KNOWLEDGE, ATTITUDE AND PRACTICES OF NURSES IN PROMOTING ANTENATAL PHYSICAL EXERCISES IN KAKAMEGA COUNTY, KENYA

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A Thesis Submitted in Partial Fulfillment of the Requirements for the Award of the Degree of Master of Science in Health Promotion and Sports Science of Masinde Muliro University of Science and Technology

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DECLARATION

This thesis is my original work prepared with no other than the indicated sources and support and has not been presented elsewhere for a degree or any other award.

Signature……..**.....** Date …….

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HPS/G/10/2015

CERTIFICATION

The undersigned certify that they have read and hereby recommend for acceptance of Masinde Muliro University of Science and Technology a thesis entitled "**Knowledge, Attitudes and Practices of Nurses in Promoting Antenatal Physical Exercises in Kakamega County, Kenya"**

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DEDICATION

With love, to my dear husband Raymond and our children Judydella, Joseph Darrel and Marydonna. May the Almighty God shower them with blessings.

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ABSTRACT

Antenatal physical exercises have proven to be beneficial. Less than 50% of pregnant women worldwide meet exercise recommendations. Sixty-seven percent (67%) of deliveries in Kakamega County are conducted by a skilled provider (Nurse/midwife) and occur in tier 2 and 3 health facilities. Maternal mortality in Kakamega County is 316:100,000 live births. The main objective of the study was to determine Nurses'/midwives' knowledge, attitude and practice in promoting antenatal physical exercises in tiers 2 and 3 health facilities in Kakamega County. The researcher hypothesized that there would be no significant differences in knowledge levels of Nurses, their attitude and practices in tier 2 and 3 health facilities in Kakamega County as regards antenatal physical exercises. It is hoped that the findings of this study will contribute to beyond zero campaign by the first lady of Kenya. A descriptive, cross-sectional study design was used with mixed methods. Data was collected using a questionnaire and an observation checklist. Multi-stage sampling was used. Purposive method (the only tier 3 Public County hospital) and systematic sampling was used to select the study sites (the tier 2 Sub-county public hospitals and private hospital). Stratified proportionate probability sampling method was used to select the 209 nurses'/midwives. Data was organized using Statistical Package for Social Sciences software (SPSS version 25.0) and analyzed using descriptive statistics of frequency, percentage, mean and standard deviations. Hypothesis was tested using ANOVA. The results showed that Nurses had limited knowledge164 (78.9%), good attitudes 202 (98.1%) and poor practices, 1/5 themes (20%) according to Blooms cut of points in terms of promoting antenatal physical exercises. On knowledge, masters group had the least mean of 17.67, SD=1.53 and CI=13.9-21.5 while others group had the highest mean of 19.5, SD=6.24 and CI=9.6-29.4. There was no significant difference in knowledge among Nurses P=0.784,np2=0.05),attitudes were different at (P=<0.001,np2 =0.225),there was significant association between knowledge and practice (r=0.156, p=0.026) but there was no association between attitude and practice towards antenatal physical exercises (r=0.25, p=0.934).On multiple regression, knowledge was a better predictor of promoting antenatal exercises (p=0.036) than attitude. The study concluded that, nurses have a good attitude in promoting antenatal physical exercises in Kakamega County, however the low knowledge affects their practice towards the same. The study therefore recommends dissemination of guidelines on antenatal physical exercises for better maternal outcomes.

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LIST OFABBREVIATIONS AND ACRONYMS

ACOG	American College of Obstetricians and Gynecologists
ACSM	American College of Sports Medicine
ANC	Antenatal Care
BScN	Bachelor of Science in Nursing
EN	Enrolled Nurse
HCP	Health care providers
KDHIS	Kenya Demographic Health Indicator survey
KRCN	Kenya Registered Community Nurse
KRN	Kenya Registered Nurse
MCH	Maternal and Child Health Clinic
MScN	Masters of Science in Nursing
NICE	National Institute for Clinical Excellency
SPSS	Statistical Package of Social Science
USDHHS	United States Department of Health and Human Service's
WHO	World Health Organization

OPERATIONAL DEFINITION OF TERMS

The key terms used in this study were defined and explained as applied throughout the proposal so that the readers can share the intended meaning with the researcher.

Antenatal exercises: Refers to the exercises that are beneficial for the antenatal women during pregnancy such as foot exercises, abdominal exercises, pelvic floor exercises and breathing exercises.

Attitude: Attitude is a state of mind involving beliefs, feelings, values, and dispositions to act in certain ways (Medical dictionary). In this study, an attitude refers to the perception or feeling of nurses'/midwives the benefit/effectiveness of antenatal exerciseand any preconceived ideas they may have towards it as measured by the scores obtained accordingto their responses to items on a rating scale.

Knowledge: Knowledge is defined as 'facts, information, and skills acquired through experience or education; the theoretical or practical understanding of a subject' (Oxford dictionary). In this study 'knowledge' refers to how nurses'/midwives informed or understood regarding the benefit of antenatal exercise and its management as measured by scores obtained accordingto their responses to the items on a structured questionnaire.

Tier 2 Hospitals: The Sub County Hospitals as represented by the various Sub-Counties in Kakamega County.

Tier 3 Hospital: The County Hospital which serves as a referral centre.

Private hospitals: Tier 2 Faith based health facilities in Kakamega County

Matrons: These are the in-charges of the health facility in terms of Nursing Care.

Midwives: Refers to nurses specifically attending to pregnant women

Nurses: These are the general nurses, for this study refers to those assigned to work in MCH.

Practices: Practice is defined as 'the actual application or use of an idea, belief, or method, as opposed to theories relating to it' (Oxford dictionary).In this study practice refers to the prescription or provision of antenatal exercise by nurses'/midwivesduring pregnancybased on the set American College of Sports Medicine (ACSM), the American College of Obstetricians and Gynecologists (ACOG) and WHO recommendations.

Pregnancy: Period from conception to delivery.

CHAPTER ONE

INTRODUCTION

Overview

This chapter helps define what antenatal physical exercises are, physiological changes during pregnancy, importance of antenatal physical exercises, examples and policy recommendations for the same.

1.0 Introduction

Antenatal is the period in a woman`s body from when a man`s sperm fertilizes an egg (conception) to parturition-the time of birth of the baby (WHO, 2016). According to the World health Organization (WHO), exercise, is a subcategory of physical activity that is planned, structured, repetitive and purposeful (WHO, 2010). During pregnancy, the body experiences dramatic physiological, physical and psychological changes (Hoeger & Hoeger, 2016). These changes for example the release of relaxin hormone tend to support and justify a lay back and relaxation situation (Hoeger & Hoeger, 2016). This is why the researcher would like to determine the nurses' knowledge, attitudes and practices in promoting antenatal exercises that usually counter the effects of this hormone.

During pregnancy, exercise can help one to keep herself in shape, physically and psychological to prepare for labor and delivery well (Khatri, Sirohi, Dixit, Rai, &Pandey,2014).Exercise has been known scientifically to promote better blood circulation to the mother and the fetal vital organs such as the brain, liver and heart (Marshall & Raynor, 2014). Physically active pregnant women reduce their risk of caesarean sections, long term weight retention, obesity, chronic disease, pregnancy

related discomfort and complications such as maternal deaths, gestational diabetes mellitus, whilst improving sleep quality, quality of life and feelings of happiness (Currie, Gray, Shepherd and McInnes, 2016).

Kenya's maternal mortality rate of 362:100,000 live births and that of Kakamega County 316:100,0000 remains well above the global rate of 210 and the Country's sustainable target of 147: 100,000 (UNFPA,2018).

Suitable and different exercise programs are available for pregnant mothers such as dancing, aerobics, walking and swimming (Sarfraz, Islami, Hameed, Hasan & Ahmad, 2013). The World Health Organization recommends at least 30 minutes of moderate exercise every day, which may include not only a great variety of leisure and recreational sports but everyday exercises such as walking, climbing stairs, gardening and dancing (WHO, 2010).

American college of obstetrics and gynecology in conjunction with American College of Sports Medicine (ACSM) reaffirmed antenatal exercise guidelines of 2017 which requires pregnant women to have 30 minutes of moderate to high intensity of antenatal exercises on most days of the week. The National guideline for healthy diets and physical exercises in Kenya gives the following recommendations for antenatal physical exercises:

- Accumulate at least 150 minutes (2 hrs 30 mins per week of moderate-intensity aerobic activity such as brisk walking, swimming, cycling and light weight trainings
- A void activities that require sudden starts or stops, jumping, rapid changes in direction or one that increases the risk of falling or abdominal injury such as netball, soccer or basketball. Always use a supportive bra and comfortable shoes.

- Always warm up muscles before each exercise and stretch and cool afterwards.
- Drink water before, during and after physical exercise to replace body fluids lost through perspiration.
- Avoid performing any exercise that involves lying on the back, instead, perform the exercises while lying on the side, sitting or standing.
- If physically active with history of or risk of preterm labour or foetal growth restriction, reduce exercise in the second and third trimesters.
- Seek the support of partner, family and friends to meet the recommended levels of exercise
- If inactive in pre-pregnancy, start off with a few minutes of exercise each day and gradually increase to the frequency and intensity of exercise to achieve the recommended levels
- Terminate exercise during pregnancy in the case of the following warning signs; vaginal bleeding, dizziness, headache, chest pain, muscle weakness, calf pain or sweating, preterm labour, decreased foetal movement and amniotic fluid (Ministry of Health, 2017).

1.1 Background information of the study

Less than half of pregnant women worldwide meet recommended guidelines for ANC exercise (Evenson & Wen, 2011). It is advisable for all pregnant before engaging in antenatal physical exercises to be screened for contra-indications and risk factors, for subsequent recommendations to be made on an individual basis. It is useful to classify pregnant women into sedentary, recreational and competitive athlete, as this will help guide the intensity of exercise.

Recent research has determined that exercise intensity that reaches at least 60% of the heart rate reserve during pregnancy while gradually increasing physical exercise energy expenditure is beneficial. To achieve the minimum expenditure of 16 metabolic equivalent task h/wk, one could walk at 2 miles/h for 6.4 h/wk (2.5 metabolic equivalent task-hours, light intensity) or, preferably, exercise on stationary bicycle for 2.7 h/wk (6 to 7 metabolic equivalent task-hours, vigorous intensity). To achieve the target expenditure of 28 metabolic equivalent task-hours per week, one could walk at 2.0 miles/h for 11.2 h/wk (2.5 metabolic equivalent task-hours, light intensity) or, preferably, exercise on stationary bicycle for 4.7 h/wk (6 to 7 metabolic equivalent task-hours, vigorous intensity (Mukona, Munjanja, Zvinavashe, & Stray-Pederson, 2016).

The Kenya stepwise survey for NCDS Risk factors (2015) shows that 28% of Kenyans aged 18-69years are either overweight or obese, with the percentage being significantly higher in women (38.5% than men 17.5%. This rate is 33% among women of reproductive age (15-49years), Ministry of Health, 2017.

This emergence of the physical activity transition in Kenya is a worrying trend and children are not left out especially those in Urban areas, (Onywera, Adamo, Sheel, Waudo, Boit, and Tremblay,2012).A study done in Kakamega County among pregnant women in selected health facilities on knowledge and attitude of pregnant mothers towards antenatal physical exercises revealed that the pregnant mothers had limited knowledge on antenatal physical exercise maters (Sabiri , Oloo, Wabuyabo & Vurigwa, 2018). Inadequate education in exercise physiology often concealed the value of exercises (Roos, 2014). Literature suggested that nurses sometimes thought that they

were inadequately trained or experienced in prescribing antenatal exercises (Persson, Brorsson, Hansson, Troein, Strandberg, 2013). This study determined the knowledge of nurses on antenatal exercises.

Many myths and stereotypes exist against exercising in pregnancy; for instance some people believe that exercise in pregnancy can cause abortion (Moses…et al., 2015). The researcher sought to determine the beliefs of nurses pertaining antenatal exercises. Many researches have been done among pregnant women for example a research by Haakstad, Voldner & Bø, 2013, unlike this research that focused on nurses knowledge, attitudes and practices in promoting antenatal physical exercises. Awareness on roles of exercise in pregnancy among Kenyan females was scarce (Pell, Menaca, Were…et al., 2013). In this study, importance of antenatal physical exercises as understood by nurses was determined. The Kenyan Nursing curricula of all the cadres lays less emphasis on ANC exercises (Kenya Nursing curriculum for midwifery, 2017). There are quite a number of contraindications to exercise in pregnancy such as restrictive lung disease, incompetent cervix and preterm labour (Barsky, Smith, Patricios, Collins, Branfield & Ramagole, 2012).

The Kenya Demographic health indicator survey (KDHIS) 2014 Kakamega County was ranked 5^{th} among the worst counties on maternal indicators. At least 64 children under five years were dying out of every 1,000 born, immunization coverage was at 63%. There was very low knowledge on the best practices a round antenatal care.

1.2 Problem statement of the study

A large body of research has shown that ANC exercises improve pregnancy outcomes for both the mothers and the babies (ACSM, 2016). Kakamega County continue to record high proportions of caesarian sections (3,285), neonatal deaths (485:100,000 live births) and maternal deaths (316:100,000 births) compared to other Counties (UNFPA, 2018). This happens even when deliveries are conducted by skilled Nurses and occur in tier 2 and 3 health facilities (KDHIS, 2015). The National standard practices have provisions for ANC exercise prescriptions by Nurses. This is because the expectant mothers who visit health facilities for ANC care are attended to by Nurses. However, anecdotal sources show that there is very little exercise prescription given by Nurses. For Kakamega County to realize health for her people as stipulated in Kakamega County health Act 2017 there is need for Nurses to promote ANC physical exercises to allow expectant mothers to meet the recommended guidelines that can help them have better pregnancy outcomes. This intervention is sustainable if knowledge, attitude and practices of nurses on ANC physical exercises is determined and challenges addressed. The study therefore set out to determine the knowledge, attitudes and practices of nurses in promoting ANC physical exercises in tier 2 and 3 health facilities in Kakamega County.

1.3 Objectives of the study

1.3.1 Broad objective

To determine the knowledge, attitude and practice (KAP) of nurses'/midwivesin promoting antenatal physical exercises in tiers 2 and 3 health facilities in Kakamega County.

1.3.2 Specific objectives

The study sought to address the following objectives,

i. To determine the nurses'/midwives knowledge levels in promoting antenatal physical exercises in tiers 2 and 3 health facilities in Kakamega County.
ii. To establish the attitude of nurses'/midwives in promoting antenatal physical exercises in tiers 2 and 3 health facilities in Kakamega County.
iii. To determine the nurses'/midwives practices in promoting antenatal physical exercises in tiers 2 and 3 health facilities in Kakamega County.

1.4 Research hypotheses

HO_1 There is no significant differences in knowledge levels of Nurses in promoting antenatal physical exercises in tier 2 and 3 health facilities in Kakamega County.

HO_2 There is no significant differences in attitude of Nurses in promoting antenatal physical exercises in tier 2 and 3 health facilities in Kakamega County.

HO_3 There is no relationship between knowledge and practices among Nurses in promoting antenatal physical exercises in tier 2 and 3health facilities in Kakamega County.

1.5 Justification of the study

To date, there is scanty information in Kenya on knowledge, attitudes or practices of nurses'/midwives at the sub county and County levels with regards to antenatal physical exercises. Many studies on antenatal physical exercises have targeted the pregnant mothers, it is imperative that for increase in uptake of antenatal exercises, nurses are equally key. Hopefully, through these study ailments like pre-eclampsia, eclampsia,

gestational diabetes mellitus that contribute to maternal mortality can be a baited contributing to beyond zero campaign and realization of vision 2030. Kenyan health strategy policy of 2012-2030 of halting and reversing the rising cases of NCDs will not be achieved if this special population of pregnant women are not focused yet are more vulnerable to increased subcutaneous weight gain which is a recipe for NCDs. It was, therefore, imperative that research pertaining to avenues for increasing exercise levels be undertaken as a matter of urgency.

1.6 Significance of the study

Understanding nurses'/midwives knowledge, attitudes and practices in promoting antenatal physical exercises may help the government institute interventions to increase antenatal physical exercise uptake including curriculum review for the trainers and improve infrastructure at health facilities to facilitate counselling on antenatal physical exercises (Cioffi, Schmied, Dahlen, Mills, Thornton, Duff, Cummings &Kolt, 2010; Watson, Oddie, and Constantinou, 2015). The community as whole will benefit from improved maternal outcomes as a result of increased uptake of antenatal physical exercises by pregnant mothers for example reduced caesarian sections, reduced neonatal and mortality rates. It is hoped that the results of this study will help nurses'/midwives and other healthcare providers to offer a more holistic approach to meeting unique health care needs of pregnant women (Price, Amini & Kappeler, 2012). Findings will contribute to available pool of knowledge on antenatal exercises.

1.7 Scope of the study

The study only focused on nurses'/midwives at tiers 2 and 3 health facilities in Kakamega County.

1.7.1 Limitations of the study

A descriptive study design was used to describe the knowledge, attitude and practices ofnurses'/midwivesin promoting antenatal physical exercise. Descriptive designs do not attempt to generalize the findings to populations outside the study participants. To address this hypothesis testing was done and ANOVA was used to make inferences to the community. The study was also limited to a particular study group for pragmatic reasons. Clearly there are other health professionals working in health facilities whose beliefs and practice related to this issue who should also be understood. Additionally, as with similar studies, response bias may be a limitation due to the potential for selective bias (those who agreed to participate were interested in the topic). This bias was handled by data triangulation thus the use of the questionnaire and an overt observational checklist.

1.7.2 Delimitations

The study was restricted to the nurses'/midwives who were on both day and night duties. Response bias was guarded by the use of the questionnaire and the overt observational checklist.

1.8 Assumptions

According to Burns and Grove (2011), an assumption is a statement that is considered to be true without having been scientifically tested. This study was based on the following assumptions:

1. Nurses' attitudes regarding antenatal exercises influence their performance at workprior to the commencement of this study.
2. Nurses' can be described by the number of characteristics that connect and contribute to each other. Characteristics cannot be looked at in isolation.

3. Nurses can be described on a number of dimensions. The interrelated dimensions paint a profile of a nurse. The goal of nursing is to restore a patient to an optimal level of wellness.
4. Nurses' may work to optimize outcomes for patients, and the healthcare system/ organization.
5. Nurses' bring their background to each situation, including various levels of education/ knowledge and skills/ experience.

1.9 Conceptual framework

Based on the antenatal physical exercise guidelines and literature reviewed, the researcher developed a conceptual framework for this study. Individual nurses'/midwives and situational factors (independent variables) such as professional level qualification, experience, training, and demographic characteristics (gender, age) could enhance nurses' knowledge, attitude, and practices as pertains antenatal physical exercises (dependent variables).

Attaining the desired goals is indirectly influenced by nurses'/midwifery role factors, promoting antenatal physical exercises, provision of evidence-based information through continuous education activities that can be shared with pregnant mothers, counselling on barriers and institutional factors such as funding, staffing and equipment. As shown using the arrows, associations may exist between the practice behavior of nurses'/midwivestowards antenatal exercise provision and their demographic characteristics, level of knowledge and attitude. The relationships between the various variables are summarized in Figure 1.1.

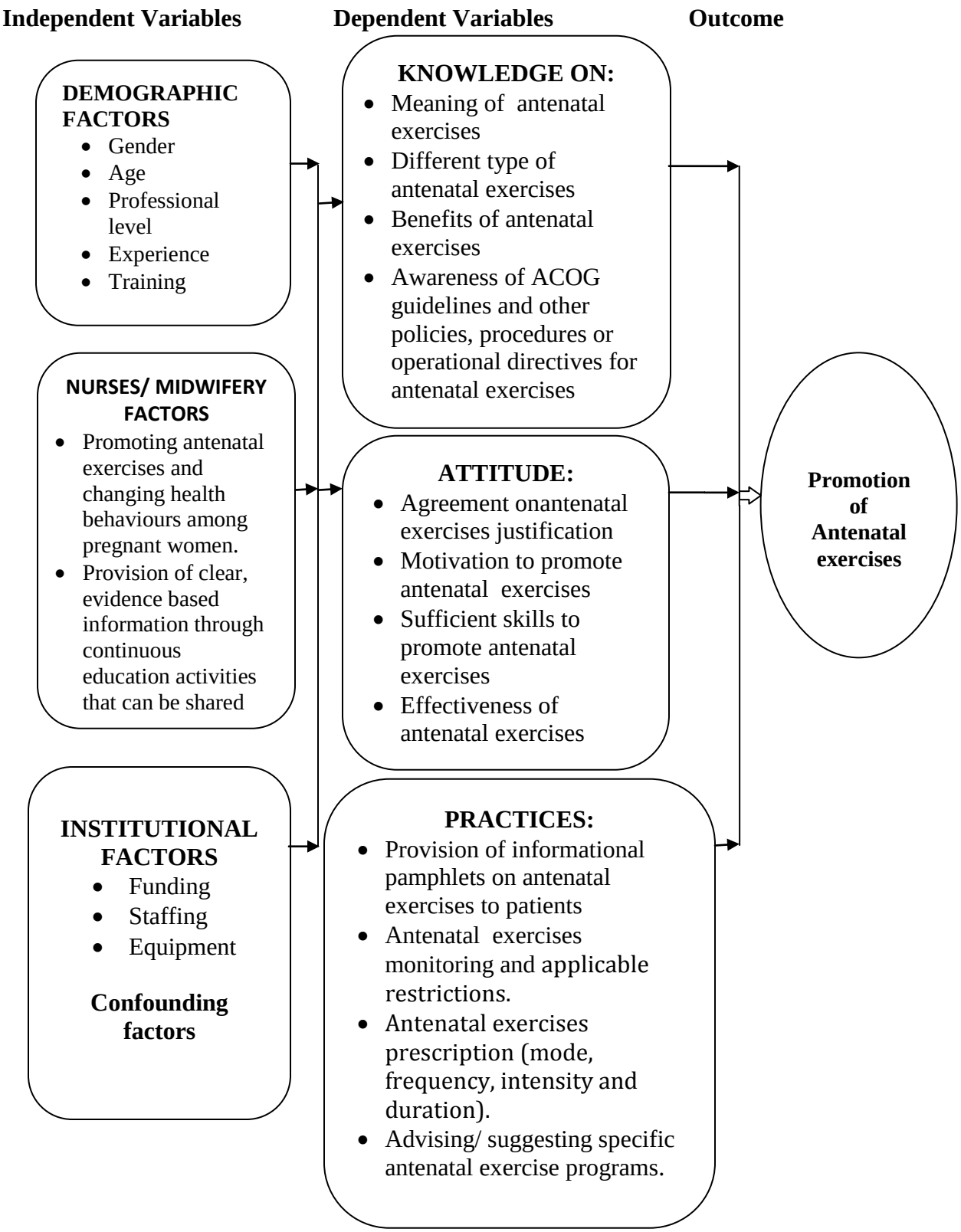

Figure 1.1: A Conceptual framework of nurses' knowledge, attitudes, and practices towards promoting antenatal exercises (Roelens…et al., 2006).

CHAPTER TWO

LITERATURE REVIEW

Overview

This chapter reviewed the related literature and built upon previous research regarding nurses' and midwives' knowledge, attitude and practices towards antenatal physical exercises in health facilities. The researcher reviewed various studies by different International scholars about the relevance of antenatal physical exercises during pregnancy.

2.1 Overview of physical exercises

Exercises are bodily movement produced by the contraction of skeletal muscle that require energy expenditures in excess of resting energy (WHO, 2015). For the purpose of this study, exercises meant the appropriately organized and selected body movement produced by contraction of skeletal muscles that require energy expenditure which is either low intensity, moderate or high intensity which aims at improving fitness of an individual (Aweto, Olibgo, Fapojuwo and Olawale, 2013). It is organized and selected because, not every activity can improve an individual's health (Centers for Disease Control and Prevention CDC, 2011). For example, when a person jumps down from a mango tree, it is an activity but it is dangerous to the person's body (Aniodo, Eskay & Ezeudu, 2014).

These aspects of activities are not the same in meaning with exercises but people often use them interchangeably (Aniodo, Eskay & Ezeudu, 2014). This study sought to determine the understanding of nurses on activities and exercises. Exercise is a subset of

the physical activities, behavior that involves purposive and repetitive movements with aim of improving cardio-vascular or muscular fitness (ACSM, 2014).

According to the WHO, inactivity has been identified as the fourth leading risk factor for global early mortality causing an estimated 3.2 million deaths globally (WHO, 2010). Among women of reproductive age in the US, exercise declined from 25 % to 23 %, however, obesity increased from 18 % to 25% from 2001/2003 to 2009 (WHO, 2010). Women who begin their pregnancy with healthy lifestyles (e.g. exercise, good nutrition, non-smoking) should be encouraged to maintain those habits (WHO, 2010). This study determined if the nurses are encouraging antenatal physical exercises as per the WHO recommendations and the Kenya policy on antenatal physical exercises. Those who do not have healthy lifestyles should be encouraged to view the preconception period and pregnancy as opportunities to embrace healthier routines (Committee Opinion, 2015).

It is an essential element of a healthy lifestyle and obstetrician-gynecologists and other reproductive health care providers should encourage their patients to continue or to commence exercise as an important component of optimal health in pregnancy (Committee Opinion, 2015). Do the nurses in tier 2 and 3 health facilities in Kakamega understand these benefits of exercises? The researcher sought to find out. Disease outcomes and conditions inversely related to regular exercises include cardiovascular disease, thromboembolic stroke, hypertension, type 2 diabetes mellitus (T2DM), osteoporosis, some form of cancers (colon and breast cancer), anxiety, depression and obesity (Booth, Roberts & Laye, 2012).

Healthcare providers should be aware of recommendations for maternal physical exercise and the research base behind them (Baur, Broman & Pivarnik, 2010). What is the knowledge level of nurses on antenatal exercises? Are they aware of the recommendations for antenatal mothers? Historically, exercise was not universally recommended for pregnant women because of limited research and fear of unknown risks to the mother and fetus (Downs, Chasan-Taber, Evenson, Leiferman and Yeo, 2012).

Pregnant women are now encouraged to follow general adult recommendations for exercises developed jointly by the American College of Sports Medicine (ACSM) and Centers for Disease Control and Prevention (CDC), suggesting 30 minutes of moderate exercise be performed on most days of the week. Women currently exercising are encouraged to continue and sedentary pregnant women were encouraged to begin an exercise program if there are no contraindications (ACOG, 2017).

Magazines and books were important sources of information initially, friends and family strongly influence exercising behavior, the study determined if nurses have an influence on antenatal physical exercises. The attitudes, beliefs and behaviors women had about exercises were rooted within their personal, social and cultural contexts and could not be addressed in isolation (Nayak, Paes, Gupta, Kumar, Narayan, Thunga & Mithra, 2015). Unlike the earlier studies, this study is focusing on the attitudes of nurses and not those of the pregnant mothers.

The need to adopt healthy living habits had been disseminated in society as illustrated by the increased demand and attendance of sports facilities, public areas for exercise, sports clubs and gyms (Hancock, 2011). This reveals the emergence of a new area, to which

attention is needed to be paid, in order to identify this "new" client, who practiced exercise and the athlete who practiced sports for professional or leisure purposes (Hancock, 2011). Society should reflect on this clientele and ask if it's prepared to offer this care, as these persons lack not only care, but mainly prevention of musculoskeletal injuries (WHO, 2012). Nowadays, nurses are mainly young people, deeply involved in their joviality and hence, physical productivity (Khatun, 2010). They also displayed a great sense of initiative, a characteristic that joined and organized other young people for the sake of exercises in nursing (WHO, 2012).

2.1.1 Global burdens of inactivity and disease

Approximately 3.2 million people died each year due to inactivity (Alwan, 2011). The five foremost causes of death worldwide could be attributed to hypertension (13%), smoking (9%), high blood glucose (6%), inactivity (6%) and obesity (5%) (Kallings, Leijon, Hellénius & Ståhle, 2008). Although inactivity was fourth on the list of the top ten risk factors for premature death, it played a role in almost all the other causes (Khan…et al., 2011).

It would be impossible to deny the numerous technological advancements that have been part and parcel of this modern-day era; cars, televisions, computers, mobile devices and machinery designed to take over manual labour (Hallal, Andersen, Bull, Guthold, Haskell, Ekelund, 2012). The driving force behind many of these developments was to increase the productivity of man, unfortunately without due regard for the major cost it would had on the worldwide epidemic of non-communicable diseases stemming from inactivity .The weighted average of adults aged 15 years or older from 122 countries

represented in the WHO global health observatory data 31.1% did not meet the minimum requirements for exercise (Hallal… et al., 2012).

Geneau, Stuckler, Stachenko, McKee, Ebrahim, Basu, Chockalingham, Mwatsama, Jamal, Alwan & Beaglehole (2010) painted an even bleaker picture by postulating that non-communicable disease would cause over three quarters of all deaths in 2030. Even though inactive lifestyles are not the lone cause of non-communicable chronic diseases, is the easiest amendable of all risk factors (Brown and Smith, 2010).

Even though the negative health effects of inactivity were well documented, the economic consequences were often neglected (Huber, Knottnerus, Green, Horst, Jadad, Kromhout, Leonard, Lorig, Loureiro, Van der Meer, Schnabel, Smith, Van Weel, & Smid, 2011). As the population aged, chronic illnesses became a common occurrence, putting pressure on the sustainability of healthcare systems as chronic diseases account for most of global healthcare expense (Huber…et al., 2011). It was, therefore, imperative that research pertaining to avenues for increasing the activity levels of the global population and more so this special population of pregnant mothers is undertaken.

2.1.2 Historical overview of antenatal physical exercise

The earliest recommendations for antenatal physical exercises largely reflected the cultural and social norms of the times, rather than scientific evaluation (Mittelmark, Wiswell,& Drinkwater,1991). In the 18th Century, while maternal exercise was viewed favorably and associated with easier labor and reduced fetal size, a number of exercise limitations were promulgated avoidance of dancing and horseback riding (Kerr, Johnstone & Phillips, 1954). The study sought to determine the nurses understanding of various antenatal physical exercises. The earliest scientific studies on the relationship

between maternal exercise and birth outcomes were published in the late 19th and early 20th Centuries and they focused on the determinants of birth weight and attributed lower birth weights to increased levels of exercise; (Briend, 1980). At the beginning of the 20th Century, 'moderate exercise' were defined as a daily walk of at least 2–6 miles (Mittelmark, Wiswell & Drinkwater, 1991*)*. In the 1920's and 1930's, the antenatal exercise program was introduced in the US with the goal of easing labor/delivery and prescribed breathing patterns and exercises for improving muscle tone, diminishing labor pain, improving fetal oxygenation, and facilitating postpartum weight loss (Mittelmark, Wiswell & Drinkwater,1991*)*. In this study, the nurses were asked to respond to knowledge items on a likert scale in terms of their understanding of the value of antenatal physical exercises.

In 1949, the US Children's Bureau issued a standard recommendation for antenatal exercises: in the absence of maternal complications, pregnant women could continue housework, gardening, daily walks (up to 1-mile in several short bouts) and even swimming occasionally but should avoid sports participation (Federal Security Agency and Social Security Administration, 1949; Sternfeld, 1997). Such recommendations for 'moderate exercise' formed the basis of antenatal physical exercise programs of the 1970s and 1980s, which were highly specific and focused, mainly on improving maternal fitness and easing labor/delivery (Sternfeld, 1997).

In 1985, ACOG issued the first guidelines for antenatal exercise. They were based on the consensus opinion of a panel of obstetricians. They endorsed the safety of most aerobic exercise but advised caution with high impact exercises such as running and included restrictions for duration (no longer than 15 minutes for strenuous exercise), heart rate (no

greater than 140 beats/minute), and core body temperature (no greater than 100.4°F/38°C). Over the following decade, several epidemiologic studies evaluated the association between antenatal exercise and maternal/fetal.

Studies with more rigorous measures of total exercise, household were more likely to find neutral or beneficial effects (Chasan-Taber, Evenson, Sternfeld, & Kengeri, 2007). The lack of evidence for any harmful effects of antenatal physical exercise on pregnancy outcomes suggested that for healthy women, antenatal physical exercises were safe subject to few limits (Sternfeld, 1997). This conclusion was reflected in the revised 1994 ACOG guidelines, which placed almost no restriction on maternal exercise and eliminated parameters for heart rate and exercise duration.

In 2002, ACOG released updated guidelines that recommended 30 minutes of moderate intensity exercise during most days of the week for pregnant women without medical/obstetrical complications and suggested that participating in a wide-range of recreational exercise is safe (ACOG, 2002). Are the nurses in tier 2 and 3 health facilities in Kakamega County aware of these ACOG guidelines? The researcher sought to determine this. Consistent with ACOG, the United States Department of Health and Human Services (USDHHS) released in 2008 the "exercise Guidelines for Americans" which recommended at least 150 minutes of moderate-intensity exercise per week for pregnant women without obstetric/medical complications. This report also put forward, for the first time, guidelines for vigorous intensity aerobic antenatal exercise (pregnant women who habitually engage in vigorous-intensity aerobic exercise can continue vigorous exercise as long as they discuss with their healthcare provider how and when exercise should be modified over time). This report provided strong scientific evidence

for the safety of moderate-intensity exercise; stating that it does not elevate the risk for low birth weight, preterm delivery, or early pregnancy loss (Physical Activity Guidelines Advisory Committee, 2008). Moreover, it highlighted the growing evidence that exercise reduces the risk of pregnancy complications (preeclampsia, gestational diabetes mellitus).

The Netherlands adopted the USDHHS (2008) exercise for pregnancy. Also, the Canadian National Guidelines and recommendations for the UK and Australia supported by The Royal College of Obstetrician and Gynecologists (RCOG, 2006) state that all women without contraindications should be encouraged to participate in aerobic and strength-conditioning exercise as part of a healthy lifestyle. The Canadian Academy of Sports Medicine further specifies that pregnant women who had been previously active may continue exercise in the first trimester to a maximum of 30–40 minutes at a frequency of 3–4 times per week as tolerated (Alleyne, 2008).

The ACOG 2002 guidelines were updated in 2010 and subsequently in 2017 in light of the increasing obesity epidemic worldwide, ACOG 2017). In particular, recent findings indicating that fetal exposure in utero to maternal obesity, excessive gestational weight gain, and abnormal glucose tolerance critically influence the risk of subsequent overweight/obesity in the offspring (Committee Opinion, 2015).

In summary, beliefs and recommendations regarding antenatal exercise have varied widely over the course of history. While initially, the health benefits of antenatal physical exercise were accepted as ‘common sense’, subsequent time periods saw the introduction of the concept of moderation of exercise in pregnancy (USDHHS, 2008). In the past 25 years, the body of evidence evaluating the impact of antenatal physical exercise on maternal and fetal outcomes has increased (Murphy, 2010).

2.1.3 Exercise and antenatal care

Increasing exercises is now considered to be as important as tobacco control in lessening the burden of non-communicable diseases (WHO, 2014). Being healthy is the dream of every individual, which can be achieved by indulging in regular structured exercise (Hoeger & Hoeger, 2016). In pregnancy, exercise program confers many benefits, and can improve overall fitness and relieve some of the discomforts associated with pregnancy (Marshall & Raynor, 2014).

Although exercise was recommended during pregnancy, it was documented that being pregnant was an event that led to decreased activity (Committee Opinion, 2015). What are the nurses in tier 2 and 3 facilities in Kakamega County doing to promote antenatal physical exercises? In the Norwegian Mother and Child Cohort Study (MoBa study) comprising 34,508 pregnancies, the proportion of regular exercise defined as exercising three times per week or more, was 46 % before pregnancy and declined to 28 % and 20 % by gestational weeks 17 and 30, respectively (Owe, Nystad & Bø, 2009). Multiple pregnancies, pelvic girdle pain, nausea, musculo-skeletal pain, uterine contractions and sick-leave were factors inversely associated with regular exercise in the MoBa study. This was a cohort study focusing on pregnant women while this study was a cross-sectional study targeting nurses who attend to the expectant mothers. Socio-demographic characteristics positively associated with exercising during pregnancy were high education, low body mass index (BMI), prime parity and being a cohabitant (Cannella, Lobel & Monheit, 2010). Regular exercise prior to pregnancy was strongly associated with regular exercise during pregnancy, and women with high levels of pre-pregnancy exercises were more likely to exercise during pregnancy (Cannella, Lobel & Monheit,

2010). This study was determining the knowledge, attitude and practices of nurses unlike in this cohort study that examined the factors associated with uptake of antenatal physical exercises. Though there is little information on exercise levels in pregnancy, studies have consistently identified social isolation, safety concerns and cultural norms as barriers to physical exercise among pregnant women, (McParlin, Robson, Tennan, Besson, Rankin, Adamson, Bell, 2010).

Exercise had become more popular among women of reproductive age and many sought medical advice on whether they could continue exercising during pregnancy. The answer to their question demanded that the influence of exercise on the mother and the fetus be properly understood (Barakat, Pelaez & Montejo, 2011).

Studies on the effects of exercise on maternal and fetal health had been around for 30 years, yet controversy still surrounded how it affected many pregnancy outcomes, including gestational age at birth, the type of delivery, maternal weight gain or birth weight, among other outcomes (Downs, Chasan-Taber, Evenson, Leiferman and Yeo, 2012). This partly explains why this study had to be done to contribute in unraveling the issues that undermine antenatal physical exercises like the knowledge, attitudes and practices of antenatal physical exercises by nurses. There are many different types of exercises available for pregnant women that work to strengthen muscles and promote fitness. These types of exercises involve lifting weights, and performing pushing and pulling exercises (Makinde, Adeeyemo and Ogundele, 2014). Strengthening the muscles prepares for the demands of labor and delivery, such as by using muscles to push and practicing how to breathe effectively. Kegel exercises are also an important part of antenatal physical exercise, this involve tightening your pelvic muscles, which are the

muscles used to control urine flow which helps after a baby is born, (Sarfraz…et al., 2013). Pelvic muscles may stretch during delivery, becoming loose and difficult to control (Carmen & Milanez, 2011).One, of the researches conducted in Brazil showed that 65.6% of the women were sufficiently informed about the practice of exercise during pregnancy and the vast majority 93.8% was in favor of it, nevertheless, just over 20% of the women exercised adequately (Evenson & Chyrise, 2010). The researcher sought to find out if the nurses in Kakamega County were aware of these types of antenatal physical exercises and their benefits.

Antenatal care was an essential pillar of safe motherhood (USAID, 2010). The aim was to give optimal care to the mother so that she could endure the nine months of pregnancy without any complications (MPHS, 2012). A proper exercise plan further helped to achieve appropriate care (ACOG, 2010). Awareness regarding the role of exercise to relieve undesired effects of pregnancy among Kenyan females was scarce (Pell…et al., 2013). Research in this area is also limited (Pell…et al., 2013). With all these overwhelming evidence of benefits of exercise to antenatal mothers ,the nursing curriculum, lays less emphasis on the same, NCK curriculum,2018.

2.1.4 Exercise as medicine

Globally, more people have been treated for chronic lifestyle diseases with biomedical means (Booth, Roberts & Laye, 2012). Although the importance of these treatment options cannot be underestimated, it had to be acknowledged that they were, in fact, secondary and tertiary treatment options for chronic disease of lifestyle (Booth, Roberts &Laye, 2012). Promotion of exercise was a priority for health agencies), evidenced by the shift in focus from monitoring, protecting and promoting general health, to injury

prevention and control, chronic disease prevention and management, health-promoting public policies and environmental support for behavioral change to increase exercise in a whole population ((Heath, Parra, Sarmiento, Andersen, Owen, Goenka, Monres, Brownson, 2012; Davis…et al., 2014; Matheson…et al., 2011).

2.2 Role of healthcare providers to promote exercise as medicine

A pillar of the WHO's global exercise plan (2010) was advice on exercise in the primary health care sector (WHO, 2010). Nurses were considered to be well positioned to champion the cause of prevention of chronic diseases by promoting physical exercises since they could take advantage of the on-going care they provided to a large sector of the population and be influential in changing patients' behaviors ((Matheson…et al., 2011).Nurses often evaluate risk factors for cardio vascular disease during routine visits like the weight, height, blood pressure and pulse measurements (ACSM, 2016). This study sort to determine if nurses were better placed to promote antenatal physical exercises.

When patients received physician advice regarding exercise, they were more likely to engage in exercise (76.5%) compared to those who did not receive such advice (38.8%) (Greenlund, 2002). In this study, nurses were to respond to some questions like whether they take histories and prescription on antenatal exercises. This means, the healthcare providers need to be knowledgeable and have the right attitude in order to provide these valuable advices. The researcher sought to determine this among the nurses in Kakamega County. Exercise prescription involved either verbal or written recommendations for exercise (Suleman, 2016). A physical prescription for exercise from a healthcare provider was a credible way to communicate changes in lifestyle to patients which focuses on

empowerment of the patient to take control of his/her preventative healthcare instead of just removing symptoms by using drugs (Huber…et al., 2011).

In order to effect change, it is important that doctors and other health care professionals included exercise counselling as part of routine health maintenance (Ribeiro, de Arruda , Carvalho, 2007).In the questionnaire, the nurses were to indicate whether they prescribe exercise through written or verbal. Considering the direct relationship between a person's health status, longevity and exercise levels, exercise status should be assessed on a regular basis similar to the other major modifiable cardiovascular risk factors (diabetes mellitus, hypertension, hypercholesterolemia, obesity, and smoking), which are assessed routinely (Sallis, 2011). Exercise assessment should therefore be considered a vital health measure that is tracked regularly over time (Strath, Kaminsky, Ainsworth, Ekelund, Freedson, Gary, Swartz, 2013). It was important therefore to determine the practice of nurses pertaining antenatal physical exercise prescription and monitoring as per this study including community referrals.

Physician-based assessment and counselling for exercise-model was developed within the US and consists of a self-completed questionnaire to elicit a exercise history and provide consequent advice on the principles of exercise (Lobelo and Garcia de Quevedo, 2014).In the United Kingdom, the schemes largely comprise of healthcare providers recommendation to a recreation centre where an exercise prescription consist of a free or subsidized attendance to the facility over a period of weeks or months (Bull…et al., 2010). In this study, the observational check list had provisions for a sample of exercise prescription and standard operating procedures guiding the practices on antenatal physical exercise.

Emphasizing the link between reduced disease risk and exercise, pointing out the role of exercise in weight control, providing a written prescription for exercise, emphasizing 30 minutes of daily exercise can make a substantial difference in long-term health outcomes. Encouraging clients to select exercises they enjoy, finding someone with whom to exercise and encouraging clients to keep a diary to monitor their behavior would improve uptake of antenatal physical exercise. Taking patient preferences into account when designing an exercise prescription is critical. (Katz, 2012).

2.3 Nurses'/midwives knowledge level in promoting antenatal physical exercises

Knowledge is the information, understanding and skills that one gains through education or experience about something (Oxford learners' dictionary, 2018). There are four dimensional of knowledge (the knowing what) factual, conceptual, procedural and metacognitive (Anderson, 2014). In this study therefore knowledge of antenatal physical exercises meant familiarity, awareness or understanding that has been perceived, gained through experience or learned about planned and selected bodily movement produced by contraction of muscles that required energy expenditure which was low, moderate or high intensity by a pregnant mother.

Literature suggested that nurses sometimes thought that they were inadequately trained or experienced in prescribing antenatal physical exercise and felt that nursing training relating to non-pharmacological treatment methods was inadequate (Persson, Brorsson, Hansson, Troein, Strandberg, 2013).

This study sought to determine the knowledge of nurses in promoting antenatal physical exercises in tier 2 and 3 health facilities in Kakamega County. Health care providers were often aware that exercise was mentioned as first-line treatment in guidelines for several

diagnoses yet training in exercise prescription was lacking all over the world (Matheson…et al., 2011). This correlated with other studies, which had found out that health care providers knowledge of exercise guidelines was low. Australian doctors' knowledge improved over the previous decade and that they felt more confident to give exercise advice (Dunlop and Murray, 2013).

A study among final year medical students in Scottish Universities reported that only 52% were confident about giving exercise advice (Dunlop & Murray, 2013). This study sort to determine the confidence in exercise prescription among the qualified nurses to see if the results would vary with this of students. Nurses who did not feel comfortable or competent to prescribe exercises were less likely to do so (Johansson, Stenlund, Lundström, Weinehall, 2010). The trend of not prescribing exercise may partially have been attributed to a foundational flaw in Nursing curricula. The importance of exercises was often undervalued and underappreciated in clinical medicine as a result of the seeming lack of education in exercise physiology which often concealed the value of exercises for health care problems (Roos, 2014).Pregnant mothers fear of harm to either their baby ('it's so precious') or themselves ('your ligaments are all soft') was a major influencing factor and was compounded by a lack of specific guidance or information to assist physical antenatal exercise decision making. On suggestions to improve uptake of antenatal physical exercises mothers suggested provision of relevant information from a trusted source delivered face to face at the appropriate time. Women expressed that they would be most receptive to information on physical antenatal exercises during the second trimester of pregnancy, 'once the morning sickness has gone' and before they 'get too big, (Currie…et al., (2016)

Many women actively sought information from books, television, and Web sites in order to guide their physical exercise behavior: 'There's a lot of mixed information out there. A lot of Web sites say you shouldn't be doing, for example, aerobics.'' Health professionals sometimes have different opinions'' (Cioffi…et al, 2010). These examples show how easy it is for women to receive inconsistent or conflicting information hence they become confused and discouraged about antenatal physical exercises.

In a study conducted by Groth and Morrison-Beedy (2013) to assess the views of low income, pregnant African American women on physical exercise and diet, factors influencing physical exercise in pregnancy were misconceptions about physical exercise in pregnancy and lack of knowledge about which exercises to undertake.

A study looked at knowledge and attitude towards antenatal physical exercise in pregnancy in Zimbabwe. Findings revealed that participants had some knowledge about types of exercise and some benefits and contraindications to antenatal physical exercise. Forty-seven point six (47.6%) had below average knowledge, 5.82% had average knowledge while 46.6% had good knowledge of antenatal exercises. Almost half of the participants had below average knowledge (Mukona…et al, 2016). This in itself might be a barrier to performance of physical exercise during pregnancy.

All women should be aware of warning symptoms that may develop during physical exercise, and advised to stop the exercise and seek medical advice should they occur. Exercise forms only one component of a healthy lifestyle. A nutritious diet, adequate hydration, and abstinence from smoking, alcohol and illicit drugs are crucial in maintaining optimal health during pregnancy (Horak and Osman, 2012).

It is therefore important for each medical practitioner to understand the different physiologic effects and benefits of different forms of exercise to be able to guide each patient to the best regimen (Katz, 2012).

2.4 Attitude of nurses'/midwives towards promoting antenatal physical exercises

In this study, attitudes of nurses were generally positive or negative views of a person or an individual about planned and selected bodily movement produced by the contraction of skeletal muscles that required energy expenditures in excess of resting energy in pregnancy. It is believed that attitude influences behavior. In this study the relationship between attitude and practices of nurses in promoting antenatal physical exercises was determined. Attitudes are developed over a lifetime and they are heavily influenced by family, past experiences, knowledge, experience, the quality of education about a subject, cultural or religious belief. Nurses' stereotyped perceptions and social prejudice had been shown to lead to marginalization. Due to these negative attitudes, nurses and other health care professionals may not respond therapeutically or professionally to individuals with antenatal exercise issues (Huges, 2008).

Duperly…et al.,(2009) replicated some aspects of the "Healthy Doctor = Healthy Patient" study in a sample of Colombian medical students, and even though the association between higher exercise levels and better attitudes towards exercises counseling was not statistically significant, the association was found for other health habits (better diet, not smoking, non–binge drinking) and related counseling. A relationship between attitude and practices of nurses in promoting antenatal physical exercises in tier 2 and 3 health facilities in Kakamega County, Kenya was sort in this study.

Evidence suggests that people with antenatal problems were reluctant to use health services for antenatal issues or other health problems for fear of reprisal by nurses (Vadlamudi, Adams, Hogan, Wu, & Wahid, 2008).

According to a study by Johansson…et al. (2010), doctors and nurses were the professional group with the least positive attitude to doing preventative work in health care. Many did not see exercise promotion to be a priority in practice or relevant to the consultation (Hébert…et al., 2012). There was need for change of attitude if the attitude towards beneficial events was negative like participation in exercise (Leijon…et al., 2010).

A research done among nurses, it was noted that they had limited knowledge about antenatal exercise and they held punitive and negative, rather than positive and supportive, attitudes towards their patients (Kath and Katic 2011).

Brug (2008) in his own view stated that researchers had recommended that motivational education techniques would have been useful in influencing personal belief and therefore support sustained attitude change.

In a qualitative study exploring women's experiences and the acceptability of antenatal walking groups, the bio-psycho-social approach to understanding the complexity of influences and views towards antenatal physical exercises in this population revealed that pregnant mothers had negative attitude. The findings were presented using the women's own words as indicated below;

"Apparently it makes it easier to shed the baby weight, that's a myth by the way … That's a myth, I've still no shed it four years later, that's a myth. They do say that if you exercise when you've had a baby it makes it easier to shed, but that's just a myth that is." (FG1: P2).

Another participant had this to say 'there's a little too much focus on the fact that, you know, you're pregnant, oh you can't walk, you can't…a very, kind of, can't nature' (FG4: P3).

This negativity towards antenatal physical exercises was also reflected in some of the information women received from health professionals such as midwives, physiotherapists and health visitors, which tended to be focused on 'don't do this, don't do that, don't do this' and tended to make womenless receptive to many health messages (Currie…et al., 2016).

In another study, health professionals may also perpetuate myths: '' not a good idea to be swimming from 36 weeks onwards, if your waters break while you're in the pool, there is chance of infection.'' (Cioffi…et al., 2010).

In a Nigerian study among pregnant women, in terms of attitude towards exercise, only 16% had a negative attitude towards exercise in pregnancy. This gives health care providers an opportunity to utilize exercise as an adjunctive therapy to many health conditions, including gestational diabetes (Mbada, Adebayo, Adeyemi, Arije, Dada, Akinwande, Awotidebe, & Alonge, 2014).

2.5 Nurses'/midwives level of practice in promoting antenatal physical exercises

The BBC English Dictionary (2011) explained that something people did regularly or the way in which they did it could be referred to as practice. An individual's habits towards something were influenced by his/her knowledge and attitude of that particular thing (Ryan, 2009). In this study therefore, practice of antenatal physical exercises refers to means and ways of encouraging antenatal mothers to participate in physical exercises. Questions were asked to find out if they engaged in any form of antenatal physical

exercises, standard operating procedures, monitoring and reporting levels and any job aids on antenatal physical exercises. Many interventions have aimed to address physical exercises in pregnancy however, the experiences of facilitators of antenatal physical exercises for women is under-investigated. It is important to explore and understand the barriers to antenatal physical exercise engagement for these women in order to adequately develop interventions relevant to their beliefs, barriers, facilitators and circumstances. Likewise to this study the relationship between knowledge, attitudes and practices of nurses in promoting antenatal physical exercises was determined.

A study conducted on junior doctors in the UK found that only 21% met accepted exercise recommendations, much lower than the national average. This means that 21% of the group undertook at least 30 minutes of moderate exercise (3-6 metabolic equivalents (METs) at least 5 times/ week. A clinician's participation in exercise not only benefits their own health, but also makes their endorsement of an active lifestyle more credible (Gupta and Fan, 2009).

The Kenyan curriculum for nurses of all educational level for example the Diploma nurses is not specific when it comes to antenatal physical exercises prescription. The various antenatal physical exercises have been stated but the intensity, measurements before, during and after the exercises are not clear. This means the standard operating procedures are inadequately addressed. (NCK, Diploma curriculum 2019)

Another obstacle that prevents nurses from prescribing exercise to their clients is the health worker's own exercise regimen (Phillips & Roy, 2009). Being involved in a healthy behaviour is the most reliable and powerful predictor of nurses advising clients about related prevention issues (Shahar, Henken & Rozen…et al., 2009). Health care

providers should partake in an active lifestyle to familiarize themselves with the issues involved and model active behaviour for clients and the public. Nurses'/midwives who embraced active lifestyles themselves were often vocal promoters of exercise and translated their beliefs, attitudes, and behaviours to their clients (Phillips & Roy, 2009).

Pharmacological treatment was traditionally touted for treating for lifestyle-related diseases (Persson…et al., 2013). Patients expected quick treatment and doctors found out that even when they recommended treatment with exercises, the patients often asked for medicine (Persson…et al., 2013). In this study there were open-ended questions for the nurses to indicate the barriers in promoting antenatal physical exercises in tier 2 and 3 health facilities in Kakamega County.

On the other hand, a study by Leijon, Stark-Ekman, Nilsen…et al (2010) found out that three out of four (76%) patients thought that nurses had a responsibility to encourage exercises among patients. In order to succeed, health care providers needed exercise equipment and processes to back exercise assessment and counselling (Joy…et al., 2012).

A study done in Ethiopia on Level of antenatal physical exercise and associated factors during pregnancy among women who gave birth in Public Zonal Hospitals of Tigray, showed that primiparous women were 7.68 times more likely to be inactive as compared to multiparous women. In addition, those women with history of miscarriage had 8.05 times higher odds of becoming physically inactive during pregnancy as compared to those without history of miscarriage (Gebregziabher, Berhe, Kassa and Berhanie, 2017).

In a South African study by Muzigaba, Kolbe-Alexander & Wong (2014), to explore the perceived role and influencers of physical exercise among pregnant women from low

socioeconomic status communities. In terms of physical exercise, about 44% reported that they were currently not physically active and of the 56%, who reported engaging in physical exercise, 44% did light physical exercise and 12% did moderate physical exercise. All participants were generally aware of physical exercise in pregnancy and recognized the importance of being healthy during pregnancy. Self-reports are used typically in large epidemiological investigations but they lack precision both due to recall error and social desirability bias (Gaston and Cramp, 2011). The checklist in this study investigated exercise prescription whether written or oral.

A lack of specific information or guidance on how to manage pregnancy related conditions left some women unsure if exercise may be helpful.

I don't know, when I got told that I basically couldn't do nothing [due to pelvic girdle pain], my life stopped. The only time I exercised is when I walked from the taxi to the physio department and back, that was the only time I really done anything…. they didn't tell me if there was stuff I could actually do, so basically I sat and ate and that was it, sat on the couch and ate with the feet up. What else was I meant to do?" (FG1: P2)

Research indicates that under study conditions, a dedicated midwife who spends time with women explaining antenatal physical exercise intervention enhances understanding and therefore participation however this may need to be adapted for incorporation into routine antenatal care (Currie…et al., 2016).

While exercise was seen as 'a good thing', most women admitted becoming less active during their first and subsequent pregnancies in comparison with pre-pregnancy exercise levels and while many said they planned to be active, this often just 'didn't happen.

Previous interventions have attempted to address known barriers to antenatal physical exercises such as availability of facilities and social support, through group exercise

classes or to enhance knowledge through educational programmes . However, there has been little research into what the health professionals know, believe and practice to support antenatal physical exercise uptake throughout pregnancy (Currie…et al., 2016).

CHAPTER THREE

MATERIALS AND METHODS

Overview

This chapter describes the methodology which was used to determine the knowledge, attitude and practice of nurses'/midwives in promoting antenatal physical exercises during in tiers 2 and 3 health facilities in Kakamega County, Kenya.

3.1 Study area

The study sites were the tiers 2 and 3 private and public health facilities in Kakamega County, Kenya. The study sites were selected because Kakamega County is one of the leading Counties in terms of neonatal (0.03%) and maternal (0.4%) mortality rates, UNFPA, 2018. Only 67% of deliveries in the County are skilled and this mainly occur in tiers 2 and 3 health facilities. In Kakamega County the Maternal deaths accounts for 316:100,000 live births, (UNFPA, 2018) compared to a target of <147:100,000 live births according to the sustainable development goals.

Table 3.1: Kakamega County statistics (Source: DHIS2 2019)

Indicator	2016	2017	2018	2019
Normal Deliveries	40166	34918	41573	41695
Caesarian sections	2700	2946	3285	3642
Breach Delivery	468	347	417	408
Assisted vaginal delivery	229	123	64	262
Pre-term babies	998	1253	1703	1984
Fresh still births	451	394	435	464
Macerated still Birth	385	383	458	388
Neonatal deaths	397	230	490	505

3.2 Research design

A descriptive, cross-sectional design was used to determine the level of nurses'/midwives knowledge, attitudes and practices (KAP) as well as to identify the possible relationships between knowledge attitude and practice in promoting antenatal physical exercises.

3.3 Study population

The population of interest for this study comprised of the 480 nurses/midwives involved in clinical practice in tiers 2 and 3 private and public health facilities within the Kakamega County (Personnel Data base at Kakamega County).

3.3.1 Inclusion criteria

Nurses'/midwives working at hospital tiers 2 and 3 private and public health facilities in Kakamega County. Those who were (EN), registered (KRN/KRCN), BScN, MScN and

other nurses'/midwives. The nurses'/midwives who were deployed in antenatal clinics, maternity or who had ever worked in antenatal clinic and maternity. Lastly nurses'/midwives who voluntarily gave consent to participate in this study.

3.3.2 Exclusion Criteria

Nurses'/midwives who were on maternity, sick and annual leave during the period of study. All antenatal clinics nurses'/midwives who declined to participate in the study. Antenatal care nurses'/midwives who were not involved directly in immediate patient management such as those permanently deployed in radiology, minor theatre and the like.

3.4 Study variables

3.4.1 Dependent variables

Dependent variables considered were perceived as nurses' knowledge, attitude, and practices as pertains to antenatal physical exercises.

3.4.2 Independent Variables

Independent variables considered were demographic characteristics (gender, age), professional level qualification, experience and training.

3.5 Sampling design

3.5.1 Sampling techniques

The investigator used multi-stage sampling technique. Purposive sampling to include the County Hospital, since it is the only tier 3 hospital in the study catchment population. Systematic random sampling was used to select all public Sub-County and private hospitals to be included in the sample population. In this method of sampling, the first

unit of the sample selected at random and the subsequent units were selected in an orderly manner. A list of all the private and public tier 2 level hospitals was arranged in alphabetical order, 5 out of 10 Sub-County public hospitals and 1 out of 2 private hospitals were selected. Every 2nd member in the population frame was selected for inclusion in the sample.

Finally, proportionate probability sampling was used to select the participants in the 7 antenatal clinics. Within each of these tiers 2 and 3 private and public health facilities (clinics), sample frames of the study participants were recruited in collaboration with the nursing managers. The target population was divided into different homogenous strata, EN, registered (KRN/KRCN), BScN, MScN and other nurses'/midwives] and that each sub-group (strata) was represented in the sample in a proportion equivalent to its size in the accessible population. This was to ensure that each subgroup characteristics is represented in the sample.

Table 3.2: Multi-stage Sampling technique

TYPE OF HEALTH FACILITY	TIER	SAMPLING TECHNIQUE
County Hospital –Public	3	Purposive sampling
Sub-County Hospitals – Public	2	Systematic random sampling
Private Hospitals	2	Systematic random sampling
Subjects (Nurses'/midwives)		Proportionate probability sampling

3.5.2 Population sampling

Table 3.3: Sampling of the Institutions

Health Facilities	Tier	No Sampled	No. of Nurses	No. Sampled	Attritions	Total
County Hospital - Public (Total 1)	3	1	300	136	13	149
Sub-County public hospitals (Total 10)	2	5	80	36	4	40
Private Hospitals (Total 2)	2	1	100	46	5	51
Total		**7**	**480**	**218**	**22**	**240**

3.5.3 Sampling procedures

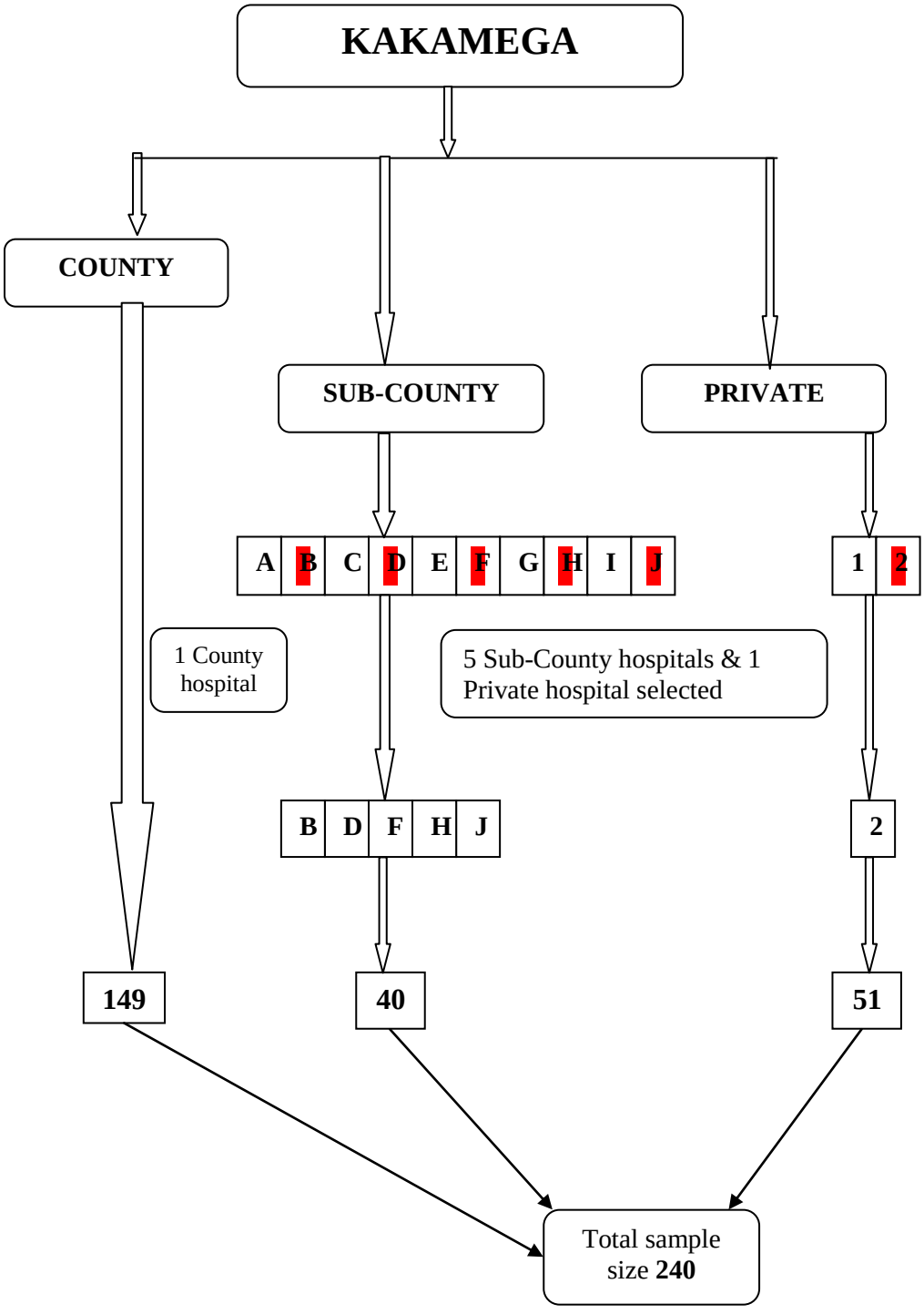

Figure 3.1: Diagrammatic presentation of sampling procedures for the study

3.6 Sample size determination

The sample size was calculated using Taro Yamane (1967) formulae cited by Singh & Masuku (2014) since the study population was known.

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

Where:

n = is the sample size

N = is the population size

e = the acceptable sampling error

- Population of nurses' in Kakamega County:480
- Level of precision:±5%; (e = 0.05)

Using the formula:

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

$$N = \frac{480}{1 + 480 (0.05)^2}$$

$$n = \frac{480}{1+1.2}$$

$$= 218$$

Sample size = 218

Attrition rates - 10/100*218 -22

Total sample = 218+22

The minimum sample size = **240 nurses'/midwives**

3.7 Data collection Instruments

The study used questionnaires and observational check list to collect data from the respondents. Primary data was gathered directly from the nurses'/midwives working at

tiers 2 and 3 private and public health facilities using questionnaires while secondary data was collected using observational checklist. The data was collected between August and November 2018.

A questionnaire was preferred in this study to help gather as much information as possible. An overt observational check list assisted in establishing the exact practices at the antenatal clinics in terms of antenatal exercises.

3.7.1 Questionnaire

The questionnaire was divided into two parts and comprised of the following sections:

Section 1: Socio-demographic data

There were six questions in this section, on gender, age, professional level, clinical experience (length of time worked) in antenatal clinics, maternity and whether they received any in-service trainings on antenatal physical exercises.

Section 2: Nurses' knowledge on promoting antenatal physical exercises

There were nine questions in this part, which interrogated the knowledge of nurses on the different type of antenatal physical exercises, benefits, effects on the fetus and mother associated, awareness of policies, procedures or operational directives, assessment of whether a pregnant woman adheres to recommended antenatal physical exercises or not, major barriers/ hindrances to successful implementation of antenatal physical exercises.

Respondents answered a total of nine closed-ended questions. Each response was given a mark based on the level on the 5-point Likert scale with the anchors being Disagree=1 to Agree=3 and vice versa for questions that were reverse coded. Scale scores were computed by adding responses to the nine questions resulting in a minimum possible

score of 9 and a maximum of 27. The score was classified into 2 levels according to the Blooms' (1956) cut off point as follows: good knowledge (above 60%) 17 or more score while poor Knowledge (Below 60%) 16 or less score

Section 3: Nurses' attitude in promoting antenatal physical exercises

This part included the attitude of nurses in promoting antenatal physical exercises. There was a total of twelve questions; one open ended question and eleven positive statements on a 5-point Likert scale to provide ordinal data to enable the researcher evaluate on a continuum the various phenomena of interest of the study. The rating scale was measured as follows: Strongly agree -5, Agree- 4, Undecided -3, Disagree - 2 and Strongly disagree - 1.

The scores ranged from 9 to 45 and all individual answers were summed up for total and calculated for means. The score was classified into 3 levels thus ranged between 36 - 45 scores (80%-100%) for positive attitude, 27 - 35 scores (60%- 79%) for neutral attitude and 09 - 26 scores (Less than 60%) for negative attitude).

Section 4: Practices of nurses in promoting antenatal physical exercises

Thirteen questions were included in this part. One question was designed to test the competence of nurses'/midwives' skills of promotion of antenatal physical exercises, four positive statements on general advice given during pregnancy with Likert scale options of choice ranging from strongly agree to strongly disagree. The rating scale was measured as follows: Strongly agree -5, Agree- 4, Undecided - 3, Disagree - 2 and Strongly disagree - 1.

Seven questions were on exercise prescription and one open ended question asking about major interventions required for the successful implementation of antenatal physical exercises in their working areas (health facility).

Hence the scores in measuring the practice of nurses towards antenatal physical exercise provision and its treatment management were varied from 0 to 16, and were classified into 3 levels according to the Bloom's cut off point, 60-80% (Bloom 1956). The levels of practice were: 12 - 16 scores (80-100%) for good practice, 9 - 11 scores (60-79%) for fair practice and 0 - 8 scores (Less than 60%) for poor practice.

3.7.2 Observational checklist

The focus of the observation was to determine actual practice of nurses'/midwiveson how they apply their knowledge and skills on promoting antenatal physical exercises. An overt observational checklist adopted from WHO was used to objectively assess what the nurses'/midwives do in terms of antenatal physical exercises. The researcher observed the hospitals' environment, documentation of antenatal physical exercises using registers; the standard operating procedures on antenatal physical exercises; exercise prescription to patients as a therapeutic modality; health promotion practices; Space in the clinic or special rooms, offices for antenatal physical exercise counseling and demonstration and the availability of equipment to support antenatal physical exercises (health facilities). This helped to expose any hidden information that may not be easily brought out by the questionnaire. A modified international checklist adopted from WHO was used (WHO, 2016).

3.7.3 Reliability

The split–half method was used to ascertain the reliability of the instrument. The completed instrument was given to two groups of Nurses at St. Elizabeth Hospital Mukumu the tier 2 private hospital that did not participate in the research and their responses were used to ascertain the reliability of the instrument. As a result, some appropriate corrective measures like; rephrasing and reordering of question items, adding more relevant questions and removing less relevant, was done. Cronbachs alpha test was also done to further verify reliability of the questionnaire which was at 0.7.

3.7.4 Validity

The questions were based on information gathered during literature review and experts' feedback i.e. nurses'/midwifery managers and three lecturers in the Department of Health Promotion & Sports Science, Masinde Muliro University of Science and Technology.

In the study, the questionnaires were administered on a small group of respondents i.e. ten (10) nurses' selected randomly from a tier 2 private health facility (St. Elizabeth Hospital Mukumu) who did not form part of the study to help validate the information collected. Recommendations were made regarding instructions, content and layout.

3.8 Data management and analysis

Descriptive statistics namely the mean, standard deviation and frequency distributions were used to describe the characteristics of the sample from which the data was collected and ANOVA was applied to test whether differences between variables was significant at a statistical significance value of 0.05 and 95% level of confidence. Inferential statistics of f-test was used to test the associations between the nurses'/midwives' level of

knowledge, their attitudes and actual practices of antenatal physical exercises. Data was fed into computer, cleaned and analyzed using Statistical Package for Social Sciences software (SPSS version 25.0). Results were presented in forms of graphs and tables.

3.9 Logistical and Ethical Considerations

3.9.1 Autonomy

Autonomy refers to the research participant's freedom of action and freedom of choice to take part in a study without coercion (McLeod, 2010). In the case of antenatal physical exercises, the researcher respected the "right of individuals (nurses'/midwives) to discontinue participation in research at any time, and be responsive to non-verbal indications of a desire to discontinue if individuals had difficulty in verbally communicating such a desire". Each nurses'/midwives had the right to make their own decisions based on their own beliefs and values.

3.9.2 Justice

Justice, implies that researchers need to be mindful of the social justice aspect of their research activities and give due recognition to the role of research to work in the interests of the oppressed, marginalized or minority groups (McLeod, 2010). In the study, all nurses'/midwives i.e. participants had a right to be treated fairly and equitably.

3.9.3 Respect

Respect in research practice denotes the confidential and respectful nature of research and the need for "loyalty, reliability, dependability and action in good faith" (McLeod, 2010). The purpose and execution of the research study was communicated honestly and accurately, in a straightforward and open manner, and non-exploitative in terms of any

conflicts of interest to the nurses'/midwives as professionals. They were provided with information and an opportunity to make their own decisions regarding their care (e.g., informed consent).

3.9.4 Confidentiality

Information provided by the subjects was not publicly reported or made accessible to anyone else other than those involved in the research. The subject's information gathered from each individual was kept confidential and questionnaires did not bare names but codes.

3.9.5 Beneficence

The study may benefit the entire society including the participants in terms of policy formulations hence enhance antenatal physical exercises uptake. However, there were no direct benefits to the participants in terms of handouts.

3.9.6 Non-maleficence

Non-maleficence refers to the concept of 'doing no harm' and minimizing the risk of psychological, emotional, professional and personal damage (Cohen et al., 2011). This is also known as the 'costs/benefits ratio' dilemma which is defined as the balancing of likely social benefits accrued from the research against the personal costs to the individuals taking part (Cohen…et al., 2011). The study participants were not subjected to any harm neither was the study intended to harm anybody.

3.9.7 Informed consent

In order to receive consent, the researcher provided each individual participant with sufficient understandable information regarding his/her participation in the research project. This includes information on the purpose of the study, its objectives, as well as the dissemination of results. Participants had the power of free choice, enabling them to consent voluntarily to participate in the research or to decline participation at any time, without fear of reprimand. Participants were asked to sign a consent form (see appendix VI).

Permission to conduct the research was requested from the following authorities:

The Ethics and Research Committee (ERC) of Masinde Muliro University of Science and Technology. National Commission for Science, Technology and innovation (NACOSTI). The County Government of Kakamega, the Medical Superintendent of tier 3 County Hospital, the Hospital administrators at tiers 2 public and private health facilities in Kakamega County, Kenya. The researcher also adhered to the principles of scientific integrity and honesty. All sources used in the study were acknowledged.

CHAPTER FOUR

RESULTS

4.1 Introduction

This chapter presents the findings of the study collected from health institutions in Kakamega, Kenya on knowledge, attitude, and practice of nurses in promoting antenatal physical exercises in tier 2 and 3 health facilities in Kakamega County. The data for this study was collected through questionnaires and observation check list from healthcare professionals working in public and private health facilities. This chapter provides a detailed description of the results obtained from the data analysis of the survey. Results are described as simple percentages, means, and standard deviations as appropriate depending on the nature of the variable. The data was collected over 3 months period and the analysis was conducted using SPSS data software. The chapter is organized by preliminary analyses conducted to check for outliers and evaluate the assumptions of normality and homoscedasticity. The analytical strategy and subsequent findings from the analyses are then presented. It starts with the demographic data followed by the responses for each section of the questionnaire.

4.2 Reliability analyses

The researcher conducted a reliability analysis for the knowledge, attitudes and practices, subscale of the questionnaire to assess consistency in response in these subscales. Cronbach's alpha for the 9-items knowledge scale was $\alpha = .735$. Regarding the attitudes subscale, which had a total of 10 items, Cronbach's alpha was $\alpha = .697$.Regarding the practice subscale, which had a total of 10 items, Cronbach's alpha was $\alpha = .740$. These

three Cronbach's alpha values indicated that the scale generated reliable scores for the current sample are shown in table 4.1.

Table 4.1: Reliability test scores

Subscale	No. of Items	Cronbach's Alpha
Knowledge	9	0.735
Attitude	10	0.697
Practice	10	0.740

4.3 Questionnaire Response Rate

Out of the 240 respondents, 209 successfully filled the questionnaire and returned. This represented a response rate of 87%. Out of the 240 questionnaires a few were incomplete in some of the survey questions and were not included. According to Burns & Grove (2011), subjects must be excluded from the analysis when data considered essential to that analysis are missing.

4.4 Demographic characteristics of respondents

The study asked the respondents to indicate their background characteristics based on their professional level, gender, facility type, age bracket, and working experience. The summary of their responses is given in table 4.2. Findings in table 5reveals that most 126 (60.3 %) were females while 83 (39.7%) were male. This implied that the majority of health workers in health institutions in Kakamega County are female as opposed to male. Results on their professional level revealed that 165(78.9%) were Diploma holders, 37 (17.7%) were Degree holders, 3 (1.4%) had a Masters' Degree, while 4(1.9%) were others (4 PHD Nurse students). Distribution of age bracket showed that majority 114

(54.5%) were aged between 26-35 years. The working experience statistics showed that majority 112 (53.6%) had worked less than one year.

Table 4.2: Background characteristics of respondents

		Frequency	Percent
Professional Level	Nurse Diploma	165	78.9%
	Nurse Degree	37	17.7%
	Nurse Masters	3	1.4%
	Others	4	1.9%
	Total	**209**	**100.0**
Gender	Male	83	39.7%
	Female	126	60.3%
	Total	**209**	**100.0**
Facility type	Public	158	75.6%
	Private	51	24.4%
	Total	**209**	**100.0**
Age bracket	Below 25 years	34	16.3%
	26-35 years	114	54.5%
	36-45 years	39	18.7%
	Over 46 years	22	10.5%
	Total	**209**	**100.0**
Experience	Less than 1 year	112	53.6%
	1-3 years	67	32.1%
	3-5 years	16	7.7%
	More than 5 years	14	6.7%
	Total	**209**	**100.0**

From the figure 4.2 the results show that all the respondents were professionally trained nurses. Majority of the respondents were females 99 (60%) with Diplomas, 23 (62.2%)

with Degrees,1 Masters (33.3%) and 3 (75%) were others. This variable was studied because professional level greatly influences the quality of a nurse, those with higher qualifications are found more flexible and resourceful than those with inferior qualifications.

Furthermore the results in the table 4.2 can be more illustrated by the figure 4.1:-

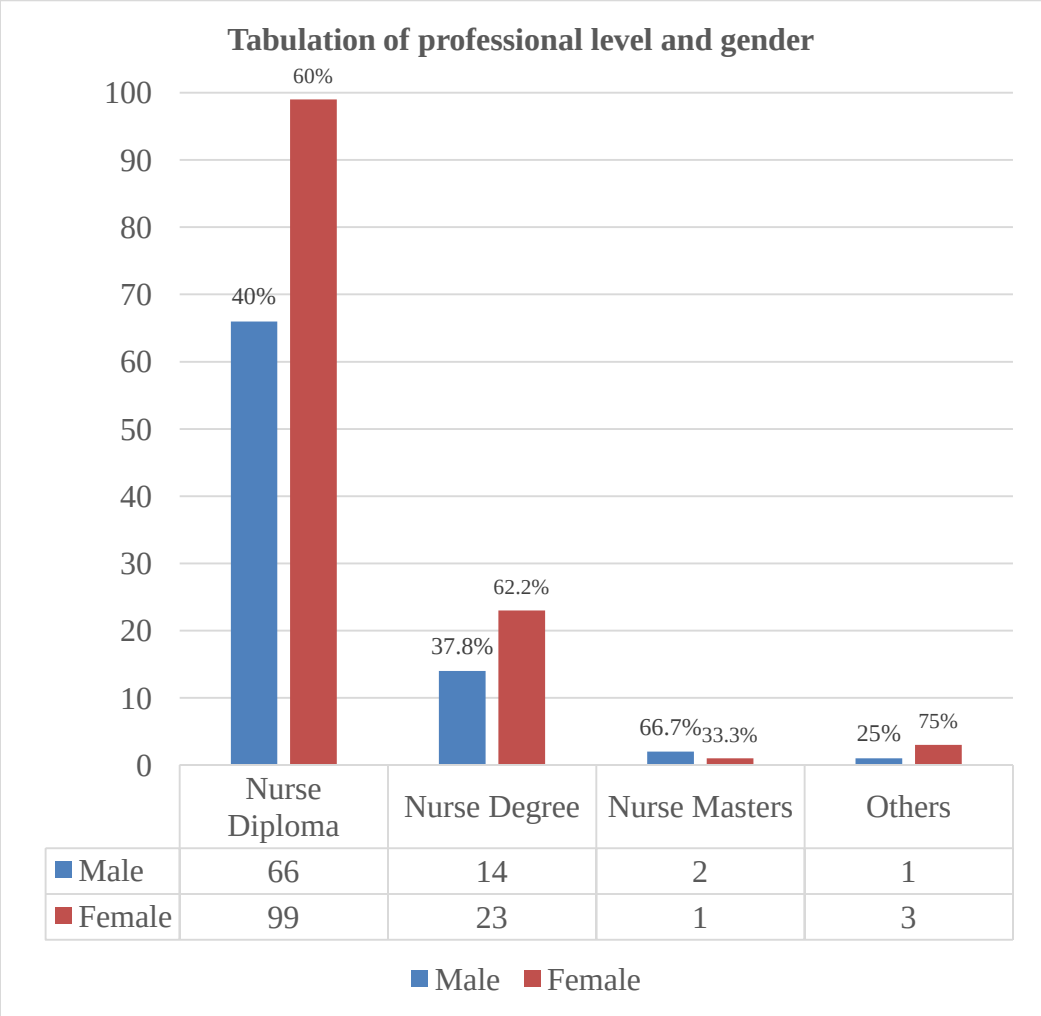

Figure 4.1: Tabulation of professional level and gender

4.5 Nurses' knowledge level in promoting antenatal physical exercises

Table 4.3 shows the nurses' knowledge level of antenatal physical exercises. Of the 209 respondents, 114(54.5%) said that they disagreed exercise reduced risk of back pain during pregnancy. Results showed that, of the 209 respondents, majority 103 (49.3%) agreed that exercise causes more rapid postnatal recovery, thus, the nurses were aware that antenatal physical exercises improves postnatal recovery. The results showed that from the 209 respondents, 108(51.7%) disagreed about knowing different types of antenatal physical exercises.

The results showed that from the 209 respondents, 113(54.1%) agreed that exercising strengthens pelvic floor muscles in pregnancy. From the 209 respondents, 107(51.2%) disagreed on knowing the ACOG 2017 guidelines or WHO 2018 or Kenya National guidelines for antenatal physical exercises. One hundred and forty- three (68%) Nurses stated that antenatal physical exercises causes vaginal bleeding. Eighty-six Nurses (41.1%) disagreed that exercise caused premature labor during pregnancy. The results showed that, of the 209 respondents, 137 (65.6%) disagreed that exercise caused uterine contractions during pregnancy as shown in table 4.3.

Table 4.3: Knowledge levels on benefits and contraindications of antenatal physical exercises (N=209)

	Disagree		Undecided		Agree	
Variable	Count	Row N %	Count	Row N %	Count	Row N %
Exercise reduce risk of back pain during pregnancy	114	54.5%	23	11.0%	72	34.4%
Exercise causes more rapid postnatal recovery	65	31.1%	41	19.6%	103	49.3%
I know different types of antenatal exercises	108	51.7%	8	3.8%	93	44.5%
Exercising strengthens pelvic floor muscles in pregnancy	90	43.1%	6	2.9%	113	54.1%
I know ACOG 2017 guidelines or WHO 2018 guidelines or Kenya National guidelines on antenatal exercises	107	51.2%	17	8.1%	85	40.7%
Exercise causes vaginal bleeding during pregnancy	143	68.4%	16	7.7%	50	23.9%
Exercise causes premature labour during pregnancy	86	41.1%	68	32.5%	55	26.3%
Exercise causes abdominal pain during pregnancy	95	45.5%	14	6.7%	100	47.8%
Exercise causes uterine contractions during pregnancy	137	65.6%	27	12.9%	45	21.5%

From the results, majority of the health care professionals had poor knowledge of antenatal exercises 164 (78.5%) scoring 16 and below, while only 45 (21.5%) had good knowledge of antenatal exercises scoring 17 and more illustrated by (Figure 4.2)

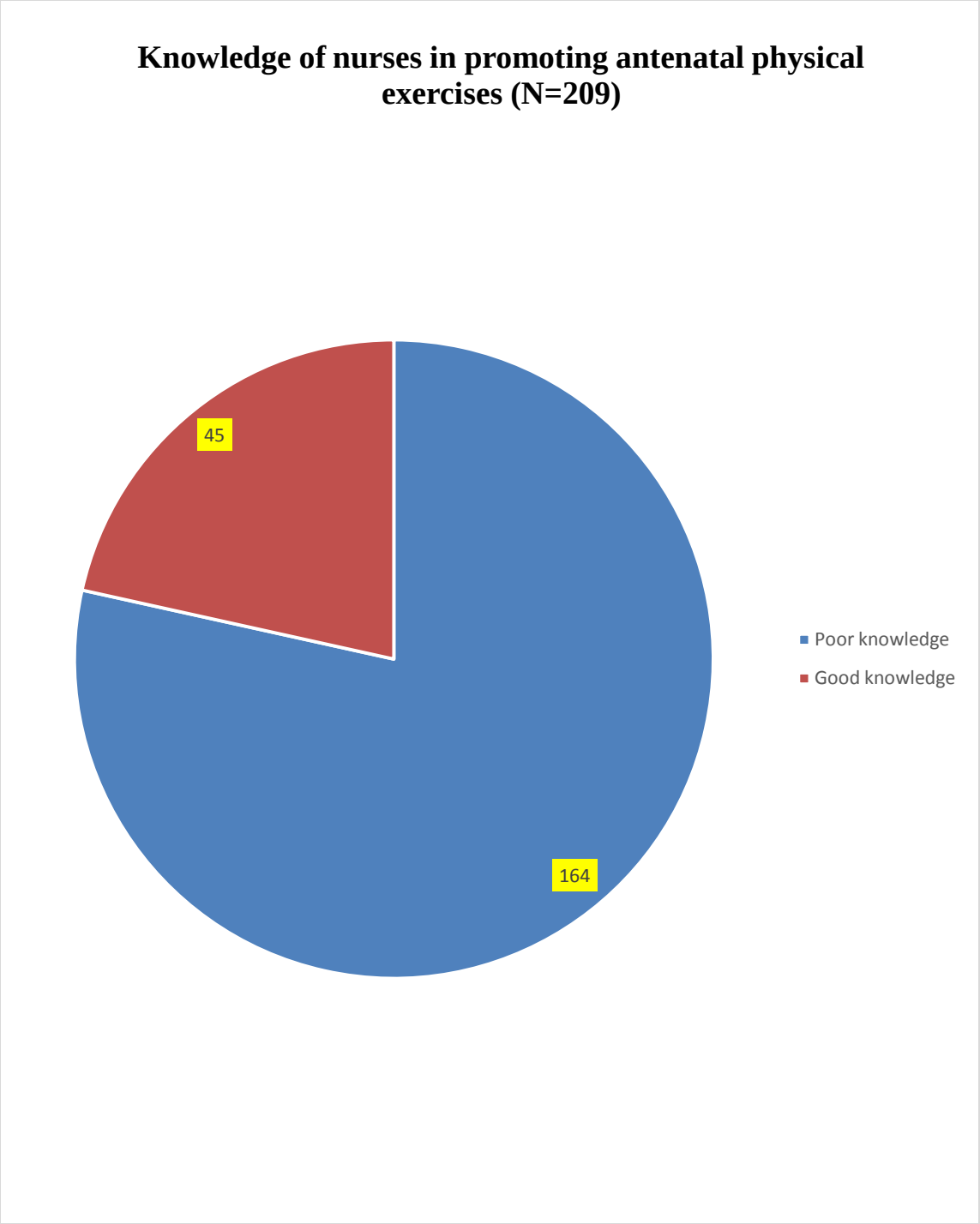

Figure 4.2: Nurses knowledge of antenatal physical exercises

Table 4.4: Descriptive Statistics on Knowledge of antenatal physical exercises

Knowledge Items	n	M	SD	Skewness	Kurtosis
Exercise reduces risk of back pain during pregnancy	209	1.8	.924	.411	.335
Exercise causes more rapid postnatal recovery	209	2.18	.880	-.001	-.431
Exercising strengthens pelvic floor muscles in pregnancy	209	1.98	.982	-.226	1.498
Exercise causes vaginal bleeding during pregnancy	209	2.44	.854	-.377	1.831
I know ACOG 2017 guidelines or WHO 2018 guidelines or Kenya National guidelines on antenatal physical exercises	209	1.89	.955	-.044	.948
Exercise causes premature labor during pregnancy	209	2.15	.810	-.604	-.627
Exercise causes abdominal pain during pregnancy	209	1.98	.968	.505	-.495
Exercise causes uterine contractions during pregnancy	209	2.44	.825	-.732	.163

Note. M= Mean; SD= Standard deviation

4.5.1 First null Hypothesis in the study

The first Null hypothesis stated that:

H_0:1 There exist no significant differences in knowledge among nurses in promoting antenatal physical exercises in tier 2 and 3 health facilities in Kakamega County, Kenya.

The descriptive statistics associated with knowledge of antenatal physical exercises across the four professionals' groups are reported in Table 4.5. It was seen that the master's group was associated with the numerically smallest mean of knowledge of antenatal physical exercises (M=17.67 SD=1.53 CI=13.9-21.5) and the others group was associated with the numerically highest mean of knowledge of prenatal exercises (M=19.5 SD= 6.24 CI=9.6-29.4). In order to test the hypothesis that the professional level (Nurse Diploma, Nurse Degree, Nurse Master's and others) had an effect on knowledge of prenatal exercises, a between-groups ANOVA was performed.

Prior to conducting the ANOVA, the assumption of normality was evaluated and determined to be satisfied as the four groups distributions were associated with skew and kurtosis less than |-1.0| and |1.0| respectively (Howel, 2006; see table 9). Furthermore, the assumption of homogeneity of variances was tested and satisfied based on Levene's F test, F test (3, 205) = 1.433, p= .234.

The independent between-group ANOVA yielded a non- statistically significantly effect, F (3, 205) = .357, p = .784, η_p^2= .005. Statistical power was not adequate and was equal to .119. Thus, the null hypothesis of no significant differences in knowledge of antenatal physical exercises among nurses of different professional levels in Kakamega was accepted, and only 0.5% of the variance in knowledge was accounted for by group membership.

Table 4.5: Descriptive statistics for knowledge scores among nurses

Professional cadre	n	M	SD	CI 95%	Skewness	Kurtosis
Nurse Diploma	165	18.84	3.45	18.3-19.3	-.220	.258
Nurses Degree	37	19.32	3.46	18.2-20.5	-.0.48	.467
Nurses Masters	3	17.67	1.53	13.9-21.5	-.935	.589
Others	4	19.50	6.24	9.6-29.4	.238	.391

The null hypothesis was accepted ($p > 0.05$) leading to the conclusion that there exist no significant differences in knowledge of antenatal physical exercises amongst nurses in tier 2 and 3 health facilities in Kakamega County, Kenya.

4.6 Attitudes of nurses in promoting antenatal physical exercises

The results from table 4.6, showed that, 84 (40.2%) of the respondents agreed they had confidence in giving advice to clients on antenatal physical exercise. Eighty three (39.7%) agreed that they had confident in suggesting specific exercise programs, 101 (48.3%) agreed that discussing the benefits of antenatal physical exercise with clients is part of the nurse's role, 112(53.6%) agreed that suggesting to patients' ways to increase daily antenatal physical exercise is part of the nurse's role, 119 (56.9%) agreed that they can be effective in persuading some patients to increase antenatal physical exercise, 76 (36.4%) agreed that any amount of antenatal physical exercise is beneficial to health, 98 (46.9%) strongly disagreed that only vigorous/strenuous activity is beneficial to health, 94 (45%) agreed that behavior of nurses affects attitude of clients towards information

received, 94 (45%) agreed that nurses should be physically active to act as a role model for their clients. The results also showed that the respondents 60 (28.7%) agreed that they are complying with the, WHO, ACOG guidelines and the Kenyan National guidelines on diet and antenatal physical exercises.

Table 4.6: Attitudes of nurses in promoting antenatal physical exercises

	Strongly Agree		Agree		Undecided		Disagree		Strongly Disagree		110	
Variable	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %	Count	Row N %
Confident giving advice to pregnant mothers on antenatal exercise	58	27.8%	84	40.2%	25	12.0%	36	17.2%	6	2.9%	0	0.0%
Confident in suggesting specific exercise programs to pregnant mothers	49	23.4%	83	39.7%	26	12.4%	44	21.1%	7	3.3%	0	0.0%
Benefits of antenatal exercise nurse's role	87	41.6%	101	48.3%	9	4.3%	8	3.8%	4	1.9%	0	0.0%
Suggesting to pregnant mothers ways to increase daily antenatal exercises	74	35.4%	112	53.6%	12	5.7%	7	3.3%	3	1.4%	1	0.5%
Effective in persuading pregnant women to increase antenatal exercise	46	22.1%	119	57.2%	29	13.9%	9	4.3%	5	2.4%	0	0.0%
Amount of antenatal exercises beneficial to health of mothers	76	36.4%	72	34.4%	12	5.7%	29	13.9%	20	9.6%	0	0.0%
Only vigorous antenatal exercise is beneficial to health	18	8.6%	5	2.4%	12	5.7%	76	36.4%	98	46.9%	0	0.0%
Behavior of nurses affects attitude of pregnant mothers towards information received	83	39.7%	94	45.0%	16	7.7%	5	2.4%	11	5.3%	0	0.0%
Nurses should be active to act as a role model	80	38.3%	94	45.0%	16	7.7%	13	6.2%	6	2.9%	0	0.0%
Complying with Kenya National guidelines/recommendations for exercises	45	21.5%	60	28.7%	50	23.9%	40	19.1%	14	6.7%	0	0.0%

From the results, majority of the nurses had positive attitude towards antenatal physical exercises 205(98.1%) scoring 30 or more, while only 3(1.4%) had negative attitude towards antenatal physical exercises scoring 30 or less (Figure 4.3)

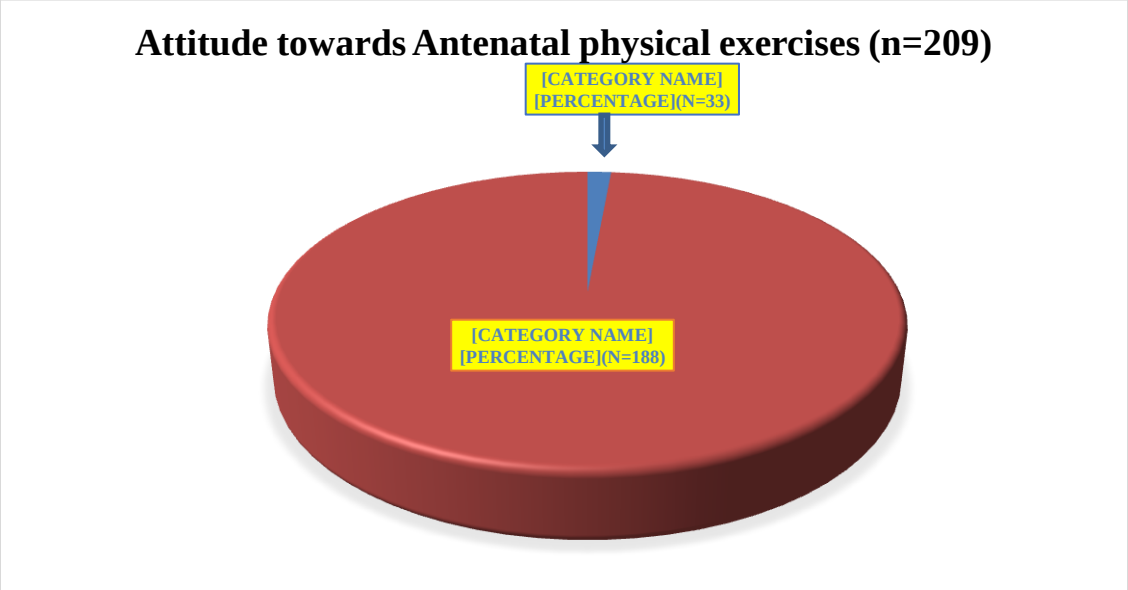

Figure 4.3: Attitude towards antenatal physical exercises

4.6.1 Second null Hypothesis in the study

The second null hypothesis stated that:

H_0:2 There is no significant differences in attitudes of nurses towards promoting antenatal physical exercises in Kakamega County. The descriptive statistics associated with attitude towards antenatal exercises across the four professionals' groups are reported in Table 10. It was seen that the Masters group was associated with the numerically highest mean of attitude towards antenatal physical exercises (M=15.92 SD=1.23 CI=11.9-20.4) and Nurses degree group was associated with the numerically smallest mean of attitude towards prenatal exercises (M=12.1 SD= 5.18 CI=10.3-13.7).

In order to test the hypothesis that the professional levels (Nurse Diploma, Nurse Degree, Nurse Masters and Others) had an effect on attitudes towards antenatal physical exercises, a between- groups ANOVA was performed.

Prior to conducting the ANOVA, the assumption of normality was evaluated and determined to be satisfied as the four groups distributions were associated with skew and kurtosis less than |-1.0| and |1.0| respectively (Howel, 2006; see table 4.7). Furthermore, the assumption of homogeneity of variances was tested and satisfied based on Levene's F test, F test (3, 204) = 3.544, p= .734.

The independent between- group ANOVA yielded a statistically significantly effect, F (3, 204) = 74.12, p< .001, η_p^2= .225. Thus, the null hypothesis of no significant differences in attitude towards antenatal exercises among nurses of different professional levels in Kakamega was rejected, and 22.5% of variance in attitude was accounted for by group membership. Hochberg Posthoc test revealed that those with Masters differed significantly from those with Diploma, Degree and Others.

Table 4.7: Descriptive statistics for attitude scores among nurses

Professional cadre	n	M	SD	CI 95%	Skewness	Kurtosis
Nurse Diploma	165	13.21	5.83	12.3-14.1	-.870	.108
Nurses Degree	37	12.05	5.18	10.3-13.7	-.348	.797
Nurses Masters	3	15.92	1.23	11.9-20.4	-.935	.589
Others	4	14.50	2.08	11.1-17.8	.528	.612

***Note*. M= mean; SD = standard deviation; CI = confidence interval**

The null hypothesis was rejected ($p > 0.05$) leading to the conclusion that there exist significant differences in attitude towards antenatal physical exercises amongst nurses of different professional levels in Kakamega County, Kenya.

4.7 Level of practice of nurses in promoting antenatal physical exercises

Table 4.8 shows, out of the 209 respondents, 116 (55.5%) frequently tried to encourage as many clients as possible to increase their antenatal physical exercise, 81 (38.8%) evaluated their clients on antenatal physical exercises, 72 (34.8%) agreed that they only advised clients about antenatal physical exercise if it was linked to their presenting problem, 66 (31.6%) disagreed that they only discussed antenatal physical exercise if their client mentioned it.

Table 4.8: Nurses practices on antenatal physical exercises (N=209)

Variable	Response	Count	Table N %
Encouraging uptake of antenatal physical exercises	Strongly agree	62	29.7%
	Agree	116	55.5%
	Undecided	9	4.3%
	Disagree	18	8.6%
	Strongly disagree	4	1.9%
Seldom evaluate antenatal physical exercises	Strongly agree	40	19.1%
	Agree	81	38.8%
	Undecided	22	10.5%
	Disagree	49	23.4%
	Strongly disagree	17	8.1%
Only advise about antenatal physical exercises if linked to their problems	Strongly agree	45	21.7%
	Agree	72	34.8%
	Undecided	15	7.2%
	Disagree	53	25.6%
	Strongly disagree	22	10.6%
Only discuss antenatal physical exercise if pregnant mothers mentioned it	Strongly agree	37	17.7%
	Agree	44	21.1%
	Undecided	16	7.7%
	Disagree	66	31.6%
	Strongly disagree	46	22.0%

From table 4.9, the results show that, 64 (30.6%) said pregnant mothers are seldomly asked questions about antenatal physical exercises, 111 (53.4%) never provided informational pamphlets on pregnancy and exercise, 65 (31.4%) seldom obtained exercise histories from pregnant mothers, 90 (43.3%) never gave each pregnant mother an individualized exercise programme for her to follow and 97(46.4%) seldom gave exercise prescriptions to pregnant mothers as a therapeutic modality. Generally, the practices on antenatal physical exercises were poor.

Table 4.9: Questions about antenatal physical exercises during pregnancy (N=209)

	Never		Seldom		Often		Always	
Variable	N	%	N	%	N	%	N	%
Nurses ask questions about exercises during pregnancy	57	27.3%	64	30.6%	61	29.2%	27	12.4%
Nurses Provide informational pamphlets on pregnancy and exercises	111	53.4%	43	20.7%	33	15.9%	21	10.1%
Nurses Obtain exercise history of pregnant mothers	65	31.4%	51	24.6%	58	28.0%	33	15.9%
Nurses provide Individualized exercise program to pregnant mothers	90	43.3%	43	20.7%	48	23.1%	27	13.0%
Routine exercise prescriptions to pregnant clients	34	16.3%	97	46.4%	78	37.3%	0	0.0%

Overall, the results showed that, out of the 209 respondents 187 (89.5%) said they verbally prescribed exercises to their patients.

From figure 6, the results reveal that out of the 209 respondents, majority of the nurses had poor practices of antenatal physical exercises 202 (97%) scoring 22 or less, while only 7(3%) had good practice of antenatal exercises scoring 23 or more (Figure 4.4).

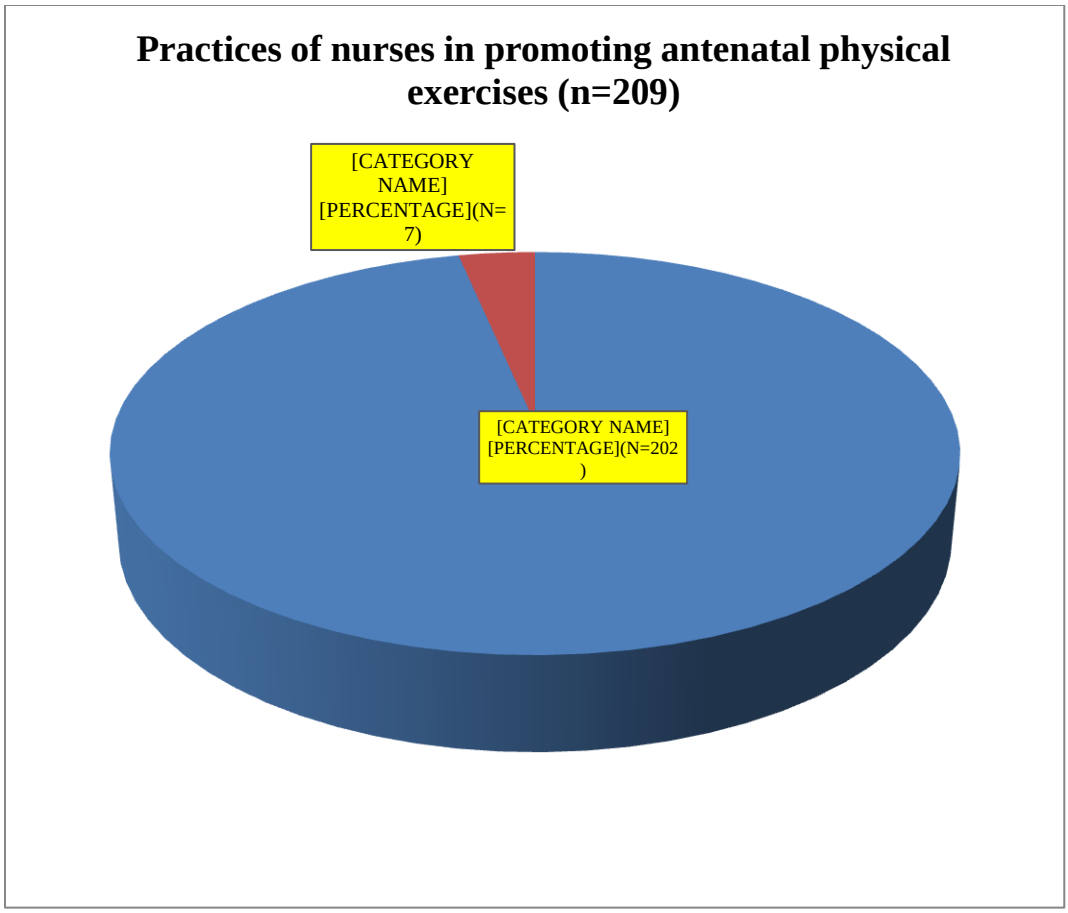

Figure 4.4: Practices of nurses in promoting antenatal physical exercises

4.7.1 Third null Hypothesis in the study

H_0:3 There is no significant relationship between practice of antenatal physical exercises and knowledge of antenatal physical exercises among nurses in tier 2 and 3 public and private health facilities in Kakamega.

To confirm whether the hypothesis was true or false, a correlation analysis was computed at 0.05 significance level. The results are presented in Table 4.10.

Table 4.10: Relationship between practice of antenatal physical exercises and knowledge

		Practice	Knowledge
Practice	Pearson Correlation	1	.156
	Sig. (2-tailed)		.026
	N	209	209
Knowledge	Pearson Correlation	.156	1
	Sig. (2-tailed)	.026	
	N	209	209

At 0.05 significance level, the third Null hypothesis was rejected r (209) = .156, p =.026. This led to the conclusion that there is a significant relationship between knowledge and practice with regards to promotion of antenatal physical exercises by nurses in tier 2 and 3 health facilities in Kakamega County. The effect size was calculated using the coefficient of determination (r^2) and only 2.4% of the variability in the practice could be explained by knowledge.

4.7.2 Observational checklist to assess the level of practice of nurses/midwives in promoting antenatal physical exercises

Practice was assessed by an overt observational check-list, thus nurses/midwives were informed that they would be observed before data collection took place. It was to assess the level of practice of nurses/midwives about antenatal physical exercises. The check-list

included the following themes: documentation of antenatal physical exercises using registers, the standard operating procedures on antenatal physical exercises, prescription of antenatal physical exercise as a therapeutic modality, health promotion practices in the clinic or special rooms like counselling and demonstration on antenatal physical exercise and availability of equipment to support antenatal physical exercises (health facilities environment). Each activity performed by the nurses/midwives denoted "YES" was rated by '1' score and not performed denoted "NO" was rated by '0' (WHO, 2016).

A total of 7 health facilities were visited during the study to assess the level of practice of nurses in promoting antenatal physical exercises. The results presented in table 4.11 shows that all the health facilities 7/7(100%) capture documentation of antenatal physical exercises using registers; there are no 7/7(100%) written standard operating procedures that support counseling on antenatal physical exercise in all the visited health facilities. Exercise prescription as a therapeutic modality is not practiced 7/7(100%). None 7/7(100%) of the health facilities provided space in the clinic or special rooms, offices for antenatal physical exercise counseling and demonstration. Lack of availability of health education materials i.e. pamphlets, videos that clients can read or see on antenatal physical exercise to promote their health behaviours were unavailable 7/7(100%) in the health facilities. The availability of equipment to support antenatal physical exercises session at the health facilities was poor hence inhibiting the full provision of antenatal physical exercises as they were not available 7/7(100%). Health promotion practices on ANC physical exercises were poor on overall, 1/5 themes (20%)=<60% a according to Bloom, 1957.

Table 4.11: Practices of nurses in promoting antenatal physical exercises in tier 2 and 3 health facilities in Kakamega County (N=7)

Variable	Questions	Response	Frequency (f)	Rating score	Percentage (%)
Practices	Are there registers to capture documentation of antenatal physical exercises?	No	0	0	0.0%
		Yes	7	1	100.0%
	Are there written standard operating procedures that support counselling on antenatal physical exercises?	No	7	0	100.0%
		Yes	0	1	0.0%
	Are there job aids to help in prescription of antenatal physical exercises?	No	7	0	100.0%
		Yes	0	1	0.0%
	Are there referral mechanisms where pregnant women are referred to for ANC physical exercise?	No	7	0	100.0%
		Yes	0	1	0.0%
	Any Community follow up on antenatal physical exercises at various centers like gyms?	No	7	0	100.0%
		Yes	0	1	0%
	Is there enough space in the clinic or special room for antenatal physical exercise counseling and demonstration?	No	7	0	100.0%
		Yes	0	1	0.0%
	Are there any pamphlets that pregnant mothers can read on antenatal physical exercises?	No	7	0	100.0%
		Yes	0	1	0.0%
	Any videos on antenatal physical exercise?	No	7	0	100.0%
		Yes	0	1	0.0%
	Are there any antenatal physical exercise prescriptions in place?	No	7	0	100.0%
		Yes	0	1	0.0%
	Is there availability of equipment to support antenatal physical exercise in pregnancy?	No	7	0	100.0%
		Yes	0	1	0.0%
	NOTE: Yes - 1	**NO - 0**			

5 THEMES

Documentation of antenatal physical exercises using registers; (1)

i. The standard operating procedures on antenatal physical exercises; (0)
ii. Antenatal physical exercise prescription to clients as a therapeutic modality; (0)

iii. Health promotion practices; Space in the clinic or special rooms, offices for antenatal physical exercise counseling and demonstration; (0)
iv. The availability of equipment to support antenatal physical exercises (health facilities environment) (0)

Some of the verbatims heard during the observations were as follows;

By the way what are we supposed to record under this column of antenatal physical exercises? (Nurse at Facility 1)

I just put a tick to make the register complete but I don't know what I need to indicate there. (Nurse at facility 2)

This column is part of the changes that were introduced in this new register, in the previous register it was not there. (nurse at facility 3)

There is no time for demonstration of this exercises to mothers, the ques are very long (nurse at facility 4)

Multiple regression analyses was conducted, utilizing the enter method, in order to test if knowledge and attitude significantly predicted nurses practice with regards to antenatal physical exercises. Regression model results indicated that a significant regression model was found and the two predictors knowledge and attitude of healthcare professionals, explained only 6% of the variance ($F [2, 207] = 2.23$, $p = .027$, $R^2 = .022$), equating to a small effect size. Regression analyses found that predictor variable knowledge ($\beta = .206$, $p = .036$) significantly predicted increased likelihood that participants would practice antenatal physical exercises to their clients. The coefficient of attitude was not a significant predictor in the model ($\beta = .006$, $p = .872$).

Table 4.12 shows the complete results from this multiple regression model.

Table 4.12: Multiple regression of knowledge and attitude variables (practice with regards to antenatal physical exercises)

	B	**SE b**	**b**	***P***
Constant	16.12	1.95		
Knowledge	.206	.098	.25	.036
Attitude	-.06	.035	-.04	.872

Note. Model 1 R^2 = .022.
*p <.05

CHAPTER FIVE

DISCUSSION

Overview

The chapter introduces the results of the study as they relate to the literature regarding knowledge, attitude and practice of nurses in promoting antenatal physical exercises in Kakamega County. The chapter also gives a comparison between studies reviewed on chapter two and the study results herein.

5.1 Nurse's knowledge in promoting antenatal physical exercises

Majority of the nurses (78%) had limited knowledge on antenatal physical exercises.

The current study noted that 84.1% of the respondents in both hospital categories were in agreement that nurses/midwives were in the best position to offer the best guide to antenatal physical exercises. This finding is in line with ACSM (2016) that noted that nurses often evaluate risk factors for cardio vascular disease during routine visits like the weight, height, blood pressure and pulse measurements.

Literature suggested that nurses sometimes thought that they were inadequately trained or experienced in prescribing antenatal physical exercise (Persson…et al., 2013). This study confirmed the same since majority (90%) indicated that they would like to be trained in antenatal physical exercise. A unique finding in this study was that those who had received some training on antenatal physical exercises, scored poorly on knowledge factors, p=<0001. There could have been inadequate understanding of a sensitization and training, sub optimal continuous medical education on antenatal physical exercises or practice affected memory. Health care providers were often aware that exercise was

mentioned as first-line treatment in guidelines for several diagnoses yet training in exercise prescription was lacking all over the world (Matheson…et al., 2011). Nurses who did not feel comfortable or competent to prescribe exercises were less likely to do so according to Johansson…et al., 2010 and Persson et al., 2013 which is a similar finding in this study. The trend of not prescribing exercise may partially have been attributed to a foundational flaw in Nursing curricula. A study in United Kingdom among pregnant mothers, they expressed fear of harm to either their baby ('it's so precious') or themselves ('your ligaments are all soft') was a major influencing factor and was compounded by a lack of specific guidance or information to assist antenatal physical exercises decision making. On Suggestions to improve uptake of antenatal physical exercises, mothers suggested provision of relevant information from a trusted source delivered face to face at the appropriate time. Women expressed that they would be most receptive to information on physical exercises during the second trimester of pregnancy, 'once the morning sickness has gone' and before they 'get too big, Currie…et al., (2016). This study confirmed the fears of the mothers as stated above, they lacked specific guidance on antenatal physical exercises; similarly the findings in this study revealed that 55% of the nurses disagreed exercise reduce risk of back pain during pregnancy.

Many women actively sought information from books, television, and Web sites in order to guide their physical activity behavior: ''There's a lot of mixed information out there. a lot of Web sites say you shouldn't be doing, for example, aerobics.'' Health professionals sometimes have different opinions.'' (Cioffi…et al, 2010). On the question whether antenatal physical exercises strengthen pelvic muscles, 43% of the nurses disagreed, 54% agreed with about 3% not sure. Sixty-six (66%) of the nurses agreed that exercises causes

uterine contraction. These examples show how easy it is for women to receive inconsistent or conflicting information hence they become confused and discouraged about antenatal physical exercise.

In a study conducted by Groth and Morrison-Beedy (2013) to assess the views of low income, pregnant African American women on physical exercise and diet, factors influencing physical exercise in pregnancy were misconceptions about physical exercise in pregnancy, lack of knowledge about which activities to undertake. Similarly in this study, 52% of the nurses disagreed that they knew various antenatal physical exercises with only 45% agreeing to be knowing them.

A study that looked at knowledge and attitude towards physical exercise in pregnancy in Zimbabwe revealed that participants had some knowledge about types of exercise and some benefits and contraindications to antenatal exercise. Forty eight (48%) had below average knowledge, 5.82% had average knowledge while 46.6% had good knowledge of antenatal physical exercises. Almost half of the participants had below average knowledge. This in itself might be a barrier to performance of physical exercise during pregnancy (Mukona…et al., 2016). In this study, only 22% of the nurses were knowledgeable on maters antenatal physical exercises and also in another study done among antenatal mothers, the knowledge of women on exercise during pregnancy was less than average (Sujindra, Bupathy, Suganya & Praveena, 2015). All women should be aware of warning symptoms that may develop during physical exercise, and advised to stop the exercise and seek medical advice should they occur. Exercise forms only one component of a healthy lifestyle. A nutritious diet, adequate hydration, and abstinence

from smoking, alcohol and illicit drugs are crucial in maintaining optimal health during pregnancy (Horak and Osman, 2012).

Contrarily to a study among final year medical students in Scottish Universities whom 52% were confident about giving exercise advice, (Dunlop & Murray, 2013). Similarly, a study conducted in South Africa by Barsky…et al., (2012) among pregnant women were found to be knowledgeable. Most of the respondents agreed that exercise in pregnancy would lead to reduction in the risk of back pain (75%), prevention of excess weight gain (69.1%) and increased ability to cope.

In another study on knowledge, attitude and practices of exercise among expectant women from selected health facilities in Kakamega County Kenya, among 306 pregnant women revealed that the knowledge of different antenatal physical exercises and their benefits was inadequate. There was a strong association between education level and knowledge of antenatal physical exercises, p=0.02, (Sabiri…et al., 2018). In this study, the other nurses (PHD Nurse students) exhibited higher knowledge levels with a mean of >19.5.

It is therefore important for each medical practitioner to understand the different physiologic effects and benefits of different forms of exercise to be able to guide each client to the best regimen (Katz, 2012).

5.2 Nurses attitude towards promoting antenatal physical exercises

In this study, majority of the nurse had a good attitude towards antenatal physical exercise (98%). More than 60% of the nurses were confident in suggesting specific antenatal physical exercises programs. One hundred and twelve, (53.6%) agreed that

suggesting to antenatal mothers ways to increase daily exercises is part of nurses roles, this is in line with the study by ACSM (2016) that found out that Nurses often evaluate risks factors associated by clients. The current study sought to find out the effectiveness of nurses in persuading pregnant mothers to increase exercise, 119 (56.9%) were persuasive towards ANC physical exercises. Any amount of exercise is beneficial to health, 76 (36.4%) agreed that any amount of antenatal physical exercise is beneficial to health while 98 (46.9%) strongly disagreed that only vigorous/strenuous exercise is beneficial to health. To find out if the behavior of nurses affects attitude of clients towards information received, 94 (45%) of the nurses agreed, similarly in a study by Currie…et al., (2016) many women sourced their information from friends, family and occasionally via the internet. The negative attitudes of others put some women off.

According to Baur, Broman & Pivarnik (2010), healthcare providers should be aware of recommendations for exercises but this will be highly influenced if they engaged in exercises, similarly the current study showed that 174 (80%) were in agreement that Nurses should be active to act as a role models in the prescription of exercise to the antenatal mothers. This study had similar findings to one done by Mukono…et al (2016) in terms of attitude to exercise; only 16% had a negative attitude towards exercise in pregnancy. This gives health care providers an opportunity to utilize exercise as an adjunctive therapy to many health conditions, including gestational diabetes.

Contrarily to a study by Currie…et al., (2016) that explored perceptions of pregnant women on antenatal physical exercises, some had very negative attitudes and uttered statements like;

'There's a little too much focus on the fact that, you know, you're pregnant, oh you can't walk, you can't…a very, kind of, can't nature' (FG4: P3).

This negativity towards antenatal physical exercises was also reflected in some of the information women received from health professionals such as midwives and physiotherapists which tended to be focused on 'don't do this, don't do that, don't do this' and tended to make women less receptive to many health messages (Currie…et al.,2016).

In another study that contradicted this one ,it was found that health professionals may also perpetuate myths: ''the midwife said it was not a good idea to be swimming from 36 weeks onwards, if your waters break while you're in the pool, there is a chance of infection, (Cioffi…et al,2010).

5.3 Nurses' practices on promoting antenatal physical exercises

The study revealed that promotion of antenatal physical exercises by nurses was sub optimal at only at only 3%. This was similar to a study by Currie…et al., (2016) that found out that while exercise was seen as 'a good thing', most women admitted becoming less active during their first and subsequent pregnancies (in comparison with pre-pregnancy exercise levels) and while many said they planned to be active, this often just 'didn't happen.

The confidence to prescribe exercise for antenatal mothers has been supported by extensive body of literature describing how HCPs can prescribe exercise (Hallal…et al., 2012)

When asked whether they practice the act of prescribing exercises, majority 62.9% refer them to a trainer. In a study by Currie…et al., (2016) when a midwife specifically recommended an exercise, some women described being more determined to go. Some made such statements below;

Yes because she said that so the minute I felt good, I thought, right I am going to do that and I remembered what she'd said. Whereas if she hadn't have pointed that out and I'd come across it in a leaflet, in amongst everything else I might not have. (FG2: P3)

On whether pregnant mothers ask questions about exercises during pregnancy 47% of the respondents answered Never this shows that some pregnant mothers may not be aware of the practices of antenatal physical exercises. During the discussions in the study by Currie…et al., (2016) among pregnant women practicing antenatal physical exercises it emerged that in addition to there being limited classes for pregnant women, there was also a lack of information about classes that did exist. Much of the information is passed 'by word of mouth', but women expecting their first baby were not linked into this social and informational network and did not access. Some women suggested they would welcome a leaflet. In this study, a gap of lack of issuance of pamphlets on antenatal physical exercises was evident, 53% stated that they Never provide informational pamphlets on pregnancy and exercise.

On routine exercise prescriptions to pregnant clients, more than 50% of nurses said they had never given a prescription and on monitoring,>80% depended on pregnant mothers self- report. Similarly, in the study by Currie…et al. (2016) it is was recognized that antenatal physical exercise is not a priority for health professionals providing antenatal care as there are many other important health messages and information to be delivered during routine visits. Other researches indicated that under study conditions, a dedicated midwife who spends time with women explaining a physical intervention enhances understanding and therefore participation however this may need to be adapted for incorporation into routine antenatal care. This was contrary to a study that showed that pregnant women were given an appropriate exercise prescription that encouraged them to participate in physical exercise (Colberg…et al., 2013).

In the current study, more than 50% of nurses' seldomly evaluated mothers for antenatal physical exercises with majority only advising about antenatal physical exercises if linked to pregnant mothers presenting complain. Cioffi…et al. (2010) in their study recommended that ANC Providers should increase women's awareness of the benefits of physical exercise in pregnancy; provide reassurance about safety concerns; and present options to women that can guide their incorporation of recommended exercise levels into their daily lives.

Among some of the reasons cited for those who do not prescribe antenatal physical exercises were; about 60% do not believe that exercise is as effective as medicine, 50% it takes up too much of their consultation time, 80% they did not feel confident in their knowledge to be able to prescribe it while 60% said clients expect medication to cure them not exercises. Irrespective of gender, age, professional experience, training in

exercise or training in antenatal physical exercise, the majority (90%) cited training as a major intervention required for successful implementation of antenatal physical exercise, followed by making antenatal exercise compulsory as a routine prescription for all expectant mothers. A bout 40% mentioned availing adequate staff and equipment to facilitate antenatal physical exercises with 10% citing client cooperation is required. In most cases, confidence comes with knowledge about the subject matter.

The observational check list confirmed what majority of the nurses had expressed in the questionnaires as inadequate practices as regards ANC physical exercises. Out of the five themes, studied on level of practice of nurses in promoting antenatal exercises, availability of ANC register to capture ANC physical exercises was the only one that scored a 'Yes', the rest like the standard operating procedures on antenatal physical exercises, exercise prescription to patients as a therapeutic modality, space in the clinic or special rooms, offices for antenatal physical exercise counseling and demonstration and the availability of equipment to support antenatal physical exercises scored a 'No'. The triangulation between the questionnaire and the overt observational check list yielded similar findings as regards practices on ANC physical exercises.

In a systematic review by Mukona…et al. (2016), a study done on health Irish pregnant women only 21% (55) women met the current recommendations for exercise in pregnancy. Physical exercise tended to decrease as pregnancy progressed in the African studies reviewed (Hjorth…et al., 2012 and Adeniyi …et al (2014). The risk of being sedentary increase with advancing pregnancy probably because most women are careful to avoid injuries to themselves and the unborn baby and that there is a general distortion of body frame with a backward sway that makes it difficult to perform physical exercise.

Studies conducted in developed countries have reported a declining physical exercise level with advancing pregnancy (Guelinckx… et al., 2010; Hayes…et al., 2012).

The practice of obtaining antenatal physical exercise history from clients was significantly affected by training in physical exercise and also nursing experience p-value <0.05. Knowledge was a better predictor of practice of exercises, this was also found by (Peterson…et al., 2012 in a study on correlates of physical exercise among pregnant women in USA that found out that pregnant women meeting the moderate to vigorous physical exercises were more likely to be younger and more educated.

Contrarily to a study that was conducted in three randomly selected zonal public hospitals of Tigray Regional state of Northern Ethiopia from Oct. 2016 up to May 2017, out of 442 women who participated in this study, only 21.9% were physically inactive with 78.1 reported to be practicing antenatal physical exercises (Gebregziabher….et al., 2019).

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.0 Introduction

The conclusions of the findings were based on the study's research objectives. Consistent with this study's findings, recommendations were offered for how these findings would be used to inform different parts of the field, particularly regarding policy and practice. In addition, there's a section dedicated to addressing the strengths and limitations of the study.

6.1 Conclusions of findings

The purpose of this study was to determine knowledge, attitude and practices (KAP) of nurses'/midwives in promoting antenatal physical exercises in tiers 2 and 3 health facilities in Kakamega County. A summary of the findings is presented based on the research objectives of the study.

6.1.1 Nurses'/midwives knowledge level in promoting antenatal physical exercises

Within the limitations of this research and based on all the items used to assess knowledge, it was concluded that nurses have low knowledge in promoting antenatal physical exercises in tier 2 and 3 health facilities in Kakamega County and there was no difference in their knowledge despite their education levels.

6.1.2 Attitudes of nurses towards promoting antenatal physical exercises

Generally, from the computation of all the questions used to assess attitude, the study found majority of the nurses had positive attitude towards antenatal physical exercises 205 (98.1%) scoring >30. However, there was significant difference in their attitude with those with master's degree having better attitude than the rest with a mean of >15.

6.1.3 Nurses practices in promoting antenatal physical exercises

Majority of the nurses had poor practices of antenatal physical exercises 202 (97%) scoring 22 or less. On the overt observational check list, all the 7 health facilities under the study had an ANC register for capturing ANC physical exercises. The other themes of having standard operating procedures (SOPs) in place, exercise prescriptions, referral mechanism to the community, space for counselling and equipment to support ANC physical exercise services were missing.

6.1.4 Relationship between knowledge, attitudes and practices towards antenatal physical exercises

There was significant positive correlation between knowledge and practice at p value=0.026. On multiple regression, knowledge was a better predictor for practice in promoting antenatal physical exercises in tier 2 and 3 health facilities at p value=0.036 compared to attitude at p value=0.9. There was no significant relationship between attitude and practice in promoting antenatal physical exercises.

6.1.5 Contribution of this study to health promotion

It is believed that this study will help create awareness on the benefits of antenatal physical exercises among nurses leading to better maternal outcomes. With empowerment of nurses, this will get down to the recipients of the services, the pregnant mothers who will actively participate in their own health through peer to peer mentorship leading to improved health and wellbeing of pregnant mothers. This will result into healthy communities (mothers and children) hence reducing economic burden on the government. In terms of policy, the study indicated that infrastructure to support antenatal physical exercises was missing in most of the health facilities, if this is addressed, there will be overall improvement in health promotion in maters antenatal physical exercises for all the clients. Lastly on knowledge management, dissemination of the findings and contribution to the pool of knowledge on health promotion especially for the special populations, the pregnant women. The study is also likely to spur other health promotion related studies and activities.

6.2 Strengths and Limitations

The strength of the study is that it did not use a single question to serve as the sole outcome variable (ANC physical exercise). The study used several questions to wholesomely represent the outcome variable. The study also had two data collection instruments, the questionnaire and the overt observational check list to triangulate data. Mixed methods were used for in-depth analysis of the problem at hand. The reliability of the tools were tested and Cronbachs alpha value was at 0.7.

Despite the robust evidence that exercise is beneficial for the prevention and treatment of non-communicable diseases, limited data existed on the long-term effectiveness of exercise counseling (Nunan…et al., 2013). This study was a cross-sectional design and so did not address some of the gaps revealed in the literature review such as the effects of antenatal physical exercise that can be determined through a prospective study or cohort study.

There was little to no control over the setting or environment in which the research participants completed the surveys. Also, there was limited to no control on who completed the survey, participants only needed to be available and willing to participate in the survey. Also, since a correlational design was used, causal statements were unable to be made due to the inability to account for other factors that may be potentially present. Hence, the conclusions and results of this study were only based on relationships between variables, and not causality.

6.3 Recommendations

Based on the findings of this research, the following are the recommended corrective measure which can contribute to effective antenatal physical exercise counseling and prescription in healthcare setting.

6.3.1. Recommendations for Knowledge

The study recommends dissemination of the already existing guidelines on antenatal physical exercises. Continuous professional development on antenatal physical exercises, CMEs and Webinars are also recommended.

6.3.2 Recommendations for attitude

The study recommends relevant stakeholders to establish antenatal physical exercise programs in health institutions that would provide direct and indirect support encouraging nurses/midwives to maintain the good attitude towards promoting ANC physical exercises.

6.3.3 Recommendations for Practice

The study recommends establishment of exercise programs in the antenatal clinics by availing adequate space for counseling, equipment for use in demonstration like exercise marts, fitness balls, videos on ANC physical exercises. Availability of SOPs and algorithms to support exercise prescription. Strengthen referral mechanism to and from the community to help track ANC physical exercise uptake.

It is the recommendation of this study that government institutes a policy to make it mandatory for nurses/midwives to put in writing exercise prescriptions for pregnant mothers and not verbal statements.

6.3.4 Recommendations for further research

The study recommends further research to be inclusive of other cadres like Physiotherapists, Clinical officers, Doctors who in one way or another attended to the pregnant mothers to determine their knowledge, attitudes and practices in promoting antenatal physical exercises. It would be good to have an intervention study to determine the outcomes of pregnant mothers who engage in antenatal physical exercises.

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APPENDICES

APPENDIX I: CONSENT FORM

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY

FULL TITLE OF RESEARCH: ***Knowledge, Attitudes and Practices (KAP) of Nurses in Promoting Antenatal Physical Exercises in Kakamega County, Kenya.***

NAME, POSITION AND CONTACT ADDRESS OF RESEARCHER:

Esther Vurigwa, Registered Clinical Officer of Box 35307 - 00200 Nairobi*,*

	Please tick (√) Box as applicable
1) I confirm that I have read and understand the information sheet for the above study and have had the opportunity to ask questions.	☐
2) I understand that my participation is voluntary and that I am free to withdraw at any time, without giving reason.	☐
3) I agree to take part in the above study.	☐
4) I agree to the use of anonymised quotes in publications	☐

Name of Participant	Date	Signature
Name of Researcher	Date	Signature

APPENDIX II: QUESTIONNAIRE FOR NURSES'/MIDWIVES

Dear respondent, as part of the requirements for the fulfillment of the award of Masters Degree in Health Promotion & Sports Science, am conducting a research about "Knowledge, attitudes and practices (KAP) of nurses in promoting antenatal exercises in tier 2 and 3 health facilities in Kakamega County, Kenya". Therefore, I am requesting for your participation by filling this questionnaire. You are invited to participate in this research voluntarily by filling this questionnaire.

Understanding that your honest and genuine response will have significant contribution to the success of this study, please take your time to respond to all questions. Do NOT write your name on the questionnaire and the information you give will be kept strictly confidential.

Thanks in advance!

(General items to be filled by the researcher or research assistant)

Name of health facility: _____

Facility setting:1.County Hospital

2.Sub-County Hospital

Facility type: 1. Public 2. Private

PART I

SECTION 1: SOCIO-DEMOGRAPHIC DATA

1.1 **Gender**1. Male 2. Female

1.2 **Age (in years): _____**

1.3 **Professional level**

1. Nurse-Diploma

2. Nurse-Degree

3. Nurse-Masters

4. PhD

5. Other, please specify: _____

1.4 How long have you worked in Antenatal clinic?

1. Less than 1 year

2. 1 to 3 years

3. 3 to 5 years

4. More than 5 years

1.5 Have you ever been trained on physical exercises and collaborative activities?

1. Yes 2. No

1.6 Have you ever been trained specifically, on antenatal l exercises?

1. Yes 2. No

PART II

SECTION 2: NURSES' KNOWLEDGE ON ANTENATAL PHYSICAL EXERCISES

2.1	In your opinion, who can serve as the best guide to antenatal physical exercises during pregnancy	1. Gynecologist 2. Nurse/ Midwife 3. Physiotherapist 4. Other, please specify _____
2.2	Are you aware of the meaning of antenatal physical exercises?	1. Yes 2. No
2.3	Mention the different type of antenatal physical exercises you are aware of	1. _____ 2. _____ 3. _____
2.4	Mention the benefits of physical antenatal exercises during pregnancy.	1. _____ 2. _____ 3. _____

2.5	Mention the effects of antenatal physical exercises on the fetus and mother	1. _____ 2. _____ 3. _____		
2.6	How do you assess whether a pregnant woman adheres to recommended antenatal physical exercises or not?	1. Patient self-report 2. Detailed interview 3. All above 4. Other, please specify _____		
2.7	Are you aware of the WHO,2017 ACOG guidelines and Kenya National guidelines on antenatal physical exercise	1. Yes 2. No		
2.8	Would you be interested in attending a workshop on exercise in pregnancy?	1. Yes 2. No		
2.9	In your opinion, mention the major barriers for successful implementation of antenatal physical exercises	1. _____ 2. _____ 3. _____		
	Variable	**Disagree**	**Undecided**	**Agree**
3.0	Exercise reduce risk of back pain during pregnancy			
	Exercise causes more rapid postnatal recovery			
	I know different types of antenatal physical exercises			
	Exercising strengthens pelvic floor muscles in pregnancy			
	I know WHO 2018, ACOG 2017 guidelines and Kenya National			

	guidelines on antenatal exercises			
	Exercise causes vaginal bleeding during pregnancy			
	Exercise causes premature labour during pregnancy			
	Exercise causes abdominal pain during pregnancy			
	Exercise causes uterine contractions during pregnancy			

SECTION 3: NURSES' ATTITUDE TOWARDS PROMOTING ANTENATAL PHYSICAL EXERCISE

Please select only one response that best suits among the likert-scale measurements of your attitude.

5 - Strongly agree 4 - Agree 3 - Undecided 2 - Disagree 1 - Strongly disagree

	STATEMENT	5	4	3	2	1
3.1	I have sufficient knowledge to advise pregnant women about ANC exercise					
3.2	I feel confident in giving general advice to mothers on antenatal physical exercise					
3.3	I feel confident in suggesting specific antenatal physical exercise programs for pregnant mothers					
3.4	Discussing the benefits of exercise with pregnant mothers is part of the nurse's role					
3.5	Suggesting to pregnant mothers ways to increase daily exercise is part of the nurse's role					
3.6	I can be effective in persuading mothers to					

	increase ANC exercise					
3.7	Any amount of exercise is beneficial to health					
3.8	Only vigorous/strenuous exercise is beneficial to health					
3.9	Behavior of nurses affects attitude of pregnant mothers towards information received					
3.10	Nurses should be active to act as a role model for the pregnant mothers					
3.11	On overall, do you agree that you are complying with the WHO 2018,ACOG 2017guidelines or Kenya National guidelines recommendations for exercise during pregnancy?					
3.12	If not agree for Q3.11, mention your major beliefs preventing you from complying with the recommendations?	1. _____ 2. _____				

SECTION 4: NURSES' PRACTICES IN PROMOTING ANTENATAL PHYSICAL EXERCISES

4.1 Which one of the following statements best describes your current practice with pregnant women? Please choose and mark **(√)** only one box. Statement

□ I don't promote ANC physical exercise and I don't intend to start

□ I don't promote ANC physical exercise but I'm thinking of starting

□ I promote ANC physical exercise sometimes but not regularly

□ I promote ANC physical exercise regularly but just started recently

□ I promote ANC physical exercise regularly (for longer than 6 months)

□ I have promoted ANC physical exercise in the past but not now

Please select only one response that best suits among the likert-scale about your current practice.

5 - Strongly agree 4 - Agree 3 - Undecided 2 - Disagree 1 - Strongly disagree

	STATEMENT	**5**	**4**	**3**	**2**	**1**
4.2	I try to encourage as many mothers as possible to increase ANC physical exercise.					
4.3	I seldom evaluate pregnant mothers on ANC physical exercise.					
4.4	I only advise pregnant mothers about ANC physical exercise if it is linked to their presenting problem.					
4.5	I only discuss ANC physical exercise if mothers mentions it.					
4.6	Do your pregnant mothers ask you questions about exercise during pregnancy?	1. Never 2. Seldom 3. Often 4. Always				
4.7	Do you provide informational pamphlets on pregnancy and exercise to pregnant mothers?	1. Never 2. Seldom 3. Often 4. Always				
4.8	Do you obtain exercise histories on pregnant mothers?	1. Never 2. Seldom 3. Often 4. Always				
4.9	Do you give each pregnant mother an individualized exercise programme for her to follow?	1. Never 2. Seldom 3. Often 4. Always				
4.10	Do you routinely give exercise prescriptions to pregnant mothers as a therapeutic modality? *Note that "prescription" does not involve casual advice such as "you should stop smoking and do more exercise"*	1. Yes, always 2. Yes, sometimes 3. No				
4.11	If you do prescribe ANC physical exercise, is it:	1. Verbal 2. Written				

		3. Refer to trainer 4. Via Internet 5. Other, please specify ____
4.12	If you do not prescribe ANC physical exercise, why not?	1. I don't believe that exercise is as effective as medicine 2. It is not really my job, there are physiotherapists and biokineticists for that 3. I don't feel confident in my knowledge to be able to prescribe it 4. It's a waste of time, the patients won't adhere anyway ……. 5. It takes up too much of my consultation time 6. I do not have the necessary resources 7. I am afraid of medical-law issues because of the high risk of sudden death or other complications 8. Patients expect medication to cure them, not exercise 9. Not applicable; I do prescribe exercise 10. Other, please specify_____
4.13	Please mention the major interventions required for the successful implementation of antenatal physical exercises	1. _____ 2. _____ 3. _____

Your responses will help us to better learn more about antenatal physical exercise in health facilities settings. All of your responses will remain anonymous. Thanks in advance.

If you have any questions or concerns please contact me at delestray@gmail.com

APPENDIX III: OBSERVATIONAL CHECKLIST

Response YES  **= Red** **NO**  **= Yellow**

1. Are there registers to capture documentation of ANC physical exercises among pregnant women?

a. Yes  b. No 

2. Are there written standard operating procedures that support counselling on ANC physical exercises in pregnancy?

a. Yes  b. No 

3. Are there job aids to help in prescription of ANC physical exercises in pregnancy?

a. Yes  b. No 

4. Are there referral mechanisms where pregnant women are referred to for ANC physical exercises?

a. Yes  b. No 

5. Community follow up on ANC physical exercises at various centers like gyms.

a. Yes  b. No 

6. Is there enough space in the clinic or special room for exercise counseling and demonstration?

a. Yes  b. No 

7. Are there any pamphlets that clients can read on ANC physical exercise?

a. Yes  b. No 

8. Any videos on ANC physical exercise in pregnancy?

a. Yes  b. No 

9. Are there any ANC physical exercise prescriptions in place?

a. Yes  b. No 

APPENDIX IV: LETTER TO THE INSTITUTIONS

Date

Mr./Mrs./Miss

Head of Clinical services

Address

Dear Sir/ Madam,

RE: PERMISSION TO CONDUCT A STUDY IN YOUR INSTITUTION

I am writing this letter to kindly request you for permission to conduct a study at your institution. Currently I am enrolled in a Master's program "Health Promotion Sports Science" and my Master's thesis has been approved by the Ethical and Research Committee (ERC) of Masinde Muliro University of Science and Technology (MMUST).. My study title is "Knowledge, Attitudes and Practices (KAP) of Nurses in promoting antenatal physical exercises in Kakamega County, Kenya. During the process of my study, I will be conducting interviews to seek the responses of the nurses only and the study will not be harmful to the study participants, the Nurses. By seeking permission from you, I confirm in advance that the study will be conducted in conformity with the rules and regulations of your institution and at the end of the study, I will share my findings with your office as an act of appreciation for the support your institution will have accorded me in the course of the study. The nurses will be required to fill in the questionnaires, a copy of which will be shared with you at the commencement of the study, from January, 2017 at their various stations of duty. The survey results will be pooled for the thesis project and individual results will be treated confidentially and anonymous. Should this study be published, only the pooled results will be documented. No costs will be incurred by either your hospital or individual participants and the participants will be free to withdraw from the study if they feel uncomfortable without any penalty and as a sign of respect for their human rights.

Your approval to conduct this study will be greatly appreciated. I will follow up with a telephone call in a week's time and I will be happy to answer any questions or concerns that you may have at that time or any other time of your convenience.

You may contact me on delestray@gmail.com,0722 861608 or P.O. Box 35307-00200 Nairobi.

If you agree, kindly sign below and return the signed form in the enclosed self addressed envelope. Alternatively, kindly submit assigned letter of permission on your institutions letter head acknowledging your consent and permission for me to conduct this study in your institution

Sincerely,	Approved by:
Esther Vurigwa	Name:
Signature	Signature
Masters student	Date:

APPENDIX V: INFORMATION TO THE STUDY PARTICIPANTS

I, Esther Vurigwa of Box 35307-00200 Nairobi, email address –delestray@gmail.com and phone no. 0722 861608, invite you to participate in this study on the "Knowledge, Attitudes and Practices (KAP) of Nurses in promoting Antenatal Physical Exercises in Kakamega County, Kenya. The overall objective of this study will be to determine the Knowledge, Attitude and Practices of Nurses in promoting antenatal exercises in Kakamega County Kenya. The specific objectives will be to determine the knowledge levels of Nurses in promoting antenatal exercises at tier 2 and 3 health facilities in Kakamega County, to determine the attitudes of Nurses in promoting antenatal exercises at tier 2 and 3 health facilities in Kakamega County and to determine the practices of Nurses in promoting antenatal exercises in tier 2 and 3 health facilities in Kakamega County.

This study is envisaged to promote the following; create awareness on importance of exercises in pregnancy, improve the health of babies and their mothers, keep the mother physically, emotionally and psychologically fit, reduce morbidity, maternal mortality and disability among the babies and their mothers among other advantages. The participants' views and opinions will be protected and kept confidential in accordance with the ERC requirements; this study will not harm the participants in any way since it will only solicit verbal or written responses. Benefits will not be direct but may be associated with effective policy formulation in promoting the knowledge of nurses in terms of antenatal exercises. Your participation will be voluntary; participants may withdraw from the study at their convenience without penalty.

I take this opportunity to thank you for your support and cooperation in support of this study. Any concerns can be directed to the above address, email or via phone feel free.

Thank you

Esther Vurigwa, BSc (MMUST)

Researcher

APPENDIX VI: RESEARCH APPROVAL

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

Tel: 056-30870
Fax: 056-30153
E-mail: odel@mmust.ac.ke
Website: www.mmust.ac.ke

P.O Box 190
Kakamega – 501 00
Kenya

Directorate of Open Distance and e-Learning (ODeL)

Ref: MMU/COR: 509079

Date: 25th July 2017

Esther Vurigwa
HPS/LG/001/15
P.O. Box 190-50100
KAKAMEGA

Dear Mrs. Esther,

RE: APPROVAL OF PROPOSAL

Following communication from the Departmental Graduate Studies Committee and the Faculty Graduate Studies Committee, I am pleased to inform you that the ODeL Board meeting held on 19th January 2017 considered and approved your Master proposal entitled: ***"Knowledge, attitudes and practices (KAP) of nurses towards antenatal physical exercises in Kakamega County, Kenya"*** and appointed the following as supervisors:

1. Dr. Donald Kokonya- Senior Lecturer, School of Medicine - MMUST
2. Prof. Edwin Wamukoya- Associate Professor of Sports Medicine- Zetech University

You are required to submit through your supervisor(s) progress reports every three months to the Director ODeL. Such reports should be copied to the following: Chairman, School of Public Health Biomedical Sciences and Technology Graduate Studies Committee, Chairman, Department of Health Promotion and Sport Science and Director SGS. Kindly adhere to research ethics consideration in conducting research.

It is the policy and regulations of the University that you observe a deadline of two years from the date of registration to complete your Master thesis. Do not hesitate to consult this office in case of any problem encountered in the course of your work.

We wish you the best in your research and hope the study will make original contribution to knowledge.

Yours Sincerely,

Dr. Gordon Nguka
Ag. DIRECTOR OPEN DISTANCE AND E-LEARNING (ODeL)

APPENDIX VII: NACOSTI RESEARCH AUTHORIZATION

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone:+254-20-2213471,
2241349,3310571,2219420
Fax:+254-20-318245,318249
Email: dg@nacosti.go.ke
Website : www.nacosti.go.ke
When replying please quote

NACOSTI, Upper Kabete
Off Waiyaki Way
P.O. Box 30623-00 100
NAIROBI-KENYA

Ref: No. **NACOSTI/P/18/78638/22427**

Date: **15th May, 2018**

Esther Vurigwa
Masinde Muliro University of Science
And Technology
P.O. Box 190-50100
KAKAMEGA.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on ***"Knowledge, Attitudes and Practices (KAP) of nurses towards antenatal physical exercises in Kakamega County, Kenya,"*** I am pleased to inform you that you have been authorized to undertake research in **Kakamega County** for the period ending **15th May, 2019.**

You are advised to report to **the County Commissioner and the County Director of Education, Kakamega County** before embarking on the research project.

Kindly note that, as an applicant who has been licensed under the Science, Technology and Innovation Act, 2013 to conduct research in Kenya, you shall deposit **a copy** of the final research report to the Commission within **one year** of completion. The soft copy of the same should be submitted through the Online Research Information System.

DR. STEPHEN K. KIBIRU, PhD.
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioner
Kakamega County.

The County Director of Education
Kakamega County.

APPENDIX VIII: COUNTY GOVERNMENT RESEARCH AUTHORIZATION

KAKAMEGA COUNTY

Telephone: 056 31125
E-mail: pdmswestern@gmail.com
When replying please quote

MINISTRY OF HEALTH SERVICI
P O BOX 2309 - 50100
KAKAMEGA

Ref. No.CGK/MOH/COR/VOL.4/13

Date: 26th July, 2018

COUNTY GOVERNMENT OF KAKAMEGA
OFFICE OF THE COUNTY DIRECTOR, HEALTH SERVICES

To
Administrator – St. Mary's Mission Hospital, Mumias

RE: RESEARCH AUTHORIZATION

Following your authorization vide letter Ref: NACOSTI/P/18/78638/22427 dated 15th May, 2018 by NACOSTI to undertake research on "***Knowledge, Attitudes and Practices (KAP) of nurses towards antenatal physical exercises in Kakamega County, Kenya***," I am pleased to inform you that you have been authorized to carry out the research on the same in all the Sub Counties in Kakamega County.

DIRECTOR OF HEALTH SERVICES
KAKAMEGA COUNTY
26 JUL 2018
RECEIVED
P. O. Box 359, KAKAMEGA-50100

Dr. Misiani Ayub Wastara
Ag. County Director Medical Services
Kakamega County

APPENDIX VIII: STUDY AREA MAP