THE PREVALENCE OF OBESITY AND RELATED RISK FACTORS AMONGST NURSES IN A PUBLIC HEALTH HOSPITAL IN KWAZULU-NATAL

MEENAL KAPITAN
(B.Physio)

Supervisor: Professor J van Heerden

Submitted to the Faculty of Health Sciences, University of KwaZulu-Natal, in partial fulfillment of the requirements for the Degree of Masters in Medical Sciences (Sports Medicine).

NOVEMBER 2010

Declaration

I, Meenal Kapitan, declare that the work upon which this project is based is original and my own (except where acknowledgements indicate to the contrary) and that neither the whole of part thereof has, is presently, or is to be submitted for another degree at this or any other university.

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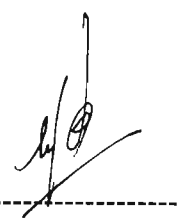

November 2010

Acknowledgements

- I would like to thank the following people for their help in completing this research and without whom this work would not have been possible:

- My research project supervisor, Professor J van Heerden (Head of School for Physiotherapy, Sports Science and Optometry, Faculty of Health Sciences, UKZN), for all his support, guidance, advice and assistance with this project.

- Mr. Junaid Azmuth (Acting Academic Co-ordinator of Department of Sports Science, Faculty of Health Sciences, UKZN), for his input and direction as my initial supervisor.

- Mrs. Fikile Ngwenyana (Statistician, College of Health Sciences, UKZN) for her help and advice with the statistical analyses.

- Mrs. KK Cele (Head of Department of Physiotherapy, King Edward VIII Hospital) and Mrs. C Henry (Typist, Department of Physiotherapy, King Edward VIII Hospital) for translating the questionnaire in Zulu.

- To the nurses of King Edward VIII Hospital who so freely gave their time and effort.

- To my Physiotherapy colleges at King Edward VIII Hospital, thank you for your support and assistance.

- To my parents and to my partner, Sumitha, thank you for your assistance, unconditional support and patience.

ABSTRACT:

Introduction: The prevalence of obesity in South Africa and throughout the world is increasing. Obesity is related to hypertension, atherosclerosis, diabetes, dyslipidemia and other sub-clinical conditions.

Aim: To establish the prevalence of obesity and related risk factors among nurses in a public health hospital in KwaZulu-Natal.

Methods: The design entailed a cross-sectional survey among 250 randomly selected nurses (22-64 yrs) working in King Edward Hospital (KZN). Obesity was measured using anthropometric and derived parameters of stature, body mass, body mass index (BMI) and waist to hip ratios (WHR). Related risks were determined using a screening questionnaire.

Results: The mean body mass and BMI observed was 84.42 ± 17.49 kg and 32.60± 6.34 kg/m², respectively with 76.10% of the sample being overweight or obese (64.80%; BMI≥30). The mean waist circumference (93.01±12.73 cm) fell into the high risk category. A large proportion (30.4%) reported experiencing lower back pain. A significant crude odds ratio (OR) was found between obesity and the risk for lower back pain with an OR of 2.53 (CI 1.12 – 5.71). An increased but insignificant risk was observed in obese individuals for hypertension (OR 1.85: CI 0.63 – 5.40). Stressed individuals (PSS>13) had an increased but insignificant risk for obesity (OR 1.78: CI 0.70 - 4.50) but a significantly increased risk for lower back pain (OR 8.59: CI 2.00-36.85; p≤0.05). Only 79 of the 250 nurses (31.6%) from our sample reported doing vigorous exercises on a regular basis and the nature of their exercise programs did not protect against the risk of obesity (OR 2.18: CI 1.03-4.60; p≤0.05).

Discussion and Conclusion: A high prevalence of obesity and related risk factors among this population of nurses in a public hospital, and potentially in the nursing occupation at large, should be addressed within the context of employee wellbeing. The need for education on appropriate diet and exercise programming in order to prevent hypokinesis and associated diseases of lifestyle is evident.

Key words: Nurses, Body Mass Index, Obesity, Low Back Pain, Hypertension, Stress, Hypokinesis

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CHAPTER ONE

1. INTRODUCTION

Obesity is a major risk factor for cardiovascular disease (Abate, 2000; Despres, 2001) and is defined according to the World Health Organization (WHO, 1998) as an abnormal or excessive fat accumulation that may impair health. The World Health Organization uses a classification system to categorize obesity using the Body Mass Index (kg/m^2). Obesity is classified as a BMI more than or equal to 30. Obesity is related to several clinical abnormalities that contribute to the development of atherosclerotic plaque and their complications, which could lead to a cardiovascular or cerebrovascular event. Obesity interacts with inheritable factors in determining the onset of insulin resistance. This is a metabolic abnormality that is responsible for altered glucose metabolism and predisposition to type 2 diabetes. Obesity also plays a role in the development of dyslipidemia, hypertension and many other sub-clinical abnormalities that contribute to the atherosclerotic process and onset of cardiovascular events. This clustering pattern is commonly referred to as the "metabolic syndrome."

Overweight and obesity have reached epidemic proportions in the United States. More than 61 percent of Americans aged 20 years and older are overweight and one-fourth of American adults are obese (an estimated 97 million), putting them at serious risk for poor health according to the Department of Health and Human Services in 2001 (Montague, 2003).

1.1 PROBLEM STATEMENT:

Palacios-Rodriguez *et al.* (2006) examined the parameters of overweight and obesity in a health team at a family medical clinic in Mexico. Their study included 207 workers including doctors and nurses and other allied professions. It was reported that 46% of the subjects were overweight and obese. This was determined through calculating body mass index. Males were more affected (54%) in comparison with studies of Mexican adults in a general population. According to age, people 50 years old or more were most affected (57%). Assessment of the different professions showed that the most affected groups were the laboratory workers at 64%, family doctors and gastroenterologists presented with a 58% incidence.

Rana *et al.* (2007) administered a study on adiposity compared with inactivity and risk of type 2 diabetes in women. Adiposity was measured by BMI and waist circumference. Physical activity was assessed through average hours of moderate or vigorous exercise and computation of a metabolic equivalent (MET) score. This study documented 4,030 incident cases of type 2 diabetes during a 16 year follow-up (1986 to 2002). This multivariate study reported an increased risk of type 2 diabetes with a progressive increase in BMI and waist circumference and with decreasing physical activity levels. Their study suggested that waist circumference and physical activity were significant predictors of type 2 diabetes and the association of waist circumference was substantially stronger.

Weinstein *et al.* (2004) examined the relationship of physical activity versus body mass index with type 2 diabetes in women. The study was a prospective cohort study of 37 878 women free of cardiovascular disease, cancer, and diabetes with 6.9 years of mean follow-up. The authors suggested that overweight and obese participants, whether active or inactive, had significantly elevated risks, compared with normal-weight active individuals. They suggested that although BMI and physical inactivity are independent predictors of incidence of diabetes,

the association with BMI was greater than with physical activity in combined analyses. This demonstrated the critical importance of adiposity as a determinant of diabetes.

Fanghanel *et al.* (2001) examined the evolution of the prevalence of obesity in the workers of a general hospital in Mexico. The study compared the prevalence of overweight and obesity of a first study (1994) to a second study in 1996. The 1994 survey included 2383 people and the 1996 survey included 2759 people. Age, sex, weight, height, and BMI were measured. Their findings suggest that the prevalence of age-adjusted overweight increased from 26.91% to 37.45%. This increase was observed in both genders but the men had a higher increase from 24.51% to 40.21%. The prevalence of overweight females was predominant in the 30- to 39-year-old, 40- to 49-year-old, and 50- to 59-year-old groups. The global prevalence of obesity changed from 13.8% to 17.2%.

Ha and Park (2003) looked at the relationship between shift work duration and the metabolic risk factors of cardiovascular disease among shift workers. They used a population consisted of 226 female hospital nurses and 134 male workers at a manufacturing firm. The parameters measured were the fasting blood sugar level, serum cholesterol, blood pressure, height and weight, waist and hip circumferences (only for the nurses), and numbers of walks during work (for physical activity). They found that the duration of shift work was significantly associated with Systolic blood pressure or cholesterol level among male workers aged 30 or more. It was inversely associated with Diastolic blood pressure (in those who were below 30 yr old) and cholesterol (in those who were aged 30 or more) for the female nurses. They found that Waist to Hip Ratio in female nurses increased slightly according to increasing duration of shift work however BMI was non-significantly associated with the duration of shift work in both male workers and female nurses who were 30 yr old or more. They suggest that there is an association between shift work duration and the metabolic risk factors of cardiovascular disease.

Obesity has been associated with several negative physiological changes of which, hypertriglycerolaemia, hypercholersterolaemia, hyperinsulinaemia are the most observable and the most intensively researched. These physiological changes result in hypokinetic disease like arterosclerosis, coronary heart disease, strokes and diabetes.

Due to obesity resulting from hypokinetic lifestyles, associated arthritic changes in the weight bearing joints is a possibility which result in osteoarthritis presenting prematurely. Nurses are predisposed to back injuries due to the very nature of their work. A prevalence of obesity amongst this population group could exacerbate low back pain. Back pain is prevalent in nurses (Edlich, 2004; Blue, 1996). Stress can be a contributing factor to weight gain. The nursing profession is associated with stressful working conditions and contributes to inadequate work ability index (Fischer *et al.*, 2006). These factors may contribute to ill health amongst nurses and to the increasing absenteeism rates.

Naidoo and Coopoo (2007) conducted a study using 107 nurses at a public hospital in Durban that looked at the correlation of lower back pain to hypokinesis and the relationship between lower levels of physical activity and obesity. They found that the mean waist-to-hip (WHR) ratio was 0.91cm, which is greater than 0.86. Almost all the groups in that study had a BMI over 30; the mean percentage body fat was over 33.6% using skin fold thickness tests. Over forty percent (40.20%) of the nurses reported having back pain. Aerobic capacity was poor due to lack of physical activity and exercise and 44% of the nurses did not exercise at all. Of the subjects that exercised regularly, 20% walked for an average of 38 minutes. The frequency of these exercises is unknown. They found that those having high BMI's were more likely to have high body fat percentages with correlation of 0.72. They also found that general flexibility and aerobic capacity was poor.

1.2 HYPOTHESIS:

There is a high prevalence of obesity amongst nurses.

1.3 PURPOSE:

This study aimed to establish the prevalence of obesity and related risk factors of nurses in a KwaZulu-Natal Public Hospital. Factors considered were weight, height, age, rank, activity levels (which included intensity, frequency and duration of exercise performed per week), related chronic illnesses, arthritic conditions, the incidence of back pain, stress and dietary habits in addition to rank and years of service.

The researcher aimed to establish:

- a suspected high prevalence of obesity exists in nurses in a public hospital
- the prevalence of chronic diseases related to obesity amongst this population
- general activity levels of these nurses

1.4 DELIMITATIONS

This study is delimited to a survey and self-reported responses among a public health hospital in KZN. Accordingly the following assumptions and potential limitations are acknowledged.

- All subjects would truthfully complete the questionnaire and divulge the relevant details
- Memory lapses of the subjects whilst completing the questionnaire
- In the greater Durban area and taking into consideration the history of South Africa, it should be noted that the racial profile of nurses varies

dramatically between the various public hospitals ranging from predominantly black, predominantly Indian to mixed racial populations. The variability between public hospitals may not provide an accurate comparison and broad based survey including several hospitals from the public and private sector may be required. The variations in the racial profile of different hospitals, cultural and socio-economic factors may play a role.

- Exposure to diseases like Tuberculosis (TB) and Human Immune Virus (HIV) may affect the health of nurses

CHAPTER TWO

2. LITERATURE REVIEW:

2.1 PREVALENCE OF OBESITY:

Ogden (2006) looked at the prevalence of overweight in children and adolescents and obesity in adults in the United States during 1999-2004. The National Health and Nutrition Examination Survey (NHANES) analyzed the height and weight measurements from 3958 children and adolescents aged 2 to 19 years and 4431 adults aged 20 years or older obtained in 2003-2004. This was then compared to data from the NHANES obtained in 1999-2000 and in 2001-2002. In the 2003-2004 survey, they found that 32.2% of adults were obese having a BMI greater than 30. The prevalence of extreme obesity (body mass index ≥40) in 2003-2004 was 2.8% in men and 6.9% in women. They found that significant differences in obesity prevalence remained by race/ethnicity and by age in the 2003-2004 survey with approximately 30% of non-Hispanic white adults being obese as were 45.0% of non-Hispanic black adults and 36.8% of Mexican Americans. Among adults aged 20 to 39 years, 28.5% were obese while 36.8% of adults aged 40 to 59 years and 31.0% of those aged 60 years or older were obese. They concluded that there was a significant increase in the prevalence of obesity and suggested that the increases in body weight are continuing in men and in children and adolescents while they may be leveling off in women.

Pappas *et al.* (2005) did a studying looking at self rated health amongst nurses in Greece. A sample of 353 nurses were used of which 311 (80%) were female and the remaining 12% were males. They found that 36% of the nurses reported being overweight or obese; 47% reported smoking. Nurses that had reported good health, showed significant tendencies to participate in leisure time exercises.

Puoane *et al.* (2002) used the South African Demographic and Health Survey of 1998 to ascertain the anthropometric profile of obesity in the South African population. They found that the mean Body Mass Index (BMI) for women was 27.1 kg/m^2 and over half of the women surveyed (56.6%) were overweight to obese. 42% of the females had a waist to hip ratio > 0.85 which is indicative of abdominal obesity. Only 5.6% of women were underweight. They found that the urban women and those women with mixed ancestry had the highest rates of abdominal obesity. It is interesting that between the ages of 15-24 yrs, 10% of women were found to be obese.

A studying looking at obesity in black women in the North West Province of South Africa (Kruger *et al.*, 2002) found that 25.2% of their sample was classified as overweight and 28.6% were obese. They compared theirs findings with other studies done on black women and the following table was extracted.

Table 2.1: Mean Body Mass Index for Black South African Women in Three Studies

	Age groups (y)				
Study	15 - 24	25 - 34	35 - 44	45 - 54	55 - 64
Urban Africans in Cape Peninsula BMI (Mean SD) %BMI	171 24.8 4.4 12.9	147 27.8 6.2 30.6	109 30.3 6.7 47.7	64 31.7 5.1 59.4	53 31.9 5. 54.7
Africans in Free State BMI (Mean SD) %BMI	-	141 27.1 5.5 27.5	110 29.4 6.6 41.8	99 29.8 7.8 42.4	102 30.5 7. 49.0
Mangaung Africans BMI (Mean SD) %BMI	-	105 27.2 6.2 31.1	126 29.5 7.0 42.9	105 31.1 7.2 54.3	68 30.6 9. 47.1
North West Province BMI (Mean SD) %BMI	200 23.2 4.8 9.0	272 26.7 6.6 24.6	228 28.9 6.7 39.0	176 27.9 7.7 35.2	99 28.0 6. 38.7

BMI, body mass index; SD, standard deviation (Kruger *et.al*, 2002)

The table suggests that with increasing age, the prevalence of obesity increased peaking at the age group of 35 to 44 years. They found that the consistantly low

physical activity and higher income groups were most at risk of being obese. There was a significantly negative association between low physical activity and BMI. In urban areas, fat intake was the highest and was found to be a contributing factor to a high obesity prevalence.

2.2 **OBESITY AND BODY DIMENSIONS**:

There is a statistically significant correlation between abdominal obesity, waist/hip ratio, waist circumference and body mass index according to Tymonas (2006). They found that abdominal obesity is the most frequent indicator of metabolic syndrome after looking at 2774 male and female patients. Seventy five (75%) of men with a BMI >30 had a waist circumference of 102 cm or greater; in 85% of women with a BMI >30 a waist circumference of 88 cm or greater was found to have a positive family anamnesis of diabetes mellitus. Positive family anamnesis of diabetes mellitus was found in more than a half of the respondents who had the increased waist circumference (in 58.9% of men and 67.3% of women).

2.3 **OBESITY AND CARDIOVASCULAR DISEASE**:

Reaven *et al.* (2004) examined the relationship between obesity, insulin resistance and cardiovascular disease. These authors demonstrated that there are greater risks of develop cardiovascular disease (CVD), type 2 diabetes, hypertension, stroke, polycystic ovary disease, nonalcoholic fatty liver disease, and certain forms of cancer in individuals that are insulin resistant. 25-35% of the variability in insulin action is attributed to being overweight. Following weight loss in a subset of overweight/obese individuals that were also insulin resistant,

improvements in metabolic abnormalities were noted. This was clinically significant.

Steyn *et al.* (2001) conducted a survey looking at 13802 adults aged 15 or over and found high levels of hypertension amongst South Africans. Using a cut off 160/95 mmHg for blood pressure, they found that 14% of women and 11% of men were hypertensive. For women, the levels of awareness was 67%, the taking on anti-hypertensives was 55% and having controlled blood pressure (<160/95 mmHg) was 38% compared to males that were 49, 39 and 26% respectively.

2.4 **METABOLIC SYNDROME**:

Alberti *et al.* (2006) reported that the International Diabetes Federation came to a consensus on a world-wide definition for metabolic syndrome. They defined metabolic syndrome as a person having central obesity in the presence of any two of the fours factors (raised triglyceride level: ≥ 1.7 mmol/l (150 mg/dl); reduced HDL-cholesterol: < 1.29 mmol/l (50 mg/dl) in females; raised blood pressure (systolic BP ≥ 130 or diastolic BP ≥ 85 mmHg and raised fasting plasma glucose: FPG ≥ 5.6 mmol/l (100 mg/dl)). A person having BMI > 30 kg/m^2, central obesity is assumed and waist circumference is not required to be measured.

Metabolic syndrome is a growing issue in women's health. It is a cluster of health findings that increase the risk of cardiovascular events (Miller and Mitchell, 2006). The prevalence of metabolic syndrome was found to be higher in women and is linked to conditions including polycystic ovary syndrome, gestational diabetes, pregnancy-induced hypertension, and female sexual dysfunction.

A study done in the Philippines by Tanchoco *et al.* (2003) looked at the prevalence of metabolic syndrome in 4541 adults over the age of 20 years. They

analyzed total cholesterol, LDL-c, HDL-c, triglycerides and fasting blood glucose. In addition, measurements of obesity such as body mass index, waist-to-hip ratio and waist circumference. Those with higher levels of fasting blood sugars were found to have were higher rates of hypertension, high waist-to-hip ratio, high cholesterol, high triglycerides, high LDL-c, low HDL-c, among the overweight and obese compared to those with normal BMI. The authors showed that the prevalence rate of metabolic syndrome is 0.28% and females had an almost twofold higher rate than males.

2.5 **EXERCISE/ PHYSICAL ACTIVITY AND OBESITY**

Physical activity is beneficial in the prevention and reduction of excess body weight (Okay *et al.*, 2009 and ACSM, 2005). Recommendations by Jakicic *et al.* (2001) suggested that moderate intensity exercises should be carried out for a minimum of 30 minutes, 5 days per week (150 minutes per week) for health benefits to be recognized. Progressively increasing exercises to 200 – 300 minutes per week have been shown to facilitate the long term reduction or maintenance of weight loss.

2.6 **STRESS**:

Tyler *et al.* (1991) examined stress and well being in nurses and compared the public and private sectors. They reported that both groups had similar high levels of stress that was associated with high work loads and the experience of death and dying. The public sector nurses were more troubled by high work loads Uncertainty over treatment was found to be a frequent stressor amongst the private sector nurses. The authors found that the workload was the best independent predictor of health and well-being status.

Tyler and Ellison (1994) looked at sources of stress and psychological well-being in high dependency nursing. Theatres, liver/renal, haematology/oncology and elective surgery were the areas examined. The authors reported that factors which influenced both the level and sources of stress included post-qualification training, number of children and partnership-status where those with post-qualifications and less social support from either a partner or children showed higher perceived stress levels.

Pendukeni (2004) looked at the impact of HIV/AIDS on health care nurses in Namibia. The author reported that there was an increase in the workload of health care workers due to increased number of patients affected by HIV/AIDS. Stress related illnesses were noted and a fear of contracting the HIV virus were contributing factors. Low morale was also noted amongst the workers.

2.7 **SHIFTWORKERS:**

In a study by Karlsson *et al.* (2001), the authors suggested that there might be an association between shift work and the metabolic syndrome after they found that obesity, high triglycerides, and low concentrations of HDL cholesterol seem to cluster together more often in shift workers than in day workers. A working population of 27,485 people was used. Results from the study demonstrated that obesity (in all age strata of women) was more prevalent among shift workers. Among 60 year old women shift workers, impaired glucose tolerance was more prevalent.

Fischer *et al.* (2006) looked at inadequate work ability among the nursing personnel at a public hospital. The factors that were found to be related were socio-demographic, lifestyles, working conditions, and health outcomes. The study used an adapted Brazilian version of the Work Ability Index (WAI). The following shift schedules were used by the staff at this hospital: 12 h nights

followed by 36 h off or 9 h or 6 h day (morning or afternoon) shifts. The mean age of the sample was 34.9 (SD +/-10.4) years of age. It should be noted that 31.5% of the participants held two jobs. The study found that the significantly associated factors were working conditions (thermal discomfort, organization of the workplace, and verbal abuse), socio-demographic (income responsibility, sole breadwinner, raising kids, age group), and health outcomes (high body mass index, obesity, sleep problems, and fatigue). These factors contributed to an inadequate WAI.

Van Amelsvoort (1999) looked at 377 newly employed shift and nonshift workers and found a positive relationship between BMI and waist to hip ratio with respect to the duration of shift work experience. This appeared to be relevant to both males and females.

2.8 **SMOKING AND CHRONIC DISEASES**

The risk of type 2 diabetes was increased with cigarette smoking in a graded manner (Patja K, 2005). The authors stated that smoking increased the risk of diabetes at all BMI and physical activity levels and that female former smokers had a slightly lower risk of type 2 diabetes compared with never smokers. The authors further reported that the risk of weight gain when quitting smoking is greater if physical activity and dietary control are not used to compensate the increase in appetite.

CHAPTER THREE

3. METHODOLOGY

3.1 Study Design and Selection of Subjects

This study entailed a survey of 250 nurses between the ages of 22 and 64yr who were randomly recruited from a local public hospital (King Edward VIII Hospital) in Durban. Departmental and ward registers were used and every fourth nurse was selected. The sample was approximately twenty percent (20%) of the population of nurses within the hospital. An independent statistician was consulted and a sample size value for a Type 1 error of 5% and power of 90%, adjusted for a finite population, justified a sample size of 250.

The following inclusion/exclusion criteria were applied:

INCLUSION CRITERIA

- Female nurses only
- All nurses working for more than 2 years
- Fully employed nurses

EXCLUSION CRITERIA

- Locum nurses
- Part time nurses
- Pregnant nurses (a foregoing medical diagnosis)

- Nurses working less than 2 years
- Male nurses

Subsequent to ethical clearance being granted for the study, all participating nurses read and indicated their understanding of the participant information letter explaining the research project (Appendix A). The document outlined the testing programme, the length and duration of testing procedures and the possible discomforts that might be experienced during testing procedures. The freedom of a subject to withdraw consent and to discontinue participation was emphasized. The participating nurses were assured that all the data gathered would be treated as confidential. Thereafter, written consent (Appendix B) was provided to participate in the tests.

3.2 DEPENDANT VARIABLES:

3.2.1 Anthropometry

The following anthropometric and derived measures were taken according to standardized protocols of the American College of Sports Medicine (ACSM, 2000). Subjects were measured individually within the confines / privacy of a cordoned-off cubicle.

- **Standing Height (Norton *et al.*, 1996):**

The purpose was to measure the height of each subject. A stadiometer was used. Each participant was required to remove their shoes and stand with theirs heels, buttocks and back resting on the stadiometer with their arms hanging loosely by their sides and the positioning of the head was in the

Frankfort horizontal plane. Readings were recorded in centimeters (cm) and rounded off to the nearest 0.5cm.

- **Body Mass (Norton *et al.*, 1996):**

The purpose was to record the weight of the participant. A Seca digital scale was used. The scale was reduced to zero prior to all measurements. The participating nurses were asked to wear a t-shirt and shorts/tights and had to remove their shoes and were then asked to stand on the scale. The weight was measured in Kilograms (kg) and rounded of to the nearest 0.5kg.

- **Body Mass Index (Bray, 1993):**

The purpose was to provide and indication of the relationship of the subjects weight to height. The body mass index (BMI) was calculated as follows:

$$BMI = \frac{\text{Weight in Kilograms (kg)}}{(\text{Height in meters})^2}$$

The World Health Organisation (1998) classified BMI as follows:

-	< 18.5	Underweight
-	18.5 – 24.9	Normal Weight
-	25.0 – 29.9	Over weight
-	30.0 – 34.9	Obesity Class I
-	35.0 – 39.9	Obesity Class II
-	>40.0	Obesity Class III

- **Waist Circumference (ACSM, 2005):**

The purpose of measuring waist circumference is that it is a predictor of visceral fat. Waist circumference is the distance around your natural waist (just above the "belly button"). It was measured in centimetres (cm) using a standard tape measure. The subject was in a standing in position. Measurements were taken after normal expiration. The standards are from the ACSM guidelines for exercise testing (2005). Subjects were instructed not to eat for at least an hour and a half before testing to avoid a meal induced distention of the stomach (abdominal circumference)

- Male norm < 102cm
- Female norm < 88cm
- Post menopausal women norm < 110cm

Table 3.1: Classification of Waist Circumference

RISK	MEN (cm)	WOMEN (cm)
Very high risk	> 120	>110
High risk	100 – 120	90 – 109
Low risk	80 – 99	70 – 89
Very low risk	< 80	< 70

ACSM (2005)

- **Waist to Hip Ratio (ACSM, 2000):**

The purpose was to determine the abdominal and hip obesity for each subject. The circumferences were measured using a standard tape measure. According to the ACSM protocol (ACSM 2000), the waist is the narrowest part of the torso (above the umbilicus and below the xiphoid process) and the hip circumference was described as the maximal circumference of the hip or buttock region above the gluteal fold. Measurements were taken after normal expiration. Measurements were recorded in centimeters. The ratio was calculated as the hip

circumference divided by the waist circumference. The ratio of over 0.86 was interpreted as a high risk for metabolic disease

Other Units of Analysis:

Information relating to potential aetiological factors related to obesity such as shift work; hypokinesis; diet; smoking, alcohol consumption and stress was obtained using a validated questionnaire (Appendix D) which included a medical history and lifestyle inventory (Corbin and Lindsey, 1985). Cohen *et al.* (1983) developed the Perceived Stress Scale (PSS) as a reliable tool in evaluating stress levels. The test has been shown to be a reliable test and retest tool and correlated well with the self reported criteria and is now commonly used by many researchers in evaluating stress. A 10-item perceived stress scale (Cohen, 1994) which was adapted from the original test, was used to measure perceived stress in this study.

3.3 **STATISTICAL ANALYSIS:**

The SPSS Statistical Package was utilized for all analyses. Standard descriptive statistics of means and standard deviations, frequency counts and percentages were calculated. Inferential analyses, comprising chi square, Wilcoxon (Mann – Whitney) tests, univariate crude odds ratios and analysis of variance were used with alpha set at $p \leq 0.05$ to interpret statistical significance between sets of data. Univariate crude odds ratios exploring the relationship between obesity and chronic disease, chronic disease and exercise and chronic disease and stress among the subjects were analysed. The proposed risk factors acts as a significant risk to disease if the odds ratio was greater than one and the lower bounds of the confidence interval did not go below 1.

CHAPTER FOUR

4. RESULTS AND DISCUSSION:

4.1 Anthropometric Profile:

The mean measured and derived anthropometric profile of the subjects is reflected in Table 4.1. The mean height of the nurses was 160.88 cm (SD 6.52) and the mean mass of the nurses was 84.42 kg (SD 17.49) from the sample population.

Waist circumference is a predictor of visceral fat. The mean waist circumference in this study was 93.01 cm (SD 12.73) which falls into the high risk category according to the American College of Sports Medicine (ACSM: 2005) guidelines. From the data, it was established that 9.20% of the sample fell into the very high risk category, whilst the majority (54.40%), fell into the high risk category. The remaining 36.40% fell into the low and very low risk category.

The mean waist to hip ratio (WHR) in the study was 0.80 (SD 0.68). This is slightly lower than the 0.86 which would be interpreted as a high risk for metabolic syndrome according to the ACSM (2000). A ratio of 0.80 however may be interpreted as a moderate risk for metabolic syndrome.

Statistically significant correlation between abdominal obesity, waist/hip ratio, waist circumference and BMI have been found according to Tytmonas (2006). They found that abdominal obesity is the mostly frequent indicator of metabolic syndrome. Our sample had a high mean BMI and waist circumference placing them in a high risk for metabolic syndrome.

Table 4.1: Anthropometric Profile of Subjects (n=250)

Variable	**Mean**	**Std. Dev**	**Min**	**Max**
Height (cm)	160.88	6.52	145.00	188.90
Mass (kg)	84.42	17.49	42.65	135.60
Waist Circumference (cm)	93.02	12.73	61.00	124.00
Waist to Hip Ratio	.802	0.06	.64	1.08
Body Mass Index (kg/m^2)	32.61	6.34	17.22	49.41
Age (years)	41.44	10.84	23	64

Puoane *et al.* (2002), from the South African Demographic and Health Survey of 1998, found that 42% of the females had a waist to hip ratio > 0.85 which is indicative of abdominal obesity. They also found that the higher levels of abdominal obesity were found amongst urban women of mixed ancestry.

Maintaining a healthy population of staff is very important. According to a study looking at obesity and workers compensation (Osbyt, 2007), a direct link was found between BMI and rate of claims among full time employees, particularly a BMI of 40 or more from 1997 to 2004 as shown in the table below.

Table 4.2: Cost to Employers

	Employees with BMI>40	Employees with recommended BMI
Claims	11.65 (per FTE)	5.80 (per FTE)
Work Days Lost	183.63 (per FTE)	14.19 (per FTE)
Medical Claim Costs	$51 091	$7503
Indemnity Claim Costs	$59 178	$5396

Osbyt, 2007; FTE = Full Time Employee

This suggests employees with a BMI > 40 were making twice as many claims compared to employees with a recommended BMI. The number of working days

lost per employee for those with a BMI greater than 40 was nearly 14 times greater (n =183.63) than those with a recommended BMI (n = 14.19). Medical costs and indemnity claims costs were considerably greater with the employees with a BMI greater than 40 compared to employees with a recommended BMI.

Our study did not look at the number of days of sick leave and related medical bills. With a large population of our sample being obese, we can assume that similar trends may occur amongst our sample of nurses.

4.1.1 Body Mass Index and Obesity

The mean BMI of the sample was 32.60 kg/m^2, (Table 4.1) with 64.80% of the sample being obese (Table 4.2) according to the World Health Organisation (WHO) classification of 1998. The number of nurses that fell into the overweight category was 57 (22.8%), and only 30 of the nurses (12.4%) were within the normal weight category. From the sample, only 1 of the nurses (0.4%) was underweight. This implies that 76.10% (n = 219) of the nurses were either overweight or obese. Obesity was further subdivided into Class I, II and III. In this study using, 57 (22.80%) of the nurse fell into the Class I category, 78 (31.40%) into the Class II category and 55 (22%) were classified as Class III.

Puoane *et al.* (2002) using the South African Demographic and Health Survey of 1998 found that the mean BMI for women was 27.1 kg/m^2 and over half of the women surveyed (56.6%) were overweight to obese. This is far lower than the mean BMI and percentage of nurses that are overweight to obese. Naidoo and Coopoo (2007), found in another study of nurses in a public hospital in South Africa a mean BMI of 30.7 kg/m^2 (SD 6.70), a mean waist to hip ratio of 0.91 (SD

0.67). They had a mean age of 37 from 107 nurses. Our study is in keeping with the results found by Naidoo and Coopoo (2007).

A study in Mexico (Navarro Nunez *et al.*, 2005) looked at the BMI's of female health care workers and found that 32% of the 487 workers surveyed were obese and 43% were overweight according the WHO classification of obesity. Similar trends of increased obesity amongst the general populations are being noticed with the global problem of obesity and has affected Asian countries like Malaysia and Thailand (Newman *et al.*, 2008; Ismail *et al.*, 2002)

Table 4.3: Body Mass Index Profile of Participants

	BMI (kg/m²)	**FREQUENCY**	**PERCENTAGE**
Under Weight	<18.5	1	0.40
Normal Weight	18.5 – 24.9	30	12.40
Over weight	25.0 – 29.9	57	22.80
Obesity Class I	30.0 – 34.9	78	31.20
Obesity Class II	35.0 – 39.9	55	22.00
Obesity Class III	>40.0	29	11.16
		N=250	100.00%

World Health Organisation (1998)

4.2 Medical History

A concise medical history reported by subjects is reflected in table 4.3.

Table 4.4: Responses to Medical Questionnaire (n = 250)

Question (During the Last 12 months)	Frequency of Positive Responses	%
1. Has your weight fluctuated more than a few kilograms?	124	49.60
2. Have you attempted weight loss through diet and or exercise?	116	46.40
3. Have you experienced any faintness, light-headedness or blackouts?	49	19.60
4. Have you occasionally had trouble sleeping?	81	32.40
5. Have you experienced irregular heartbeats, skipped beats or palpitations?	93	37.20

Almost half of the sample (49.60%) reported weight fluctuations in the previous month and a large proportion (46.40%) of nurses had attempted to lose weight either from dieting or through exercise. This would imply that they were conscious of the fact that they may be overweight and made attempts to lose weight.

Over nineteen percent (19.60%) of the nurses experienced some form of faintness, light headedness or blackouts. These symptoms may be attributed to underlying cardiovascular conditions like hypertension. Almost a third (32.40%) of the nurses reported having trouble sleeping. This may have been attributed to stresses from work or from their personal lives or due to socio-economic factors.

More than a third (37.20%) of the nurses reported experiencing irregular heartbeats or palpitations. This may be indicative of a cardiac condition or due to stress related issues.

4.2.1 Chronic Disease

The nurses in the sample reported their chronic conditions and the most commonly reported are listed in Table 4.4.

A large proportion (30.4%) reported experiencing lower back pain. High blood pressure was the second most frequently reported condition at (20.80%). Over thirteen percent (13.40%) of the nurses reported having arthritis. The prevalence of diabetes and high cholesterol was 8.80% and 8% respectively.

Table 4.5: Profile of Chronic Conditions (n = 250)

CONDITION	**FREQUENCY**	%
Lower back pain	76	30.40
Arthritis	34	13.60
High blood pressure	52	20.80
High cholesterol levels	20	8.00
Diabetes	22	8.80
Stress *	209	86.01

*Perceived Stress Score >13 (Cohen *et al.*, 1994)

Smedley *et al.* (2003) and Lagerstrom (1998) found an association of lower back pain and performance of patient handling tasks without the aid of a mechanical device as well as with low job satisfaction. Obesity and overweight did increase the risk of lower back pain (Shiri *et al.*, 2010). Those that were overweight and obese and with low back pain or chronic low back pain showed a strong association for them to seek care. Louw *et al.* (2007) conducted a systematic review of low back pain prevalence in Africa and found that the low back pain mean point prevalence, the average one year prevalence and the average lifetime prevalence for adults (aged 20 years and above) was 32%, 50% and 62% respectively. They found the there is a rise in the prevalence of low back pain in Africa.

Steyn *et al.* (2001) found that 14% of females in South Africa were hypertensive (160/95mmHg) from a survey of 13802 adults over the age of 15 years. This appears far less than our nursing population (20.80%) who reported having high blood pressure. Rana *et al.* (2007) showed high relative risks for diabetes in their sample of female registered nurses that were obese and inactive, high risk for those that were active but obese and a risk for those that were lean but inactive. They found that obesity and inactivity were independent contributors to type II diabetes development.

A study in the USA looking at perceived stress and eating behaviours amongst African Americans (Sims *et al.*, 2008) found that the mean Perceived Stress Scores (PSS) was 16.81 for females and found that the PSS significantly predicted responses for the emotional eating and haphazard planning of meals. They suggested that there was an association between higher perceived stress and unhealthy eating behaviours.

Hamad *et al.* (2008) conducted a study amongst low income adults in South Africa and found (using the 10-item perceived stress test) that there were high levels of stress in men (average 17.5) and women (average 19.6). Factors that

contributed to these high depressive symptoms ranged from instability of regular employment, lower educational levels, recent birth or catastrophe, low perceived status in the community and poor credit ratings.

The PSS-10 inventory (Cohen, 1994) indicates a mean score of 13.0 for the age range (mean age of 41.44 years) of this sample. In this respect 209 nurses (86.01%) were scored greater than 13 on the PSS. The mean PSS score was 19.44 (SD = 5.5) which is far greater than the expected score of 13 and suggests that the nurses in our sample have high perceived stress levels that are comparable with the finding of Hamad *et al.* (2008).

Norm Table for the Perceived StressScore - 10 item Inventory

Category	**N**	**Mean**	**S.D.**
Gender			
Male	926	12.1	5.9
Female	1406	13.7	6.6
Age			
18-29	645	14.2	6.2
30-44	750	13.0	6.2
45-54	285	12.6	6.1
55-64	282	11.9	6.9
65 & older	296	12.0	6.3
Race			
White	1924	12.8	6.2
Hispanic	98	14.0	6.9
Black	176	14.7	7.2
Other minority	50	14.1	5.0

(Cohen, 1994)

There are several factors that may attribute to high levels of stress within our sample. There is a chronic shortage of staff within the hospital which then places a greater burden on the existing staff to carry out the necessary duties. A poor working environment with inadequate salaries may potentially be a stress inducing factor. Constant exposure to HIV/Aids patients and high mortality rates amongst patients and the constant fear of being exposed to infectious diseases may also contribute to higher levels of stress within our sample population

4.2.2 Familial History of Chronic Diseases

Having a family history of major non-communicable diseases is a significant risk factor for obesity and hyperlipidaemia (van der Sande *et al.*, 2001). Family members with chronic diseases are shown in Table 4.5. A large proportion of nurses reported having a family history of hypertension and diabetes, 58% and 40.8%, respectively. Having a family history of stroke was 20% and heart disease was 14.8%. A familial history of high cholesterol was 8.4%

Table 4.6: Profile of Chronic Diseases in Family Members (n = 250)

Condition	**Frequency**	%
Diabetes	102	40.8
Heart Disease	37	14.8
Stroke	50	20.0
Hypertension	145	58.0
High Cholesterol	21	8.4

van der Sande *et al.* (2001) did a study to examine whether familial history of major communicable diseases was a significant risk factor to family members. A significant number of the participants reported a familial history of obesity (5.4%), hypertension (8.0%), diabetes (3.3%) and stroke (1.4%). A higher systolic blood pressure, BMI, higher uric acid and cholesterol levels and increased risk of obesity was found in those that reported a family history of hypertension. Subjects that reported a familial history of obesity were at increased risk of obesity and had higher BMI's. They suggested that a familial history of the major non-communicable diseases was a significant risk factor for obesity and hyperlipidaemia.

Kurth *et al.*, (2005) found a high hazard risk for those women that were obese to having a total stroke and for ischaemic stroke compared to women with a BMI

less than 25 kg/m^2. A medical history of high blood pressure, diabetes and high cholesterol further enhanced the risk of developing a stroke.

There was a high prevalence of reported familial history of hypertension and diabetes (refer to Table 4.5) and with high prevalence of measured obesity in our sample (mean BMI = 32.60 kg/m^2), nurses in our sample are potentially at high risk for hypertension, high cholesterol and uric acid levels and hyperlipidaemia.

According to Dallman *et al.* (2003), they suggested that chronic stress and combined with high levels of glucocorticoids can elicit a reaction in humans that increases the eating of comfort food. This may result in weight gain or possibly the opposite effect of reduced food intake and weight loss. Glucocorticoids have been shown to increase abdominal fat deposition.

4.3 Exercise Patterns

Almost 77% of nurses reported that, in their opinion, their occupational workloads at work were heavy duty. Heavy duties may be related to patient care, stooping activities, lifting and transferring of patients and stock, and pushing of patients in beds and or wheelchairs and all these activities may be reflected in the high prevalence (30.4%) of reported lower back pain.

However, only 79 of the 250 nurses (31.6%) from our sample reported doing vigorous exercises on a regular basis. This would imply that there is a high incidence of hypokinesis in this population of nurses. Hypokinesis and a poor diet are contributing factors for obesity (Macfarlane and Thomas, 2009). Of those that reported doing vigorous exercises (Table 4.6), 21.43% of nurses reported exercising twice per week, 26.19% and only 11.90% exercised 3 and 4 times per

week respectively. The duration of exercises varied and 10.71% and 20.23% exercised for 15 minutes and 20 minutes respectively. A large proportion of 26.19% exercised for 30 minutes with only 16.67% that exercised for a length of 60 minutes.

Haskell *et al.* (2007) has outlined the physical activity recommendations adapted from the 1995 recommendations by the Centre for Disease Control (CDC) and the American College of Sports Medicine (ACSM) for a healthy adult between the ages of 18-65 years. To maintain a healthy lifestyle and maintain good health requires physical activity of moderate intensity for a minimum of 30 minutes for five days per week or vigorous intensity for a minimum of 20 minutes, three times per week. Moderate intensity would entail a noticeable increase in the heart rate of the individual exercising. Vigorous intensity would imply a substantial increase in the individual's heart rate and rapid breathing. It is worth noting that they recommend, in addition, that adults would benefit from the use of major muscle groups to maintain or to increase strength and endurance at least twice a week. Hence, a substantial amount of nurses (69.6%) performed no exercise and did not meet the minimum amounts of exercise per week as outlined by Haskell et al. (2007). It is worth mentioning that of those that did exercise, 38.09% exercised a minimum of 3 times time week and 63.09% trained more than 20 minutes per workout.

Pietilainen *et al.* (2008) performed a studying looking at physical inactivity and obesity and found that the risk of obesity and abdominal obesity was strongly predicted by inactivity in adolescence. Poor physical fitness increased the risk of overall and abdominal obesity. Similar trends were found by Gordon-Larsen (2002).

Table 4.7: Exercise Profile of Physically Active Subjects

Vigorous Exercise	**n**	**%**
	79	31.6
Workouts per Week	**n**	**%**
2	18	21.43
3	22	26.19
4	10	11.90
Duration (minutes)	**n**	**%**
15	9	10.71
20	17	20.23
30	22	26.19
60	14	16.67
Exercise Type	**n**	**%**
Aerobic	75	95
Anaerobic (Gym)	4	5

Sobngwi *et al.* (2002) conducted a study looking at the differences in physical activity of urban and rural dwellers with respect to obesity, hypertension, and diabetes and found that women in urban areas had a significant higher prevalence of obesity, hypertension and diabetes compared to their rural counterparts. All urban subjects showed significantly lower levels of physical activity. Similar trends were noted in Iran by Hajian-Tilaki and Heidari (2007).

Kruger *et al.* (2003) performed a study looking at the risk factors for cardiovascular disease and its relationship with physical activity in South African blacks in the North West Province. A significantly higher mean high-density lipoprotein (HDL)-cholesterol concentration, a lower mean triglyceride concentration and significantly higher mean fasting serum glucose was found in the more active female group compared to less active females. Inactive overweight female subjects had the highest total serum cholesterol, the highest mean systolic blood pressure and the highest total low-density lipoprotein (LDL)-cholesterol.

4.4 Smoking and Alcohol Consumption

From this study, only 2 subjects of the population surveyed (Table 4.7) reported smoking (0.8%). This is considerably lower than findings from other studies within South Africa and compared to worldwide trends.

Table 4.8: Smoking and Alcohol Use (n=250)

Smoking		Alcohol	
n	%	n	%
2	0.8	16	6.4

A survey done in South Africa in 1998, looking at alcohol use in the country used a sample of 13 826 (Parry *et al.*, 2005) found that 17 percent of the women surveyed consumed alcohol. Asian and African women reported the lowest rates of alcohol consumption at 9 percent and 12 percent respectively. The author mentioned statistics from other developing countries and stated that the rates for current drinkers in Namibia were 47%, Mexico was 44% and Thailand was 46%. This suggests that the rate for current drinkers in South Africa were far less than in other developing countries. From our study, only 16 nurses of 250 reported consumption of alcohol in the past month (6.4 %). This is far less than findings reported in South Africa and from other studies in other countries.

Jha *et al.* (2002) conducted a large scale survey over 7 regions across the world. The prevalence of smoking amongst women in Latin America was 22%, the Middle East and North Africa being 7% and the lowest in South Asia were the prevalence was 4%. Their survey found the overall prevalence for female smokers was 11%.

A study on the prevalence of smoking in nurses (Mckenna *et al.*, 2001) in the United Kingdom looked at 1074 qualified nurses. They found from the sample

that 25.8% were smokers, and 19% were ex-smokers. These findings were in keeping with findings from the general population of Northern Ireland.

van Walbeek (2002) conducted a study looking at the trends in the prevalence smoking in South Africa for the period of 1993 to 2000. In 1993, the prevalence of female smokers was 12.9%. In the black population there was a decrease from 28.1% to 22.7% from 1993 to 2000. There were no significant decreases in smoking habits in the coloured and white populations (49% and 28% respectively). Amongst the Indian females, the prevalence was 28%.

4.5 Dietary Habits

Diet plays a vital role in an individual's health. In the present study we examined the snacking habits of our sample, (Table 4.8).

A study from Nigeria (Ogunjimi *et al.*, 2010) looked at the prevalence of obesity amongst nurses within a particular state of Nigeria. Their study used 500 nurses that were randomly selected from three areas within the state. Their results found that just over sixty two percent (62.40%) of the nurses from the sample were obese with the mean BMI being 35.15 kg/m^2 (SD = 3.12). They found that there was a statistical significance (positive r-value of 0.45) in eating habits and the prevalence of obesity in nurses. Indiscriminant eating habits was a contributing factor to obesity. Their study also suggested that nurses from the sample did not perceive themselves as obese from observed weight attitudes and the nurses attributed their weight to a sign of "good living".

Studies have showed the "westernization" of diet and lifestyles may contribute to the development of obesity (Kopelman, 2000). The author reviewed studies of people with common genetics living under new or different environmental

circumstances and found the mean BMI increased in the western environment. This was illustrated in Nigerians living in the USA. The mean BMI for men and women in Nigeria was 21.7 and 22.6 respectively. The average BMI for Nigerians living in the USA was 27.1 and 30.8 for men and women respectively.

Bourne *et al.* (2002) looked at nutritional habits amongst black South Africans and its relationship to non communicable diseases and found that there was an increase in fat intake amongst urban blacks over the past 50 yrs. They also suggested that amongst rural populations there was a western influence on their diets. They also found that 31.8% of females over the age of 15 were obese and 26.7% were overweight.

Table 4.9: Snacking Habits

	n	(%)
Diet soda	37	14.9
Fruits	225	90.4
Milk or Milk beverages	177	71.1
Pies/cookies/cake	144	57.8
Potato chips/Pretzels	136	56.6
Doughnuts	58	23.3
Soft Drinks	163	65.5
Peanuts	111	44.8
Cheese and Crackers	133	53.6
Ice Cream	123	49.4
Sweets	192	77.1

In the present study, nurses were asked to recall the average number of times per week certain snacks were eaten. It was found that there was a large frequency of those that ate sweets (77.1%), soft drinks (65.5%), pies/cookies (57.8%) and other 'junk' related types of foods. These may be contributing factors to increased body mass noted within our sample as many of these foods are processed and have high glycaemic indices. It should be noted that there many of the nurses (90.4%) ate fruits regularly during the week and 71.1% had milk or milk beverages regularly. This may be attributed to easy availability and

access provided by street vendors and they may have a protective effect against osteoporosis. A western type of diet (Newman, 2008) including fried foods and the eating of junk food may contribute to increased BMIs.

4.6 Aetiological Risks Factors

Univariate crude odds ratios (OR) exploring the relationship between obesity and chronic disease (Table 4.9), chronic disease and exercise (Table 4.10) and chronic disease and stress (Table 4.11) among the subjects are reported henceforth.

4.6.1 Obesity and Chronic Disease

An increased but insignificant risk was observed (Table 4.9) between obese individuals and hypertension (OR 1.85: CI 0.63 – 5.40) and the risk of diabetes (OR 1.36: CI 0.65-5.40). A significant OR was found between obesity and lower back pain with an OR of 2.53 (CI 1.12 - 5.71; p≤0.05).

Table 4.10: Odd's Ratios for Obesity (BMI ≥ 30) and Chronic Disease

VARIABLES	ODDS RATIO	STD DEVIATION	p	95% CI	
Hypertension	1.85	1.01	0.25	.63	5.40
Lower Back Pain	2.53	1.05	0.02*	1.12	5.71
Arthritis	.85	.41	0.74	.32	2.20
High Cholesterol	.86	.56	0.82	.23	3.11
Diabetes	1.36	.95	0.65	.34	5.40
Shiftwork	.61	.25	0.24	.27	1.38

*p ≤ 0.05

The likelihood of obese individuals becoming hypertensive is higher than non-obese individuals (Lucus, 1985). Furthermore, those are overweight have a higher morbidity and mortality due to cardiovascular disease (Dahl, 1958).

Mokdad *et al.*, (2001) looked at obesity, and the health related risks. They found that diabetes, high blood pressure, high cholesterol was significantly associated with being overweight and obese. Morbidly obese individuals (BMI > 40) compared to those with a normal weight had a higher odds ratio of 7.27 (CI 6.39 – 8.50) for diagnosed diabetes, an odds ratio of 6.38 (CI 5.67 – 7.17) for high blood pressure and for high cholesterol, the odds ratio was 1.88 (CI 1.67 – 2.13).

Deyo *et al.*, (1989) found an association between the prevalence of lower back pain to increasing BMI and that this prevalence increases substantially in the most obese (20%) of individuals. They also found that obesity was an independent risk to lower back pain. A review performed by Leboeuf – Yde (2000) reported an association between body weight and lower back pain. They found that 32% of the studies reviewed reported a significant but weak association. Thus they stated that body weight may be considered a possible, contributing factor of lower back pain according to the literature reviewed.

The present study did not show and increased risk of obesity with shiftwork (OR .61; CI 0.27-1.38), but other studies have suggested that working a three rotating shift may lead to a higher prevalence of obesity and a higher risk of metabolic diseases (Perbellini, 2004). Nurses in our study generally work a minimum of 3 months a year on night shift. There were those that worked predominantly nights and there were those who have not worked a night shift in the past 2 years. There are variations to the shifts as well during the day with some finishing at an earlier time, and some finishing later.

4.6.2 Chronic Disease and Exercise

A positive but insignificant protective trend (ORs <1) was observed (Table 4.10) for exercisers and the risk for arthritis (OR .82: CI 0.38-1.76), diabetes (OR 0.63: CI 0.26-1.56) and high cholesterol (OR 0.43: CI 0.17-1.08). A significant OR was found between exercisers and obesity (BMI ≥ 30) with an OR of 2.18 (CI 1.23–4.60). On the other hand, exercisers did not show a reduced the risk for obesity, stress, hypertension and lower back pain (ORs>1). While this may appear anomalous, the limited number of subjects who participated in exercise (n=79; 31,6%) were likely to so because they in fact suffered from and thus showed a high association with these conditions, but chose to address them through exercise. However the volume of exercise with respect to the frequency (mean = 3.7) of sessions per week and duration (mean = 31.6 minutes) of exercise was insufficient to positively reduce the risk of the above conditions, thus showing a need to be educated and supervised with respect to exercise programming.

Table 4.11: Odds Ratio for Chronic Disease and Exercise

VARIABLES	ODDS RATIO	STD DEVIATION	p	95% CI	
Arthritis	.82	.31	0.61	.38	1.76
High Cholesterol	.43	.20	0.07	.17	1.08
Diabetes	.63	.29	0.98	.26	1.56
Obesity	2.18	.83	0.04 *	1.03	4.60
Stress	1.08	.42	0.83	.49	2.35
Hypertension	1.05	.35	0.88	.54	2.03
Lower Back Pain	1.09	.32	0.76	.61	1.96

*p ≤ 0.05

4.6.3 Chronic Disease and Stress

Among individuals experiencing stress, an increased but insignificant risk was observed (Table 4.11) for obesity (OR 1.78: CI 0.70 - 4.50) and a significantly increased risk was found for lower back pain (OR 8.59: CI 2.00-36.85; p≤0.005).

Table 4.12: Odd's Ratios for Chronic Disease and Stress

VARIABLES	ODDS RATIO	STD DEVIATION	p	95% CI	
Hypertension	.67	.28	0.36	.24	1.56
Lower Back Pain	8.59	6.38	.0004*	2.00	36.85
Obesity	1.78	.84	0.22	.70	4.50

*p ≤ 0.05

It is common for stress sufferers to seek relief in eating (Sims *et al.*, 2008) and the tendency to obesity among those with a PSS of above 13 may reflect such behaviour. The BMI of stress driven eaters are higher compared to non-stress driven eaters. There is an association between work stress, manual lifting and the prevalence of lower back pain (Yip, 2001). Furthermore, Svensson *et al.*, (1989) found that there was a direct link of lower back pain to dissatisfaction at work, a higher degree of worry, and fatigue generally at the end of the day. The high OR found for lower back pain and stress in nurses in the sample can be explained as they are exposed to work related stresses, manual lifting, and potential dissatisfaction at work due to poor working conditions.

It was estimated that one out of every five nurses is HIV positive in South Africa, Mare (2001). It was reported that half of the first-year nursing students at one of Gauteng's nursing colleges, were HIV positive and at another nursing college in Gauteng, up to 70%. Every month, one Gauteng nursing student dies of AIDS-related illnesses. It can be very dangerous working in the health sector. Exposure to illnesses and diseases and the potential for needle stick injuries is common. These factors can lead to increased levels of stress.

4.6.4 Occupational Factors

The present study observed hypertension with respect to different ranks of appointment amongst the sample population. Cross tabulations (Table 4.12) showed a significant (p=0.04) difference in the prevalence of high blood pressure across levels of appointment. None of the mangers reported having high blood pressure. The reported frequency of hypertension amongst Chief Professional Nurses (CPN) was 25%, Professional Nurses (PN) was 30.11%, Enrolled Nurses was 13.33% and only 20.51% of Enrolled Nursing Assistants reported having hypertension. It is interesting to note that no nursing managers reported having hypertension. This may be attributed to efficient managerial and coping skills or a lack of clinical duties. The CPN and PN's are usually managing a particular ward and are considered middle management.

Table 4.13: High Blood Pressure and Rank of Appointment

Rank	+ HBP	- HBP
Manager	0 0.00 0.00	5 100.00 2.53
Chief Professional Nurse	2 25.00 3.85	6 75.00 3.03
Professional Nurses	28 30.11 53.85	65 69.89 32.83
Enrolled Nurse	14 13.33 26.92	91 86.76 45.96
Enrolled Nurse Assistant	8 20.51 15.38	31 79.49 15.66
TOTAL	52 20.80 100.00	198 79.20 100.00

p≤0.05 (Fisher's Exact Test)

This would entail place them in a supervisory capacity as well as to perform clinical duties yet report and ensure that administrative running of the wards are done and may contribute to elevated high blood pressure/hypertension.
High blood pressure was also significantly related to years of service as a nurse ($p \leq 0.000$) and years of service within a particular rank ($p \leq 0.001$), when analysed by a two – sample Wilcoxon (Mann – Whitney) test performed with adjustments for ties and variances. The mean years of service for the nurses with high blood pressure (HBP) was 22.61 (SD = 10.82), (Table 4.13). The mean years of service for nurses who reported not having high blood pressure was 13.06 (SD = 9.48). On average, nurses who suffer from high blood pressure have more years of service than those that do not suffer from high blood pressure. Looking at nurses who suffer from high blood pressure and the years of service within a rank, the mean years of service was 13.78 (SD = 11.57) and of the nurse that reported not having high blood pressure, the mean was 8.12 (SD = 7.85). On average, nurses who suffer from high blood pressure have more years of service within a rank than those that do not suffer from high blood pressure.

Table 4.14: High Blood Pressure and Years of Service

	n	Mean	SD	Min Age	Max Age
Years of Service (+HBP)	52	22.61	10.82	2	42
Years of Service (-HBP)	198	13.06	9.48	2	42
Years of Service in Rank (+HBP)	52	13.78	11.57	1	37
Years of Service in Rank (-HBP)	198	8.12	7.85	1	39

The study found a statistically significant difference in the mean perceived stress score (PSS) between the various ranks of appointment (Table 4.14). Managers scored a mean of 21.80 followed by enrolled nurses with a mean of 20.53 on the

PSS. Chief Professional nurses were the least stressed during the period of the study and scored a mean of 15.57. Professional nurses and the enrolled nursing assistants scored similarly with a mean score of 18.97 and 18.05, respectively.

Table 4.15: Stress (PSS) and Rank of Appointment

	n	Mean	Std Dev
Manager	5	21.80	3.89
Chief Prof Nurse	7	15.57	4.79
Professional Nurse	92	18.97	5.61
Enrolled Nurse	101	20.53	5.38
Enrolled Nursing Assistant	38	18.05	5.25

$p \leq 0.05$ (ANOVA)

It should be noted that the mean scores for all the categories of nursing ranks were above the mean norm of 13 (Cohen *et al.*, 1994).It is interesting that none of the managers reported having hypertension (Table 4.12) however they demonstrated the highest mean score on the PSS. Conversely, the Chief Professional Nurses demonstrated the lowest levels of stress scores yet 25% reported having hypertension. There appears to be some correlation in the result as 30.11% of the Professional Nurses had hypertension and demonstrated a high mean PSS score.

CHAPTER FIVE

5. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The present study helped in establishing the prevalence of obesity in nurses with a public hospital in Kwa-Zulu Natal. The mean mass of nurses was 84.42 kg (SD 17.49) from the sample population. The mean waist circumference in this study was 93.01 cm (SD 12.73) which falls into the high risk category.The mean waist to hip ratio (WHR) in the study was 0.80 (SD 0.68). This is slightly lower than the 0.86 which would be interpreted as a high risk for metabolic syndrome. The mean BMI of the sample was 32.60 kg/m^2 and 76.10% (n = 219) of the nurses were either overweight or obese. Lower back pain was frequently experienced (30.4%). High blood pressure was the second most frequently reported condition at (20.80%). The mean PSS score of 19.44 (SD = 5.5) suggests that the nurses in our sample have high perceived stress levels.

The present study helped in establishing the level of activity amongst the nursing population with their associated illnesses in the public sector. There is a high incidence of hypokinesis in this population of nurses with only 79 of the 250 nurses (31.6%) reporting doing vigorous exercises on a regular basis.
A large proportion of nurses reported having a family history of hypertension and diabetes, 58% and 40.8%, respectively. A significant OR was found between obesity and lower back pain with an OR of 2.53 (CI =1.12 – 5.71; p ≤ 0.02) Among individuals experiencing stress, a significantly increased risk was found for lower back pain (OR 8.59: CI 2.00-36.85; p≤0.005). The current study found a statistically significant difference in the mean perceived stress score (PSS) between the various ranks of appointment with managers having the highest mean score of 21.80

From this data, recommendations can be made to address the various problems faced by the Health Department with respect to employee health. Educational programmes on the benefit of exercise, a good, well balanced diet, and awareness of chronic diseases need to be encouraged. This would hopefully lead to staff based health facilities to improve health and wellness of employee's thereby reducing long term costs of treating chronically ill employees and lead to a healthier more productive population of staff.

5.2 Recommendations

From the derived results and conclusions, the following recommendations can be made.

Awareness programmes should be developed to highlight the problems and conditions related to obesity and its complications. Lifestyle changes including the benefits of exercise, healthy diet and social habits should be emphasized. Exercises of moderate frequency, duration and intensity are important in maintain a healthy lifestyle and reducing the risks of developing obesity and related diseases.

Development of better occupational health facilities should be considered that could manage such programmes and would reduce the cost to the employer by reducing the absenteeism rates, and medical related costs. Encourage better education of lifting protocols and techniques amongst nurses.
The funding of hoists and lifting equipment by the Department of Health would assist staff in transferring of patients and would reduce the risk of back related injuries by the employee. Lifting techniques should be integral in the training of nurses.

A greater drive by the Department of Health to educate and screen for hypokinetic diseases is important. Further research is needed to look at obesity and the related conditions in other public hospitals across the country and to compare them to private hospitals.

REFERENCES:

Abate N. (2000). Obesity and cardiovascular disease. Pathogenetic role of the metabolic syndrome and therapeutic implications. *Journal of Diabetes and its Complications*. 14(3):154-74

Alberti KGMM, Zimmet P, and Shaw J (2006). Metabolic syndrome—a new world-wide definition. A Consensus Statement from the International Diabetes Federation. *Diabetic Medicine*. May;23(5):469-480

American College of Sports Medicine. (2000). *Guidelines for Exercise Testing and Prescription*. (6th edition). Baltimore: Lippincott, Williams and Wilkins.

American College of Sports Medicine. (2005). *ACSM Guidelines for Exercise Testing and Prescription*, 7th ed. Lippincott, Williams, and Wilkins

Blue CL. (1996) Preventing back injuries amongst nurses. *Orthopaedic Nursing*. 15(6):9-20: quiz 21-2

Bourne LT, Lambert EV, Steyn K. (2002). Where does the black population of South African stand on the nutrition transition? *Public Health Nutrition*. 5(1A):157-62

Bray, GA. (1993). Fat distribution and body weight. *Obesity Research*. 1:203-205

Cohen S, Kamach T, Mermelstein R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*. 24, 385-395

Cohen S. (1994). Perceived stress scale. Retrieved 10 October 2008, from http://www.mindgarden.com/docs/PerceivedStressScale.pdf

Corbin CB and Lindsey R. (1985). Concepts of physical fitness with laboratories. Dubuque, IA: Wm. C. Brown

Dahl LK, Silver L, Christie RW. (1958).The role of salt in the fall of blood pressure accompanying reduction in obesity. *New England Journal of Medicine*. 258:1186-1192

Dallman MF, Pecoraro N, Akana SF, la Fleur SE, Gomez F, Houshyar H, Bell ME, Bhatnagar S, Laugero KD, Manalo S. (2003) Chronic stress and obesity: A new view on "comfort food". *Proceedings of the National Academy of Sciences of the United States of America*. 100(20):11696-11701

Despres JP, Lemieux I, Prud'homme D. (2001). Treatment of obesity: need to focus on high risk abdominally obese patients. *British Medical Journal*; 322(7288):716-720

Deyo RA, Bass JE. (1989). Lifestyle and low-back pain: The influence of smoking and obesity. *Spine*.14:501-506

Edlich RF, Winters KL, Hudson MA, Britt LD, Long WB. (2004). Prevention of disabling back injuries in nurses by the use of mechanical patient lift systems. *Journal of Long Term Effects of Medical Implants*; 14(6):521-33

Fanghanel G, Sanchez-Reyes L, Berber A, Gomez-Santos R. (2001). Evolution of the prevalence of obesity in the workers of a general hospital in Mexico. *Obesity Research*;9(4):268-73

Fischer FM, Borges FN, Rotenberg L, Latorre Mdo R, Soares NS, Rosa PL, Teixeira LR, Nagai R, Stelluti J, Landsbergis P. (2006). Work ability of health care shift workers: What matters? *Chronobiology International*; 23(6): 1165-79

Gordan-Larsen P, Adair LS, Popkin BM. (2002). Ethnic differences in physical activity and inactivity and overweight status. *Obesity Research*; 10:141-149

Ha M, Park J. (2003). Shiftworkers and metabolic risk factors of cardiovascular disease. *Korean Journal of Occupational Environmental Medicine*; 15(2):132-39

Haijian-Tilaki KO, Heidari B. (2007). Prevalence of obesity, central obesity and the associated factors in urban population aged 20-70 years, in the north of Iran: a population –based study and regression approach. *Obesity Reviews*; 8(1):3-10

Hamad R, Fernald LCH, Karlan DS, Zinman J. (2008). Social and economic correlates of depressive symptoms and perceived stress in South African adults. *Journal Epidemiology Community Health.* 62:538-544 doi:10.1136/jech.2007.066191

Haskell WL, Lee IM, Pate RR, Powell KE, Blair SN, Franklin BA, Macra CA, Heath GW, Bauman A. (2007). Physical activity and public health: Updated recommendation for adults from the American College of Sports Medicine and the American Heart Association. *Circulation.* doi: 10. 1161/CIRCULATIONAHA.107.185649

Ismail MN, Chee SS, Nawawi H, Yusoff K, Lim TO, James WP. (2002). Obesity in Malaysia. *Obesity Reviews*; 3(3):203-8

Jakicic JM, Clark K, Coleman E, Donnelly JE, Foreyt J, Melanson E, Volek J, Volpe SL; American College of Sports Medicine (2001). American College of Sports Medicine position stand. Appropriate intervention strategies for weight loss and prevention of weight regain for adults. *Medical Science of Sports Exercise.* Dec;33(12):2145-56

Jha P, Ranson M, Nguyen SN, and Yach D. (2002). Estimates of global and regional smoking prevalence in 1995, by age and sex. *American Journal of Public Health.* 92(6):1002-1006

Karlsson B, Knutsson A, Lindahl B. (2001). Is there an association between shift worker and having metabolic syndrome? Results from a population based study of 27 485 people. *Occupational Environmental Medicine*; 58(11):747-52

Kopelman PG. (2000). Obesity as a medical problem. *Nature* 404, 635-643 doi 10.1038/35007508

Kruger HS, Venter CS, Vorster HH, Margetts BM. (2002). Physical Inactivity is a Major Determinant in Black Women in the North West Province, South Africa: The THUSA Study. *Nutrition*; 18:422-427

Kruger HS, Venter CS, Vorster HH. (2003). Physical inactivity as a risk factor for cardiovascular disease in communities undergoing rural to urban transition: the THUSA Study. *Cardiovascular Journal of South Africa* Jan-Feb; 14(1):16-23

Kurth T, Gaziano JM, Rexrode KM, Kase CS, Cook NR, Manson JE, Buring JE. (2005). Prospective study of body mass index and risk of stroke in apparently healthy women. *Circulation*; 111:1992-1998

Lagerstrom M, Hansson T, Hagberg M. (1998). Work-related low-back problems in nursing. *Scandinavian Journal of Work Environmental Health*; 24(6):449-64

Leboeuf-Yde, Charlotte DC. (2000). Body weight and low back pain: A systematic review of 56 journal articles reporting on 65 epidemiological studies. *Spine*; 25(2):226-237

Louw QA, Morris LD, Grimmer-Somers K. (2007). The prevalence of low back pain in Africa: a systematic review. *Biomedical Central Musculoskeletal Disorders*. 8:105 doi: 10.1186/1471-2474-8-105

Lucas CP, Estigarribia JA, Darga LL and Reaven GM. (1985). Insulin and blood pressure in obesity. *Hypertension*; 7:702-706

Macfarlane DJ, Thomas N. (2009). Exercise and diet in weight management: Updating what works. *British Journal of Sports Medicine*. Doi: 10.1136/bjms.2009.065235

Mare T. (2001). Health and safety for health sector workers. Masters thesis. Faculty of Law. University of Port Elizabeth.

McKenna H, Slater P, McCance T, Bunting B, Spiers A, McElwee G. (2001). Qualified nurses' smoking prevalence: their reasons for smoking and desire to quit. *Journal of Advanced Nursing*; 35(5):769-75.

Miller EL, Mitchell A. (2006). Metabolic syndrome: screening, diagnosis, and management. *Journal of Midwifery and Womens Health*;51(3):141-51.

Okay DM, Jackson PV, Marcinkiewicz M and Papino MN (2009). Exercise and Obesity. *Primary care: Clinics in Office Practice*. June;36(2)

Østbye T, Dement JM, Krause KM. (2007). Obesity and workers' compensation: Results from the Duke Health and Safety Surveillance System. *Archives of Internal Medicine*; 167:766-773

Palacios-Rodriguez RG, Munguia-Miranda C, Avila-Leyva A. (2006). Overweight and obesity in heath team of a family medicine unit. *Revista Medica del Instituto Mexicano del Seguro Social*;44(5):449-53

Parry CDH, Pluddemann A, Steyn K, Bradshaw D, Norman R, Laubscher R. (2005). Alcohol use in South Africa: Findings from the First Demographic and Health Survey. *Journal of Studies on Alcohol*;66

Pappas NA, Alamanos Y and Dimoliatis IDK. (2005). Self-rated health, work characteristics and health related behaviors amongst nurses in Greece: a cross sectional study. *BiomedicalCentral Nursing*; 4:8 doi:10.1186/1472-6955-4-8

Patja K, Jousilahti P, Hu G, Valle T, Qiao Q and Tuomilehto J (2005). Effects of smoking, obesity and physical activity on the risk of type 2 diabetes in middle-aged Finnish men and women. *Journal of Internal Medicine*. Oct; 258(4):356-362

Pendukeni M. (2004). The impact of HIV/AIDS on health care provision: perceptions on nurses currently working in one regional hospital in Namibia. Masters Thesis. Department of School of Public Health. University of Western Cape

Perbellini L. (2004). Job as a risk factor for obesity and the contrary. *Medicina del Lavoro*; 95(3):211-22

Pietilainen KH, Kaprio J, Borg P, Plasqui G, Yki-Javinen H, Kujala UM, Rose RJ, Westerterp KR, Risseanen A. (2008). Physical inactivity and obesity: A vicious cycle. *Obesity*. (Silver Spring); 16(2):409-414

Puoane T, Steyn K, Bradshaw D, laubscher R, Fourie J, Lambert V, Mbananga N. (2002). Obesity in South Africa: The South African Demographic Health Survey. *Obesity Research*; 10, 1038-1048 doi: 10.1038/oby.2002.141

Rana JS, Li TY, Manson JE, Hu FB. (2007). Adiposity compared with physical inactivity and risk of type 2 diabetes in women. *Diabetes Care*; 30(1):53-8

Reaven G, Abbasi F, McLaughlin T. (2004). Obesity, insulin resistance and cardiovascular disease. *Recent Progress in Hormonal Research*; 59:207-223

Shiri R, Karppinen J, Leino-Arjas P, Solovieva S, Viikari-Juanura E. (2010). The association between obesity and lower back pain: A meta-analysis. *American Journal of Epidemiology*; 171:135-154

Sims R, Gordon S, Garcia W, Clark E, Monye D, Callender C, Campbell A. (2008). Perceived stress and eating behaviours in a community-based sample of African Americans. *Eating Behaviours*; 9(2):137-142

Smedley J, Trevelyan F, Inskip H, Buckle P, Cooper C, Coggon D. (2003). Impact of ergonomic intervention on back pain among nurses. *Scandinavian Journal of Work Environmental Health*; 29(2):117-23

Sobngwi E, Mbanya JC, Unwin NC, Kengne AP, Fezeu L, Minkoulou EM, Aspray TJ, Alberti KG. (2002). Physical activity and its relationship with obesity, hypertension and diabetes in urban and rural Cameroon. *International Journal of Obese Related Metabolic Disorders*; 26(7):1009-16

Steyn K, Gaziano TA, Bradshaw D, Laubscher R, Fourie. (2001). Hypertension in South African Adults: results from the Demographic and Health Survey, 1998. *Journal of Hypertension*. October: 19(10):1717-1725

Svensonn HO, Andersson GBL. (1989).The relationship of low-back pain, work history, work environment and stress: A retrospective cross-sectional study of 38- to 64- year- old women. *Spine*; 14(5):483-554

Tanchoco CC, Cruz AJ, Duante CA Litonjua AD. (2003). Prevalence of metabolic syndrome among Filipino adults aged 20 years and over. *Asia Pacific Journal of Clinical Nutrition*;12(3):271-6

Tyler PA, Ellison RN. (1994). Sources of stress and psychological well-being in high-dependency nursing. *Journal of Advanced Nursing*. Mar; 19(3):469-76.

Tyler PA, Carroll D, Cunningham SE. (1991). Stress and well-being in nurses: a comparison of the public and private sectors. *International Journal of Nursing Studies*; 28(2):125-30.

Tytmonas G. (2006). The influence of increased body mass index and abdominal obesity on the development of metabolic syndrome. *Medicina* (Kaunas); 42(2):123-9

Van Amelsvoort LG, Schouten EG, Kok FJ. (1999). Duration of shiftwork related to body mass index and waist to hip ratio. *International Journal of Obesity Related Metabolic Disorders*. Sep(9): 973:-8

Van der Sande MAB, Walraven GEL, Milligan PJM, Banya WAS, Ceesay SM, Nyan OA, McAdam WJ. (2001). Family history: an opportunity for early interventions and improved control of hypertension, obesity and diabetes. *Bulletin of the World Health Organization*; 79: 321–328.

Van Walbeek C. (2002). Recent trends in smoking prevalence in South Africa: some evidence from AMPS Data. *South African Medical Journal*; 196.33.159.102

Weinstein AR, Sesso HD, Lee IM, Cook NR, Manson JE, Buring JE, Gaziano JM. (2004). Relationship of physical activity vs body mass index with type 2 diabetes in women. *Journal of the American Medical Association*. Sep 8;292(10):1188-94.

World Health Organisation. (1998). Preventing and managing the world epidemic. *Report on a World Health Organisation consultation on obesity*. Geneva: World Health Oganisation.

Yip YB. (2001). A study of work stress, patient handling activities and the risk of low back pain amongst nurses in Hong Kong. *Journal of Advanced Nursing*; 36(6):794-804

Appendix A:

[*Date*]

THE PREVALENCE OF OBESITY IN NURSES

INFORMATION SHEET FOR

PARTICIPANTS

Thank you for showing an interest in this project. Please read this information sheet carefully before deciding whether or not to participate. If you decide to participate I thank you. If you decide not to take part there will be no disadvantage to you of any kind and we thank you for considering our request.

What is the Aim of the Project?

This project is being undertaken as part of the requirements for the Postgraduate degree for a Masters in Medical Science
The aim of this study is to establish the prevalence of obesity of nurses

What Type of Participants are Needed?

- Female nurses only
- All nurses working for more than 2 years
- Fully employed nurses

The following will not be included for the study:

- Locum nurses
- Part time nurses
- Pregnant nurses
- Nurses working less than 2 years

What will Participants be Asked to Do?

Should you agree to take part in this project, you will be asked to:

1. Attend the testing station at a particular time at the designated venue in the hospital

2. Be attired in tights or shorts and a T-shirt
3. Not have eaten a meal in the past 2 hours

4. Measurements of your height, waist and hip circumference will be measured with a tape measure; and weight will be measured using a scale; The time frame for the testing should not exceed 30 minutes.

Please be aware that you may decide not to take part in the project without any disadvantage to yourself of any kind.

Can Participants Change their Mind and Withdraw from the Project?

You may withdraw from participation in the project at any time and without any disadvantage to yourself of any kind.

What Data or Information will be Collected and What Use will be Made of it?

Measurements of your height, waist and hip circumference will be measured with a tape measure; and weight will be measured using a scale. These measures are non-invasive and you will not experience any physical discomfort or pain. An open-ended questionnaire will also be required to be filled in by the participant prior to testing. All data collected will be confidential. The researcher,(Mr Meenal Kapitan) will have access to this information. Results of this project may be published but any data included will in no way be linked to any specific participant.

You are most welcome to request a copy of the results of the project should you wish. The data collected will be securely stored in such a way that only those mentioned above will be able to gain access to it. At the end of the project any personal information will be destroyed immediately except that, as required by the University's research policy, any raw data on which the results of the project depend will be retained in secure storage for five years, after which it will be destroyed.

What if Participants have any Questions?

If you have any questions about our project, either now or in the future, please feel free to contact either:-

Meenal Kapitan
Department of Physiotherapy
King Edward Hospital
Telephone Number:- *031-3603232*

OR

Prof J van Heerden
School of Physiotherapy, Sport Science & Optometry
UKZN
Tel no:- 031-2607904

This project has been reviewed and approved by the Faculty of Health Sciences Ethics Committee of the UNIVERSITY OF KWAZULU-NATAL

Appendix B:

THE PREVALENCE OF OBESITY IN NURSES

CONSENT FORM FOR

PARTICIPANTS

I have read the Information Sheet concerning this project and understand what it is about. All my questions have been answered to my satisfaction. I understand that I am free to request further information at any stage.

I know that:-

1. My participation in the project is entirely voluntary;
2. I am free to withdraw from the project at any time without any disadvantage;
3. The data will be destroyed at the conclusion of the project but any raw data on which the results of the project depend will be retained in secure storage for five years, after which it will be destroyed;
4. An open-ended questionnaire will be required by all participants to be completed prior to testing.
5. The nature of the measurements are non-invasive and no physical discomfort will be experienced.
6. There will be no remuneration or compensation for this study
7. The results of the project may be published, but my anonymity will be preserved.

I agree to take part in this project.

.....

(Signature of participant) (Date)

Appendix C:

- Ethical Clearance
- Hospital Permission

UNIVERSITY OF
KWAZULU-NATAL

24 March 2009

Mr M Kapitan
School of Physiotherapy, Sport Science and Optometry

Dear Mr Kapitan

ETHICAL CLEARANCE APPROVAL NUMBER : FECHSC 060/09

I wish to confirm that ethical clearance has been granted for the following project:

"The Prevalence of Obesity Amongst Nurses in a Public Health Hospital in KwaZulu-Natal"

Yours faithfully

SUGEN REDDY
PRINCIPAL FACULTY OFFICER
HEALTH SCIENCES

PS: The following general condition is applicable to all projects that have been granted ethical clearance:

THE RELEVANT AUTHORITIES SHOULD BE CONTACTED IN ORDER TO OBTAIN THE NECESSARY APPROVAL SHOULD THE RESEARCH INVOLVE UTILIZATION OF SPACE AND/OR FACILITIES AT OTHER INSTITUTIONS/ORGANISATIONS. WHERE QUESTIONNAIRES ARE USED IN THE PROJECT, THE RESEARCHER SHOULD ENSURE THAT THE QUESTIONNAIRE INCLUDES A SECTION AT THE END WHICH SHOULD BE COMPLETED BY THE PARTICIPANT (PRIOR TO THE COMPLETION OF THE QUESTIONNAIRE) INDICATING THAT HE/SHE WAS INFORMED OF THE NATURE AND PURPOSE OF THE PROJECT AND THAT THE INFORMATION GIVEN WILL BE KEPT CONFIDENTIAL.

cc Head of School
cc Supervisor

HEALTH
KwaZulu-Natal

KING EDWARD VIII HOSPITAL
Private Bag X02, **CONGELLA** 4013
Corner of François & Sydney Road
Tel.:031-3603853, Fax: 031-2061457
Email..rejoice.khuzwayo@.kznhealth.gov.za
www.kznhealth.gov.za

Enq.:Miss. R.Khuzwayo
Ref.: KE 2/7/1/ **(11/2009)**
Research Programming

6 April 2009

Mr. M. Kapitan
School of Physiotherapy
Sport Science & Optometry
UNIVERSITY OF KWAZULU-NATAL

Dear Mr. Kapitan

Request to conduct research at King Edward VIII Hospital

Protocol:- The Prevelance of Obesity Amongst Nurses in a Public Health Hospital in KwaZulu-Natal

Your request to conduct research at King Edward VIII Hospital has been approved.

Please ensure the following:-

- That King Edward VIII Hospital receives full acknowledgment in the study on all publications and reports and also kindly present a copy of the publication or report on completion

- Before commencement:
  - Discuss your research project with our relevant Directorate Managers
  - Sign an indemnity form at Room8, CEO's Complex, Admin. Block.

The Management of King Edward VIII Hospital reserves the right to terminate the permission for the study should circumstances so dictate.

Yours faithfully

SUPPORTED /~~NOT SUPPORTED~~

DR. OSB BALOYI
MEDICAL MANAGER

07/04/2009
DATE

APPROVED / NOT APPROVED

MR. M. SHEKISWAYO
CHIEF EXECUTIVE OFFICER

28/4/09
DATE

Appendix D:

HEALTH AND FITNESS APPRAISAL
MEDICAL HISTORY QUESTIONAIRE

Date: .....

SECTION A

1. When was the last time you had a physical examination?.....
2. Are you allergic to any medications, foods or other substances. Name them

   .....
3. Have you ever been diagnosed with any chronic or serious illnesses. Name them. (E.g. Heart disease, diabetes, etc).

   .....
4. Give the following information pertaining to the last three times you have been hospitalized:

	Hospitali-sation Number 1	**Hospitali-sation Number 2**	**Hospitali-sation Number 3**
Type of operation or illness			

5. Are you on birth control medication? : .....
6. For how many years have you been on birth control medication? .....
7. Have you noticed an increase in your weight since commencing on the birth control medication?.....

SECTION B

During the past 12 months	**YES**	**NO**
1. Has a physician prescribed any form of medication to you?	____	____
2. Has your weight fluctuated more than a few kilograms?	____	____
3. Did you attempt to bring about this weight change through diet and/or exercise?	____	____
4. Have you experienced any blackouts, lightheadedness, faintness?	____	____
5. Have you occasionally had trouble sleeping?	____	____
6. Have you felt unusually nervous or anxious for no apparent reason?	____	____
7. Have you experienced unusual heartbeats, skipped beats or palpitations?	____	____

At present .....

1. Do you experience shortness of breath or loss of breath while walking with others of your age?	____	____
2. Do you experience sudden tingling, or loss of feeling in Your arms, hands, legs or feet?	____	____
3. Do you experience swelling of your feet and ankles?	____	____
4. Do you experience any pain or discomfort in your chest?	____	____
5. Have you been told that your serum cholesterol or triglyceride level was high?	____	____

6. Indicate the frequency of the following occurrences using the rating of:

0 = Never
1 = Almost
2 = Sometimes
3 = Fairly often
4 = Very often

In the last month, how often have you been upset because of something that happened unexpectedly?

_____

In the last month, how often have you felt you were unable to control the important things in your life?

_____

In the last month, how often have you felt nervous and stressed?

_____

In the last month, how often have you felt confident about your ability to handle your personal problems?

_____

In the last month, how often have you felt that things were going your way?

_____

In the last month, how often have you found that you could not cope with all the things that you had to do?

_____

In the last month, how often have you been able to control irritations in your life?

_____

In the last month, how often have you felt that you were on top of things?

_____

In the last month, how often have you been angered because of things that were outside of your control?

_____

In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

_____

7. Have you ever been told that you have the following conditions?

_____ Myocardial infarction
_____ Heart attack
_____ Coronary thrombosis
_____ Heart disease
_____ Coronary occlusion
_____ Heart murmur
_____ Asthma
_____ Lower back pain
_____ Arthritis
_____ HIV+
_____ Arteriosclerosis
_____ Heart block
_____ Rheumatic heart
_____ Aneurysm
_____ Angina
_____ Heart failure
_____ Diabetes
_____ High blood pressure
_____ High cholesterol levels
_____ Menopause

8. If diagnosed as being HIV+ :

a) How long ago was this diagnosis made?.....
b) Are you on any medication or Anti Retroviral therapy?.....
c) For how long have you been on these medications?.....

SECTION C

FAMILY HISTORY OF DISEASE

1. Has any member of your immediate family been treated for or suspected having had any of these conditions? Please identify their relationship to you (father, mother, sister, brother, etc).

–

	Parents		Siblings		Grandparents		Age at Onset
	Mother	Father	Brother	Sister	Grand-mother	Grand-father	
A. Diabetes							
B. Heart disease							
C. Stroke							
D. High blood pressure							
E. Raised cholesterol levels							

After : American College of Sports Medicine 2005

LIFE STYLE EVALUATION

(after Corbin and Lindsey, 1985)

SMOKING HABITS

1. Have you ever smoked cigarettes, cigars or a pipe? Yes _____ No _____
2. Do you smoke presently? Yes _____ No _____

   Cigarettes _____ per day (Approximately)

   Cigars _____ per day (Approximately)

   Pipefuls _____ per day (Approximately)
3. At what age did you start smoking? _____ years.
4. If you quit smoking, when did you quit? _____

DRINKING HABITS

1. During the past month, how many days did you drink alcoholic beverages?

   _____ days
2. During the past month, how many times did you have five or more drinks per occasion? _____ times
3. On the average, how many glasses of beer, wine, and spirits do you consume per week?

   Beer _____ glasses or cans

   Wine _____ glasses

   Spirits _____ tot measures

   Other _____ tot measures / glasses

EXERCISE HABITS

1. Do you exercise vigorously on a regular basis? Yes _____ No _____
2. What activities do you engage in on a regular basis?

_____

3. How many minutes on average is each of your exercise workouts?

   _____ minutes
4. How many workouts per week do you participate on average?

   _____ workouts
5. Is your occupation:

   _____ Inactive (e.g., desk job)

   _____ Light work (e.g., housework, light carpentry)

   _____ Heavy work (e.g., heavy carpentry, lifting)
6. Check those activities you would prefer in a regular exercise programme for yourself:

_____ Walking/running/jogging	_____Tennis/badminton/squash
_____ Stationary running	_____ Soccer/cricket
_____ Skipping	_____ Hiking/golf
_____ Road cycling	_____ Aerobic dance
_____ Stationary cycling	_____ Others (specify)

DIETARY HABITS

1. What is your current weight? _____ Height? _____
2. What would you like to weigh? _____
3. What is the most you have ever weighed as an adult? _____
4. What is the least you have ever weighed as an adult? _____
5. What weight loss method have you tried? _____

6. Which do you eat regularly?

_____ Breakfast _____ Midafternoon snack

_____ Midmorning snack _____ Dinner

_____ Lunch _____ After-dinner snack

7. How often do you eat out per month? _____ times

8. What size portions do you normally have?

_____ Small _____ Moderate _____ Large

_____ Extra large _____ Uncertain

9. How often do you eat more than one serving?

_____Always _____Usually _____Sometimes

_____Never

10. How long does it usually take to eat a meal?

_____ minutes

11. Do you eat while doing other activities (e.g., watching TV, reading, working)?

.....

12. When you snack, how many times per week do you eat the following?

Cookies, cakes, pie	_____	Sweets	_____
Diet soda	_____	Soft drinks	_____
Doughnuts	_____	Fruit	_____
Milk or milk	_____	Potato chips,	_____
beverages	_____	pretzels, etc	_____
Peanuts or other		Cheese and	
nuts	_____	crackers	_____
Ice cream	_____	Other	_____

13. How often do you eat dessert? _____ times per day

_____ per week

14. How often do you eat fried foods?_____ per week

15. Do you salt your food at the table? Yes _____ No_____

_____ Before tasting it _____ After tasting it

SECTION D

1. What is your occupational rank as a nurse? .....
2. Do you mostly work night shifts ? .....
3. In the past 2 years, how many months have you worked night shifts?.....
4. Does your job entail sitting at a desk or in a office for most of your duties?.....
5. How many years of service as a nurse do you have?.....
6. How many years of service in your current position/rank?.....

RESULT SHEET

NAME: _____

AGE: _____

ANTHROPOMETRY

HEIGHT: _____

WEIGHT: _____

WAIST: _____ HIP: _____

RANK _____ WARD: ----------