information gained from it may help those students who start the programme after you.

If you have any questions about the study, please feel free to ask me (Mrs E. Langtree).

SIGN: _____DATE: _____

THANK YOU FOR PARTICIPATING IN THIS STUDY!

ANNEXURE 6: Pilot Study approval from KZNCN

health
Department:
Health
PROVINCE OF KWAZULU-NATAL

KWAZULU- NATAL COLLEGE OF NURSING
P/Bag X9089, Pietermaritzburg, 3200
Tel: (033) 264 7800 Fax: (033) 394 7239
e-mail: joan.makhathini@kznhealth.gov.za
www.kznhealth.gov.za

Enquiries: Mrs. S. Maharaj
Telephone: 033 – 264 7806
Date: 13 August 2013

Principal Investigator:
Ms EM Langtree
C/O Durban University of Technology

Dear Madam

RE: PERMISSION TO CONDUCT RESEARCH AT THE KZN COLLEGE OF NURSING

TITLE: FACTORS CONTRIBUTING TO SUCCESS IN ANATOMY AND PHYSIOLOGY IN FIRST YEAR STUDENTS IN THE KWAZULU-NATAL COLLEGE OF NURSING DIPLOMA PROGRAMME

I have the pleasure in informing you that permission has been granted to you as per the above request by the Acting Principal of the KZN College of Nursing

Data Collection sites:
Port Shepstone Campus-Pilot Study

Please note the following:

1.1 Please ensure that you adhere to all policies, procedures, protocols and guidelines of the Department of Health with regards to this research.
1.2 This Research will only commence once this office has received confirmation of approval from the Provincial Health Research Committee in the KZN Department of Health.
1.3 Please ensure this office is informed before you commence your research.
1.3.1 Permission is therefore granted for you to conduct this research at all the KZN College of Nursing Campuses
1.4 The KwaZulu-Natal College and its NEI's will not provide any resources for this research.
1.5 You will be expected to provide feedback on your findings to the Principal of the KwaZulu-Natal College of Nursing.

Thanking You

[redacted]

Ms JT Makhathini
Acting Principal: KwaZulu-Natal College of Nursing

ANNEXURE 7: Letter to Benedictine Campus

Port Shepstone Nursing Campus
Private Bag X 713 Port Shepstone 4240
Lot 107 Marine Drive Shelly Beach, 4276
Tel: 039 315 5322. Fax. 039 315 5325
Email:elly.langtree@kznhealth.gov.za
Website: www.kznhealth.gov.za

Enquiries: Mrs E. Langtree
Date: 23.08.12

The Principal
Benedictine Campus
P/Bag X5002
Nongoma
3950
Tel: 035 831 7107
Fax: 035 831 0780

Dear Mrs M Zibani,

RE: PERMISSION REQUESTED FOR MASTERS RESEARCH

I, Mrs E. Langtree, HOD for Psychiatric Nursing Science at Port Shepstone Nursing Campus am currently studying for a Masters in Nursing with Durban University of Technology.

STUDENT NUMBER: 21240552

TOPIC: Factors contributing to success in Anatomy and Physiology in first year students in the KZNCN nursing diploma program.

I would appreciate permission for the following:

1. Access to a sample of students in your campus to consent and complete questionnaires for the above study. This would involve students from both Group 1(2012) and Group 1(2013) of the nursing diploma program

Confidentiality would at all times be respected. No students name would appear in the study. Data collected will be kept in a safe and secure place and electronic information will be password protected. All data will be shredded after fifteen years as per the policy of the Durban University of Technology.

Written confirmation of permission granted is requested

Please find attached, permission from KwaZulu Natal College of Nursing (KZNCN) and KZN Department of Health to pursue the above study.

Kind Regards

E. M. Langtree

[redacted]

(HOD Psychiatric Nursing Science, Port Shepstone Nursing Campus)

ANNEXURE 8: Letter to Edendale Campus

Port Shepstone Nursing Campus
Private Bag X 719 Port Shepstone 4240
Lot 107 Marine Drive Shelly Beach, 4275
Tel: 039 315 5322. Fax :039 315 5325
Email:elly.langtree@kznhealth.gov.za
Website: www.kznhealth.gov.za

Enquiries: Mrs E. Langtree
Date: 25.08.13

The Principal
Edendale Campus
P/Bag X509
Pietermaritzburg
4060

Tel: 033 345 8010
Fax: 033 345 9477

Dear Mrs NC Majola

RE: PERMISSION REQUESTED FOR MASTERS RESEARCH

I Mrs E. Langtree, HOD for Psychiatric Nursing Science at Port Shepstone Nursing Campus am currently studying for a Masters in Nursing with Durban University of Technology.

STUDENT NUMBER 21240552

TOPIC: Factors contributing to success in Anatomy and Physiology in first year students in the KZNCN nursing diploma program.

I would appreciate permission for the following:

1. Access to a sample of students in your campus, to consent and complete questionnaires for the above study. This would involve students from both Group 4/2012 and Group 1/2013 of the nursing diploma program.

Confidentiality would at all times be respected. No students name would appear in the study. Data collected will be kept in a safe and secure place and electronic information will be password protected. All data will be shredded after fifteen years, as per the policy of the Durban University of Technology.

Written confirmation of permission granted is requested.

Please find attached, permission from KwaZulu Natal College of Nursing (KZNCN) and KZN Department of Health to pursue the above study.

Kind Regards

E. M. Langtree

[redacted]

(HOD, Psychiatric Nursing Science, Port Shepstone Nursing Campus)

ANNEXURE 9: Letter to Madadeni Campus

Port Shepstone Nursing Campus
Private Bag X 719 Port Shepstone 4240
Lot 107 Marine Drive Shelly Beach, 4275
Tel: 039 316 5322, Fax: 039 316 5326
Email:elly.langtree@kznhealth.gov.za
Website: www.kznhealth.gov.za

Enquiries: Mrs E. Langtree
Date: 26.08.13

The Principal
Madadeni Campus
P/Bag X9642
Newcastle 2940
Tel: 034 314 4617
Fax: 034 314 4618

Dear Mr S. J. Khumalo,

RE: PERMISSION REQUESTED FOR MASTERS RESEARCH

I, Mrs E. Langtree, HOD for Psychiatric Nursing Science at Port Shepstone Nursing Campus, am currently studying for a Masters in Nursing with Durban University of Technology.

STUDENT NUMBER: 21240553

TOPIC: Factors contributing to success in Anatomy and Physiology in first year students in the KZNCN nursing diploma program

I would appreciate permission for the following:

1. Access to a sample of students in your campus to consent and complete questionnaires for the above study. This would involve students from both Group 7/2012 and Group 1/2013 of the nursing diploma program.

Confidentiality would at all times be respected. No students name would appear in the study. Data collected will be kept in a safe and secure place and electronic information will be password protected. All data will be shredded after fifteen years, as per the policy of the Durban University of Technology.

Written confirmation of permission granted is requested.

Please find attached, permission from KwaZulu Natal College of Nursing (KZNCN) and KZN Department of Health to pursue the above study

Kind Regards

E. M. Langtree

[redacted]

(HOD, Psychiatric Nursing Science Port Shepstone Nursing Campus)

ANNEXURE 10: Letter to R. K. Khan Campus

Port Shepstone Nursing Campus
Private Bag X 719 Port Shepstone 4240
Erf 107 Marine Drive Shelly Beach, 4275
Tel: 039 315 5822, Fax: 039 315 5825
Email:shelly.langtree@kznhealth.gov.za
Website: www.kznhealth.gov.za

Enquiries: Mrs E Langtree
Date: 28.06.13

The Principal
RK Khan Campus
P/Bag X004
Chatsworth
4030

Tel: 031 464 8039
Fax: 031 401 5229

Dear Mrs J Reddy.

RE: PERMISSION REQUESTED FOR MASTERS RESEARCH

I, Mrs E Langtree, HOD for Psychiatric Nursing Science at Port Shepstone Nursing Campus, am currently studying for a Masters in Nursing with Durban University of Technology.

STUDENT NUMBER: 21240653

TOPIC: Factors contributing to success in Anatomy and Physiology in first year students in the KZNCN nursing diploma program.

I would appreciate permission for the following.

1. Access to a sample of students in your campus to consent and complete questionnaires for the above study. This would involve students from both Group 7/2012 and Group 1/2013 of the nursing diploma program.

Confidentiality would at all times be respected. No students name would appear in the study. Data collected will be kept in a safe and secure place and electronic information will be password protected. All data will be shredded after fifteen years, as per the policy of the Durban University of Technology.

Written confirmation of permission granted is requested.

Please find attached, permission from KwaZulu Natal College of Nursing (KZNCN) and KZN Department of Health to pursue the above study.

Kind Regards

E. M Langtree

[redacted]

(HOD Psychiatric Nursing Science, Port Shepstone Nursing Campus.)

ANNEXURE 11: Permission letter from Greys Campus

[Fri 2013-08-30 08:48 AM]

Dear Elly

Permission is granted for you to come on the 6th of September 2013 for your Research.

Thanks

E.N. Hlongwa (Miss)
Grey's Campus Principal
Tel: 033 897 3508
Fax: 033 897 3500
Email: esther.hlongwa@kznhealth.gov.za

From: Langtree Elly
Sent: 26 August 2013 11:59 AM
To: Hlongwa Esther
Subject: FW: Request for permission to access students for Masters Research

Dear Mrs Hlongwa,

Please find attached documentation relating to a request for permission to access students within your Campus for the purposes of Masters Research.

Kind Regards
Elly Langtree

ANNEXURE 12: Permission letter from R. K. Khan Campus

[Mon 2013-08-26 02:44 PM]

Good day

It would be a pleasure to assist you. Students are available from 2nd September to 5th September 2013. Please confirm date and time before you come. Mr Ramlucken will be willing to assist you.

Mrs J. Reddy

From: Elly Langtree [mailto:elly.langtree@kznhealth.gov.za]

Sent: 26 August 2013 11:20

To: Reddy Jaya

Subject: FW: Request for permission to access students for Masters Research

Dear Mrs J Reddy,

Please find attached documentation relating to a request for permission to access students within your Campus for the purposes of Masters Research.

Kind Regards

Elly Langtree