PTE/22148-4/2022

INFLUENCE OF INTEGRATED ANTENATAL EDUCATION ON THE FEAR OF CHILDBIRTH AMONG WOMEN OF REPRODUCTIVE AGE IN KENYA

Ph.D. Thesis

ONCHONGA DAVID ONDIEKI

University of Pècs

Faculty of Health Sciences

Doctoral School of Health Sciences

PÈCS, 2022

UNIVERSITY OF PÈCS

FACULTY OF HEALTH SCIENCES

DOCTORAL SCHOOL OF HEALTH SCIENCES

Head of Doctoral School: Prof. Dr. Bódis József

Programme Leader: Prof. Dr. Bódis, József

Supervisor: Dr. Várnagy, Ákos

INFLUENCE OF INTEGRATED ANTENATAL EDUCATION ON THE FEAR OF CHILDBIRTH AMONG WOMEN OF REPRODUCTIVE AGE IN KENYA

Ph.D. Thesis

ONCHONGA DAVID ONDIEKI

PÈCS, 2022

ACKNOWLEDGMENT

I am grateful to God for his grace and strength to carry out this study. I am indebted to my supervisors, Dr. Ákos Várnagy and Prof. Keraka who have diligently supported me since the inception of this study. Special appreciation to Dr. Vahideh, Mr. Enoch Ngetich, Mr. Peter Mwambi and Mr. Pius Wainaina for their inputs and support. Special gratitude to Mr. Dennis Mwangi for accepting to proof-read the final document before printing.

I also extend my sincere gratitude to the Doctoral School of Health Sciences of the University of Pècs, more particularly Dr. Viktoria Prémusz, Madam Piroska Bakonyi and Madam Szabo Petra for numerous support and facilitation. Much appreciation to all my colleagues in the Doctoral School for assisting me during my study, more specifically Sahar Hammoud who assisted me during my pre-defense and on several occasions. Equally, a deep appreciation is extended to my family members, who have been of great support during my entire period of my studies away from home.

I acknowledge the support accorded to me by the Samburu County Department of Health Services under the stewardship of Dr. Martin Thuranira and the entire County Health Management Team. The County Secretary and his team are equally appreciated for their support and encouragement.

Finally, yet importantly, I acknowledge with gratitude the financial support in the form of a scholarship I received from the Government of Hungary through Tempus Public Foundation that facilitated my tuition, accommodation and upkeep during the entire period of my studies in Hungary from 2018-2022.

DEDICATION

This work is dedicated to my children, Eliana Nyaboke and Eben Malaki who had to endure my absence from their lives for four years.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATION AND ACRONYMS

ANC	Ante-Natal Clinic
CBSEI	Childbirth Self-efficacy Inventory Questionnaire
CFA	Confirmatory Factor Analysis
CI	Confidence Interval
CS	Caesarean Section
EFA	Exploratory Factor Analysis
EPDS	Edinburgh Postnatal Depression Scale
EST	Ecological System Theory
FOC	Fear of Childbirth
IPE	Integrated Antenatal Education
NACOSTI	National Commission for Science and Technology and Innovation
OR	Odds Ratio
SCT	Social Cognitive Theory
SD	Standard Deviation
SPSS	Statistical Package for Social Sciences
SVD	Spontaneous Vaginal Delivery
W-DEQ	Wijma Delivery Expectation /experience Questionnaire
WHO	World Health Organization

DEFINITION OF TERMS

Fear of Childbirth: A strong anxiety that impairs women's daily functioning and wellbeing. It is also a health issue for pregnant women related to an anxiety disorder or a phobia including physical complications, nightmares and concentration problems, as well as a trigger for caesarean section (CS) during delivery.

Integrated Antenatal Education: This is an amalgamated teaching for expectant women on all the components of antenatal clinics and it encompasses among other things: management of labour pains, diet during pregnancy, essential vaccinations, water and sanitation, hygiene and how to cope with antenatal depression. The education is integrated with other usual education sessions undertaken during antenatal periods.

Antenatal Depression: Is a medical condition associated with an increased risk for emotional, behavioral and cognitive problems, as well as multiple forms of psychopathology.

Women of Reproductive Age: This refers to all women aged 15–49 years. For the purposes of this study, the focus will be women who are attending antenatal clinics and those who will be enrolled will be expectant women at 22 weeks of gestation. This being an intervention study, the enrolled women will be followed from weeks 22 to 36. The intervention group will undergo an integrated antenatal education programme while the control group will undergo normal antenatal clinics.

Mixed methods Research: This is the type of research in which a researcher or team of researchers combine elements of qualitative and quantitative research approaches (e. g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the broad purposes of breadth and depth of understanding and corroboration

References: There is a list of references at the tail end of this thesis which is basically acknowledging the materials that were used in development of this thesis. They include exact

words, summarized or paraphrased, data, ideas or concepts, theories or opinions. The references have been applied in the body of this thesis (in-text citation) and the citations have been linked to the list of works cited (references).

ABSTRACT.

Introduction: Antenatal fear of childbirth has been noted as a global issue due to its associated negative impacts on maternal health outcomes. It has been noted as a key contributing factor to elective caesarean section and studies have indicated that if this condition is not managed, it can lead to operations without medical indication. Studies on antenatal fear of childbirth have been conducted in many Scandinavian countries and they have been linked to adverse maternal outcomes. Developing countries are struggling with high maternal morbidities and mortalities for many decades but there have not been substantive studies conducted to determine the possibility of linking the high maternal burden with antenatal fear of childbirth.

Aims: The main objective of this study was to determine the effectiveness of an integrated antenatal education programme on antenatal fear of childbirth in a sample of pregnant women who were screened and found to have had high fear of childbirth. The specific objective of the current study was to investigate the factors contributing to fear of childbirth; to assess the prevalence of fear of childbirth; to determine the fear of childbirth among expectant women and their spouses, to assess whether institutional maternity services contribute to the fear of childbirth; and also, to evaluate the effects of integrated antenatal education on the fear of childbirth.

Methods: Initially, the current study evaluated the readability of the Wijma Delivery Expectancy/Experience Questionnaire (W-DEQ-A) among women of reproductive age in Kenya. The W-DEQ-A has been used as a standard tool for screening pregnant women with fear of childbirth for over three decades.

The second step was to translate and validate the Wijma Delivery Expectancy/Experience Questionnaire into the Kiswahili language, a commonly used language in East and Central Africa. Edinburgh Postnatal Depression Scale (EPDS) and Beck Anxiety Inventory (BAI) were

administered together with the W-DEQ-A to explore the dimensionality of W-DEQ-A using Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA), respectively.

The third and fourth step was to determine the prevalence of fear of childbirth and also the effects of integrated antenatal education on the fear of childbirth. The pregnant women who were screened and found to have a high fear of childbirth (a score of 67) according to the W-DEQ-A questionnaire were requested to participate in a single-blind Randomized Controlled Trial (RCT) to determine the effect of antenatal education on the fear of childbirth (fourth step).

A total of 119 pregnant women were found to have a high fear of childbirth from step three above. These women were then recruited into a single-blind randomized controlled trial. Randomization was done on the 119 pregnant women with an intervention group having 60 and the control group with 59 pregnant women. The pregnant women in the intervention group underwent an integrated antenatal education module comprising five sessions of 120 minutes each. The integrated antenatal education module was developed through a comprehensive literature review. The control group consisted of pregnant women who accepted voluntarily to participate in the study but undertook at least four routine antenatal care clinic visits.

The fifth and sixth steps were to qualitatively explore the pregnant women's experience on integrated antenatal education and its impact on the fear of childbirth and to determine whether institutional maternity services contribute to the fear of childbirth.

Lastly, we undertook an independent study to determine the antenatal fear of childbirth and its contributing factors among pregnant women and their spouses. In this study, the Fear of Birth Scale (FOB) was used.

Results: Regarding the readability of the W-DEQ-A, the results indicated that the readability of the W-DEQ-A varied from one readability scale to another with at least three of the seven readability scales agreeing that the W-DEQ-A instrument was easily readable by expectant

women who had at least secondary school education (grade 12). Concerns were raised over some terms used in the W-DEQ-A tool such as *desolate* and *deserted,* which were rarely used in day-to-day English language conversations.

Regarding the translation and validation of the Swahili version of W-DEQ version A, the Exploratory Factor Analysis and Confirmatory Factor Analysis of the Swahili version of W-DEQ-A identified five-factor loadings namely: lack of self-efficacy, fear, negative emotions, negative appraisal, and social isolation. The resultant model failed to support the unidimensional structure of the original W-DEQ-A. The Swahili version of the W-DEQ-A correlated well with EPDS and BAI at acceptable levels. The Cronbach alpha values of the subscales ranged from 0.867 to 0.967, an indication of an excellent internal consistency of the instrument.

The results on the prevalence of FOC among the study respondents indicated that approximately 29.5% had low, 40.4% moderate, 22.1% high, and 8% recorded severe FOC levels. Compared by parity, the prevalence of severe FOC was higher on primigravida at 13.8% than multigravida, 8.0%. There was a significant relationship between marital status ($p=0.045$), parity ($p<0.001$), literacy status ($p<0.001$), regular check-up of pregnancy at health facilities ($p=0.003$), having trust in healthcare providers ($p<0.001$), and physical activity for gravida women with fear of childbirth ($p<0.001$).

The results of the randomized controlled trial indicated that the pregnant women who underwent integrated antenatal education were found to have reduced fear of childbirth compared to the control group. There was a significant difference in the W-DEQ-A mean scores before (*$M=79.897$, $SD=10.667$)* and after the integrated antenatal education *($M=66.7570$, $SD=19.6924$, $t(106)=7.329$, $p<0.001$).* The childbirth experience was less frightening for the women who undertook the integrated antenatal education, their mode of delivery notwithstanding. The rate of caesarean section was higher in the control group

compared to the intervention group.

The result of a qualitative study that aimed at exploring pregnant women's experience from integrated antenatal education and its impact on fear of childbirth indicated that the integrated antenatal education brought positive inclination and improved trust and communication among the pregnant women and the healthcare workers.

In regards to whether institutional maternity services contribute to the fear of childbirth, it was reported that institutional maternity services contributed directly and indirectly to FOC. The direct contribution included the performance of unintended caesarean sections, severe and prolonged labour pains and negative attitudes of healthcare providers. The indirect contribution was in the form of challenges in the provision of care and the experience of care in the maternity institutions. In the provision of care; human and physical resources, inadequate referral systems, and inadequate management of emergencies were reported. In the experience of care; lack of cognition, respect, dignity, equity and inadequacies in emotional support were reported.

The current study also sought to explore antenatal FOC and its contributing factors among pregnant women and their spouses using FOB. The result indicated that about 58.6% of pregnant women and 45.7% of their spouses reported high fear of childbirth with primiparous spouses having high fear of childbirth compared to multiparous spouses. Also, the findings revealed a significant relationship between fear of childbirth among pregnant women and variables such as level of education ($p=0.022$), parity ($p<0.001$), previous mode of childbirth ($p<0.001$), going for a routine antenatal check-up ($p<0.001$), and having a positive feeling about the expected delivery ($p<0.001$). For the spouses, the level of education ($p<0.001$), their previous childbirth experience ($p<0.001$), and feelings about the forthcoming child ($p<0.001$), were significantly associated with antenatal fear of childbirth. Spearman's correlation test results indicated a significant positive correlation between antenatal fear of childbirth among pregnant women and their spouses ($r = 0.182$, $p<0.001$).

Conclusion: From the first study, it was observed that the W-DEQ was readable if administered to pregnant women with at least secondary school certificates. Also, there is need to simplify some words used in the questionnaire. Societal dynamics plays an important role in childbirth fears and therefore it was proposed that the questionnaire should address all aspects contributing to childbirth fears and not merely the thoughts and feelings about the outcomes of the current pregnancy. From study two, the study findings provided support for the Swahili version of the W-DEQ-A to be considered as a valid and reliable measuring tool for fear of childbirth among Swahili speaking pregnant women in Kenya, and the entire East and Central African region. Also, due to its multidimensional structure, the original W-DEQ-A should not be used in its original form.

From the findings of the third study, there is need to undertake screening for the fear of childbirth to all pregnant women as this will help in putting mechanisms in place such as integrated antenatal education on the fear of childbirth. Women who undertook the integrated antenatal education in the fourth study were found to have reduced fear of childbirth, reduced rates of caesarean section, less frightened and improved trust and communication between them and the healthcare givers. It is therefore recommended that the integrated antenatal education modules should be introduced to routine antenatal care clinics with a special focus on the nulliparous women who are normally more fearful.

CHAPTER I: INTRODUCTION

This chapter will look at the background information about the title of the study with the following sub-headings: background to the study, statement of the problem, significance of the study, justification of the study, purpose of the study, specific objectives, research questions, hypothesis, theoretical framework and conceptual framework.

1.1 Background to the study

The fear of childbirth (FOC) was described in the 1980s in a Swedish study as strong anxiety which affects the daily functioning and wellbeing of pregnant women [1]. Later, during the 1990s, similar studies from Finland defined the fear of childbirth as a health issue for a pregnant woman related to an anxiety disorder or a phobic fear involving physical complications, nightmares and concentration problems, as well as demands for caesarean section [2]. It is well noted that every childbirth bears a risk for both the unborn baby and the expectant mother.

Studies on the fear of childbirth have indicated that it substantially deters day-to-day activities of antenatal women's professional and social life [3]. It is projected that about 2-20 % of all antenatal women endure severe fear of childbirth distressing both nulliparous and multiparous women [4]–[8]. Fear of childbirth which is commonly experienced at labour depressingly dissuades the process of labour causing pregnant women to experience blatant pain and delayed delivery process leading to reduced patient satisfaction with the entire labour process[8]. Fear of childbirth has been noted as a key contributing factor to elective caesarean section (CS) and studies have indicated that if this condition is not managed, it can lead to operations without medical indication. High rates of childbirth fears have been documented in several Scandinavian countries [9], Australia [10], Japan [11], Hungary [12], The United States of America [13], Canada [14], [15] and in most of these studies, fear of childbirth has been linked to adverse maternal outcomes including poor postpartum mental health and high rates of caesarean section with a decreased desire to give birth to more children [16].

It is noteworthy that although studies have been conducted in some countries in Africa such as Malawi, Tanzania, Ethiopia, South Africa, Ghana and Nigeria [17] – [23], their main focus has been on antenatal depression and not necessarily antenatal FOC. It is only Malawi, Ethiopia and Tanzania that have done comprehensive studies on FOC, and therefore there is not much evidence available on the whole subject of antenatal fear of childbirth in Africa [24].

It is satisfactorily acknowledged that integrated antenatal education has an impactful role in the continuum of childbirth and parenting as a whole [25]. Studies conducted on the impact of integrated antenatal education have indicated that education reduces anxiety suffered during delivery and the same studies have demonstrated that expectant women who attend integrated antenatal educational sessions show positive changes in their health behavior. Additionally, despite integrated antenatal education being appreciated and applied in the developed world, there is no standard programme for integrated antenatal education in developing countries and therefore the quality and content of the education modules diverges from one implementer to another [24]. Studies on the background factors of fear of childbirth other than previous obstetric occurrences are fewer especially in developing countries, where there is still insufficient evidence on the effects of integrated antenatal education on antenatal fear of childbirth [26].

1.2 Statement of the problem

The fear of childbirth is one of the most intense and demanding events that women are likely to encounter in their lifetime and it may not only need psychological but also physical resources to cope with the processes involved [27]. There are several factors that have been associated with the fear of childbirth. Ulla et al., [28] have highlighted that poor maternal nutrition, emergency medical conditions attributed to pregnancy, lack of adequate support from caregivers, family members and spouses and experience of the previous childbirth which was fatal would be a trigger to antenatal fear of childbirth. The nature and quality of integrated

antenatal education will have an impact on the extent and magnitude of the fear of childbirth. In a study undertaken in Turkey, it was established that improper information given by caregivers and family members who were not healthcare professionals potentially led to increased fear of childbirth and to a large extent contributed to many pregnant women seeking elective caesarean section as a preferred mode of delivery [29]. Integrated antenatal education given by healthcare professionals such as midwives, nurses and doctors play a key role in preparing pregnant women for the phase of pregnancy, childbirth preparedness and postpartum period. There are several studies that have been undertaken confirming the effect of integrated antenatal education on pregnancy [30] delivery and post delivery period [31], but none has been undertaken in Kenya. Moreover, there is inadequate information available on the effect of integrated antenatal education on antenatal fear of childbirth. The current study aimed at responding to the globally raising antenatal fear of childbirth and more specifically to women of reproductive age in Kenya. As mentioned above, childbirth fears have received considerable attention in the developed world but little can be found in developing countries more so in Africa and specifically in Kenya. Therefore, this study aimed to investigate the influence of integrated antenatal education on the fear of childbirth among women of reproductive age in Kenya.

1.3 Significance of the study

This study was very significant since there are no comprehensive studies undertaken in developing countries on the effects of integrated antenatal education on the fear of childbirth. Developing countries are struggling with relatively high maternal and neonatal mortalities which are significantly above the World Health Organization's (WHO) threshold. The current study was carried out to determine the possible effect of integrated antenatal education in reducing antenatal fear of childbirth. The findings will inform developing countries on the possible interventions and critical measures and institutional policies and legislations to put in

place to reduce antenatal fear of childbirth which in turn will improve health-related quality of life for pregnant women and their new-born babies; thereby reducing high maternal and neonatal mortalities in developing countries and particularly in Kenya where the study was undertaken.

1.4 Justification of the study

Childbirth ignites moments of happiness for a family and society as a whole. This, however, does not come without challenges, especially the fears related to childbirth. In developing countries, there are many negative outcomes of childbirth and no substantive amounts of studies have been carried out to unearth these fears and how they contribute to high cases of maternal and neonatal mortalities. Although there are guidelines in place that are supposed to be followed to ensure that all pregnant women undertake at least four integrated antenatal care clinics/visits, there are systemic gaps that hinder all these policies and guidelines. Studies undertaken on the subject of antenatal fear of childbirth have majorly focused on developed countries and therefore might not necessarily be applicable in developing countries due to differences in economic and social-cultural dynamics. The current study aimed to unearth the effect of integrated antenatal education on fear of childbirth. The findings are crucial in informing policymakers and other relevant actors on probable areas of intervention.

1.5 Purpose of the study

The purpose of the current study was to explore the influence of integrated antenatal education on antenatal fear of childbirth in Kenya. The purpose of integrated antenatal education was to help pregnant women make the right decisions during pregnancy and delivery periods. Integrated antenatal education was envisioned to be of help to pregnant women as it familiarizes them with the appropriate steps and processes to follow during labour and childbirth. Therefore, the purpose of this study was to evaluate the influence of integrated antenatal education on antenatal fear of childbirth. Specifically, the study explored the scope

of fear of childbirth, their perception of confidence related to delivery and how integrated antenatal education contributes to the reduction of fear of childbirth in both primiparous and multiparous women. The study also assessed the effect of integrated antenatal education in birth preparedness including the mode of delivery and the relationship between integrated antenatal education and childbirth experience.

1.6 Objectives of the study

1.6.1 Broad objectives

To determine the influence of integrated antenatal education on the fear of childbirth among women of reproductive age in Kenya.

1.6.2 Specific objectives

1) To evaluate the readability of Wijma Delivery Experience/Expectancy Questionnaire version A (W-DEQ-A) among pregnant women in Samburu County, Kenya.
2) To test the validity and reliability of the translated Swahili version of W-DEQ-A among the Swahili speaking pregnant women in Samburu County, Kenya.
3) To determine the prevalence of fear of childbirth between the primiparous and multiparous women in Samburu County, Kenya
4) To evaluate the effects of antenatal education on the fear of childbirth among pregnant women in Samburu County, Kenya
5) To qualitatively explore the pregnant women's experience from midwife-led integrated antenatal education and its impact on the fear of childbirth.
6) To establish whether institutional maternity services contribute to the fear of childbirth among pregnant women in Samburu County, Kenya

7) To determine the rates of fear of childbirth among expectant women and their spouses in Samburu County, Kenya.

1.6.3 Research questions

1) Is W-DEQ-A a readable tool among pregnant women in Samburu County, Kenya?
2) Is the translated Swahili version of W-DEQ-A a valid and reliable tool to use in screening pregnant women with FOC in Samburu County, Kenya?
3) What is the prevalence of fear of childbirth between the primiparous and multiparous women in Samburu County, Kenya?
4) What are the effects of integrated antenatal education on fear of childbirth among the primiparous and multiparous women in Samburu County, Kenya?
5) Does midwife-led integrated pre-birth training have any impact on fear of childbirth?
6) Do institutional maternity services contribute to the fear of childbirth among pregnant women in Samburu County, Kenya?
7) What are the rates of fear of childbirth among expectant women and their spouses in Samburu County, Kenya?

1.7 Hypothesis

In the current study, the following hypotheses were tested.

1) There are no significant differences in the prevalence of fear of childbirth between the primiparous and multiparous women in Samburu County, Kenya.
2) There is no significant association between integrated antenatal education and fear of childbirth among pregnant women in Samburu County, Kenya.
3) There are no significant differences in the rates of fear of childbirth between

expectant women and their spouses in Samburu County, Kenya.

4) There is no correlation between antenatal education and fear of childbirth among the primiparous and multiparous women in Samburu County, Kenya

1.8 Conceptual framework

When supporting healthy lifestyle behaviour by a lifestyle intervention it is of extreme importance to tailor the intervention to the wishes and needs of the specific target population, and in our case, the women of reproductive age. Continuation of a preconceptionally initiated lifestyle intervention during and after pregnancy has the potential in sustaining lifestyle improvements during a period in which women's daily life quickly changes. To be able to set up an appropriate lifestyle intervention, it is essential to have knowledge of determinants of lifestyle behaviour among pregnant women before, during and after pregnancy.

Unhealthy lifestyles in the lives of women of reproductive age in the periods before, during and after pregnancy is greatly associated with an increased time to conceive and a broad spectrum of health risks such as accelerated risks of miscarriage, preeclampsia, gestational diabetes mellitus, and the possibility of a caesarean section. In order to change the lifestyle in women of reproductive age to improve perinatal outcome, there is need to understand the determinants of lifestyle behavior that directly or indirectly affect their wellbeing during this period.

The current study adopted the Social-ecological theory (SET). This theory largely tackles the internal and external determinants in the pregnancy realm. This model is widely used to understand the interrelations between personal, social and environmental determinants. The theory assumes that appropriate changes in the social environment will support behavioral changes in individuals by suggesting that behavior is determined on the interpersonal, intrapersonal, institutional and societal levels.

In applying this theoretical framework, integrated antenatal education is viewed beyond an individual perspective [32]. Habitually, the weight on the risk of harmful antenatal behaviors that leads to fear of childbirth is placed on individual factors. This theoretical framework assumes that the effectiveness of reduced antenatal fear of childbirth can be as a result of multilevel interventions with behavioral and environmental alteration strategies.

As demonstrated in Figure 1, the integrated antenatal education was anticipated to tackle three major factors of concern explicitly: knowledge, perception and pregnant women's self-confidence, which are likely to influence intentions for action to the reduction of fear of childbirth among the primiparous and multiparous women in Samburu County. These factors may be influenced by independent factors which may not be addressed directly by the intended intervention such as the age of respondent, academic level, marital status, occupation, religion and level of family support.

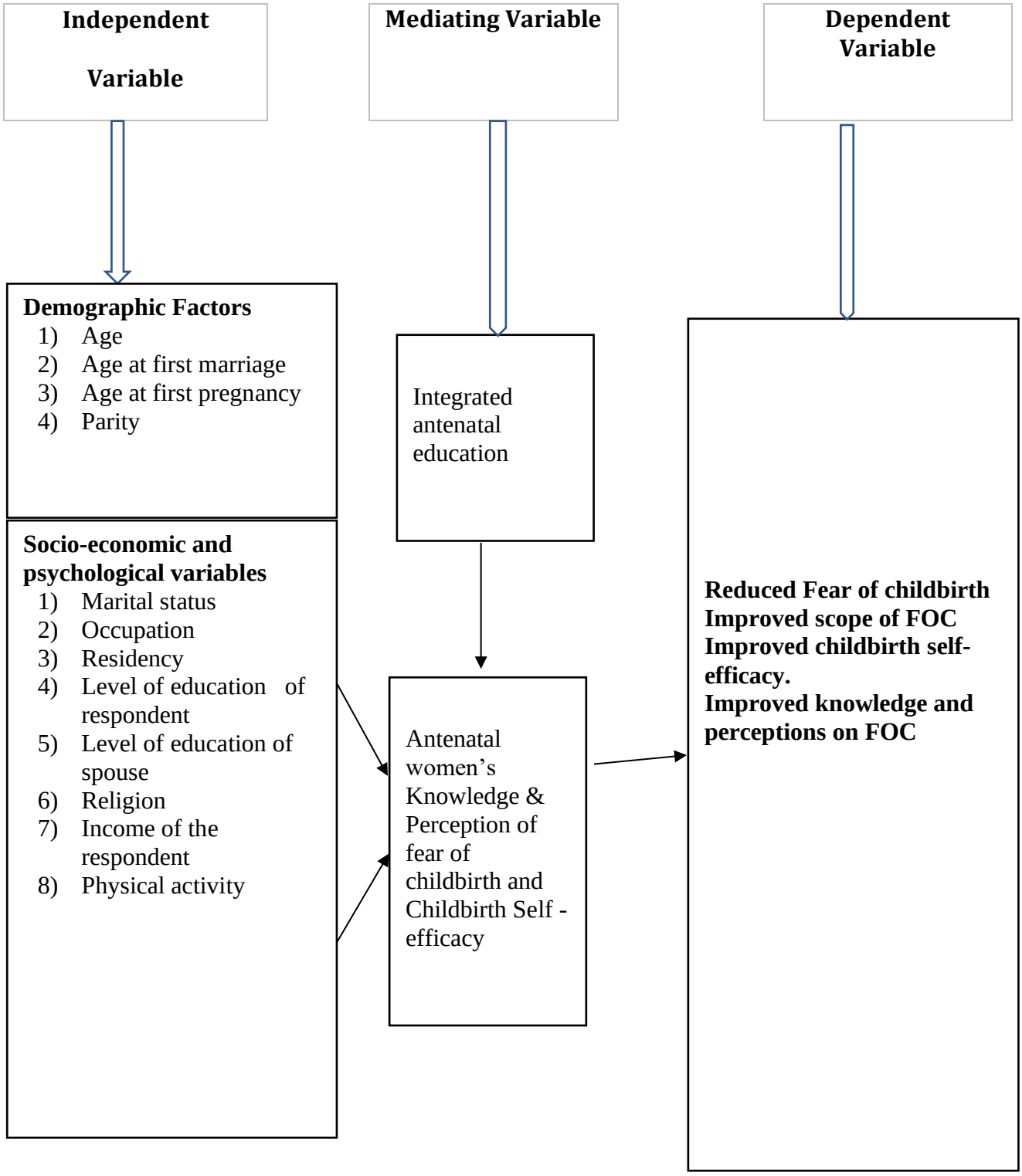


Figure 1: Conceptual Framework (Modified from PRECEDE Framework)

CHAPTER 2: LITERATURE REVIEW

2.0 Introduction

This chapter will review several pieces of literature related to the current study. It will have the following sub-headings: fertility and human reproduction, the concept of antenatal fear of childbirth and its contributing factors; the global, regional and local situation of antenatal fear of childbirth; manifestation of antenatal fear of childbirth; and intervention measures to reduce the negative effects of antenatal fear of childbirth.

2.1 Fertility and human reproduction

Fertility is a person's ability to conceive. Studies have documented that in general, when a woman is unable to get pregnant even after at least one year of unprotected sex, she is considered to have infertility. According to the International Committee for Monitoring Assisted Reproductive Technology and the World Health Organization, infertility is defined as a disease of the reproductive system defined by the failure to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse [33]. Approximately 10-15 % of couples globally are impacted by infertility [34]. Infertility has several possible causes. In women, problems with ovarian function, obstructed fallopian tubes, or uterine abnormalities like fibroids are common causes. In men, infertility can be the result of disrupted testicular or ejaculatory function, or a hormonal or genetic condition.

Lifestyle factors are the modifiable habits and ways of life that can greatly influence overall health and well-being, including fertility. Many lifestyle factors such as the age at which to start a family, nutrition, weight, exercise, psychological stress, environmental and occupational exposures can have substantial effects on fertility. Equally, lifestyle factors such as cigarette smoking, illicit drug use, and alcohol and caffeine consumption can negatively influence fertility [35].

The age of a man or woman is a factor among others that can greatly influence fertility. The delay in childbearing is a result of a profound change in social customs, especially in high-income countries. Women frequently choose to pursue a career, and wait, often for a long time, for the stability of permanent employment before starting a family. By then, couples are in their third decade of life and their fertility has dropped. Their ability to have a child, who is considered a real investment, often unique and precious, may be severely compromised. For many, the opportunity may have already passed them by [36]. Fertility peaks and then decreases over time in both men and women; thus the reproductive timeline may be one aspect to consider when determining the ideal time to start a family [37]. As men age, testosterone levels begin to decrease and hypogonadism results [38]. Equally studies have indicated that, for older men, semen parameters begin a steady decline as early as age 35. As the semen volume and motility decreases, morphology may become increasingly abnormal [39]. After the age of 40, men can have significantly more deoxyribonucleic acid damage in their sperm, as well as decline in both motility and viability [38].

Studies have also noted that the older population tended to consume more alcohol, have intercourse less often, have longer contraceptive usage, and smoke cigarettes which could have been confounding factors. Another study found that there are also exponentially fewer infants born to fathers aged 35-39 and older compared to younger age groups even when controlling for female age [40].

Women on the other hand have a complicated reproductive timeline. A woman is born with all the oocytes she will ever have in her entire reproductive life, and only 400–500 is actually ovulated. As the number of oocytes decline, a woman’s menstrual cycle shortens, infertility increases, and menstrual irregularity begins 6–7 years before menopause. Existing literature has demonstrated that women under the age of 30 have a relatively high chance of conceiving at approximately 71% [34]. As they get older, there is a steady decline to about 41% by the

time they reach 36 years of age. At this age, their chances of becoming pregnant and the ability of their body to maintain a pregnancy are affected as well. Studies have reported that in a population of women, the number of infants born begins to significantly decrease after the age bracket of 35–39years. The odds of becoming pregnant and retaining a pregnancy are thought to be connected to several factors, including euploidy. Euploidy has been found to be inversely correlated with female age [41].

There have been studies that have reported that the rates of euploidy decrease by almost 50% for women under 35 years, decrease 40% for women between the ages of 35 and 40, and decrease 33.3% for women over 40 years. In addition, chromosomal abnormalities and aneuploidy may increase the risk of spontaneous abortion and implantation loss with increasing age. Largely, women's fertility is significantly lower in their 30s and 40s [42].

Physical, social, and psychological stress continues to be documented as a contributing factor in maternal and child health challenges. Infertility itself is stressful, due to the societal pressures, testing, diagnosis, treatment failures, unfulfilled desires, and even fiscal costs with which it is associated. Studies have shown that males who experienced at least two stressful life events before undergoing infertility treatment are more likely to be classified below the World Health Organisation's standards for sperm concentration, motility, and morphology [41].

In a study of 950 men led by Gollenberg et al., [43] stress such as a pressure from work, life events, and even social strain were seen to have a significant impact on sperm density (log scale, $\beta = -0.25$; CI −0.38 to −0.11), total sperm counts (log scale, $\beta = -0.30$; CI −0.45 to −0.15), forward motility (OR 1.54; 95% CI 1.04-2.29), and morphology (OR 1.93; 95% CI 1.02-3.66). Stress and depression are thought to reduce testosterone and luteinizing hormone pulsing, interrupt gonadal function, and ultimately lower spermatogenesis and sperm parameters. It has yet to be determined if depression causes low testosterone, or if low

testosterone can cause depression. Although there appears to be a relationship between stress and infertility, it is uncertain which is the cause and which is the effect [44].

Stress can increase after diagnosis of infertility, follow-up appointments, and failed in vitro fertilization treatments. When men present to fertility clinics, it has been documented that about 10% meets the criteria for having an anxiety disorder or depression, the latter being more prominent [41]. Coping with various life styles also affect fertility. Studies have indicated that actively coping with stress, such as being assertive or confrontational, may negatively impact fertility by increasing adrenergic activation, leading to more vasoconstriction in the testes. This may result in lower testosterone levels and reduced spermatogenesis. While men are not often thought to report their anxiety or sexual stress, the link between anxiety and sexual stress has been documented to be strong. Decreased stress levels have been associated with improvements in fertility [41].

Physical stress has been associated with inducing female fertility. A study on the influence of maternal and paternal factors on time to pregnancy undertaken in a Dutch population indicated that women who had a job and worked more than 32 hours a week experienced a longer time to conception compared to women who worked 16 to 32 hours a week [45]. Psychological stress, such as anxiety disorder or depression, affects 30% of women who attend infertility clinics, possibly due in part to infertility diagnosis and failed treatments. However, this rate is not any higher than women who attend a gynaecological clinic, but it is significantly higher than women in their second trimester of pregnancy [41].

Receiving instruction on how to deal effectively or merely receiving support has a remarkable difference for women undergoing fertility treatment. There is a higher conception rate for women who are part of a cognitive behavioural intervention group or a support group than for those women who are not receiving any intervention. Women who receive support and counselling may reduce their anxiety and depression levels, and increase their chances of

becoming pregnant [46]. Positive moods correlate with increased chances of delivering a live baby while higher levels of anxiety increase chances of stillbirth [47]. Fertilization of oocytes also decreases when stress increased. A possible explanation for these associations may lie in stress hormone levels. Studies have reported that alpha amylase, but neither cortisol nor adrenalin, negatively correlated with fertility, and that the chances of conceiving in the short time period surrounding ovulation may decrease. Although the mechanisms by which alpha amylase may decrease fertility are unknown, it is hypothesized that catecholamine receptors could alter the blood flow in the fallopian tubes [40].

2.2 The Scope of antenatal fear of childbirth

Pregnancy and childbirth are normal physiological events that are closely associated with great emotional, psychological and cultural significance for pregnant women and their families. Studies have demonstrated that while childbirth can be frightening and challenging especially for the first-time mothers, it can also be one of the most accomplishing and potent experiences in the lives of expectant women [48].

For over three decades, researchers have been showing steady interest in the study of the fear of childbirth [49], which affects both nulliparous and multiparous women. Also known as tokophobia, the fear of childbirth is a phenomenon that has been widely researched, yet there is no agreement in regards to the universal definition of the fear of childbirth. It is important to note that it is not easy to compare studies, clinical data and experiences on this topic since the whole problem and diagnosis are poorly defined. However, there is general agreement on the existence of the condition and the fear of childbirth, also known as tokophobia has since received medical significance in the spectrum on maternal and neonatal health and wellbeing [50]. In general, the fear of childbirth can be seen as an anxiety disorder or as a phobic fear manifesting as nightmares, physical complaints and difficulties in concentrating on work or on family chores. It is a recurrent phenomenon and has negative effects on the pregnancy and

childbirth process. The experience of women's pregnancy has been known to have both direct and indirect impact on their health and wellbeing, their newborn baby and the entire family [51]. Equally, there is a distinct relationship between the fear of childbirth and prolonged labour leading to expectant women suffering unnecessary labour pains. As a result, more pregnant women become exposed to childbirth fears, thus shifting to elective caesarian section [52].

Pregnant women with high fear of childbirth are more prone to low self-esteem and there is a correlation between fear of childbirth and mental health conditions. Depression and anxiety during pregnancy has been studied widely and its relationship with FOC has been documented [8]. For example, clinical anxiety and fear of childbirth consist of different aspects in different women. Studies have identified three dimensions of prenatal anxiety namely: pregnancy and childbirth, parenting the child, and the general psychiatric symptomatology. Of the three, anxiety during pregnancy is associated with several adverse maternal and child health outcomes such as postpartum depression, preterm birth, low birthweight and subsequent developmental and mental health challenges in children [53].

2.3. The Reasons, prevalence and clinical manifestation of the fear of childbirth

The fear of childbirth is experienced by almost all pregnant women and it can be seen as a biological, social, psychological or secondary stressor [54]. Previous psychological morbidity and a high number of daily stressors have the potential of exposing pregnant women to a higher risk of fear of childbirth. Research has demonstrated that the prevalence of the fear of childbirth ranges between 2- 20% [7], [55], [56] and the situation is worse among female adolescents [57] and women who are giving birth for the first time [58]. The severity of the labour pains for first time mothers is a key determining factor for the choice of mode of delivery in consecutive births. About 6-10% of antenatal fears are specifically attributed to fears related to delivery and are presented in the form of anxiety. An extra 13 percent of non-pregnant women are very

fearful of parturition delays due to either lack of or limited information regarding pregnancy and childbirth [59].

Severe fear of childbirth may represent initially as general anxieties and as they continue to increase, they may yield to a distressful life of the pregnant women which in the end may directly and indirectly affect their day to day's activities. There is a close relationship between the fear of labour pains and the fear of childbirth. Pregnant women with fear of pain during labour have been found to have the fear of losing control during delivery. Studies have shown that the majority of the women, more so in western countries who seek caesarean section (CS) as a preferred mode of childbirth, are generally fearful of the childbirth pain [60]. They choose CS even though the majority of them are cognizant of the maternal risks associated with CS compared to vaginal deliveries such as deep vein thrombosis, pulmonary embolism, hemorrhages, increased possibility of endometritis, sepsis and thromboembolic events [61]. In comparison with vaginal birth after CS, neonates born after electives repeat CS delivery have significantly higher rates of respiratory morbidity and hospital admissions and longer length of hospital stay. In the long-term, CS deliveries may lead to the rapture of the uterine, placenta previa and accrete, preterm delivery, and although not so common, it can lead to subfertility, stillbirths and miscarriages [62].

2.4. Factors associated with the Fear of Childbirth

Several researchers and specialists in maternal and neonatal health have given different reasons for the fear of childbirth. The majority of nulliparous women are more concerned with the outcome of their pregnancy, more specifically, the fear of giving birth to a baby with deformities, complicated natural childbirth leading to emergency caesarean section, austere pain experienced during delivery, provocation by healthcare providers during labour and delivery, inauspicious birth delivery environment leading to contamination and nosocomial infection of the women and their neonates and fear of death of both the mother and the neonate

and post-traumatic stress related to post-delivery [63]. For the expectant women giving birth to their second child, there is evidence from research demonstrating that if their previous pregnancy was either complicated or unsuccessful, it will have a direct link to present expectations for their delivery [6]. Generally, the knowledge of childbirth is a multifaceted outcome since it can only be measured retrospectively after undergoing all the labour stages [24] and it comes with a myriad of feelings ranging from unbearable pain to unending happiness depending on the delivery outcomes [42].

Pregnant women who lack social support are likely to develop the fear of childbirth. Both emotional, informational and instrumental support are paramount in reducing prenatal fear of childbirth. Social support is crucial for the general well-being more so for women who have undergone unpleasant childbirth experiences [64]. Good and positive couple support is very important during pregnancy and delivery as it creates a conducive environment for the pregnant women to freely express their concerns and any issues with their couples.

There is also an important aspect of maternal care support and respect from the healthcare providers. Expectant women very often need social support and information from maternity care institutions, and this would include helping them in making decisions to undergo screening for the purpose of reaching out for treatment of the fear of childbirth particularly for pregnant women with clinical manifestation of the fear of childbirth [65].

During antenatal care visits, the healthcare providers should be able to dispel rumors, horror stories, innuendos and misconceptions about childbirth [66], and they should be able to assure the pregnant women that their worries and concerns will be taken care of during the routine antenatal clinics and even during labour.

Antenatal depression as a psychiatric disorder, manifests mostly during pregnancy and is known to cause alteration of normal fetal development with a long-term effect on the child's

neurological and general behavioral development [64]. Antenatal depression is linked with adverse obstetric and mental health outcomes [67], [68]. Studies have indicated that the projected prevalence of antenatal depression in developed countries ranges from 7-20% [69], while in low- and middle-income countries it is estimated to range from 21.4-29.6% [70]. This kind of depression has been known to be among the leading causes of perinatal morbidity and mortality among pregnant women [71].

2.5. Childbirth self- efficacy and its association with the Fear of Childbirth

Having confidence in labour and childbirth, also known as childbirth self-efficacy, has been identified as an important marker of women's coping abilities during labour and childbirth [72]. Bandura argues that perceived self-efficacy influences all aspects of behaviours, including the acquisition of new behaviours, inhibition of existing behaviours and disinhibition of behaviours [73]. Self-efficacy also affects people's choices of behavioural settings; the amount of effort they will spend on a task and the length of time they will persist in the face of obstacles. Self-efficacy is influenced by individuals' past experiences in mastering the situation at hand, the vicarious experiences of others, verbal persuasion, and the degree of emotional and physiological arousal [74].

Perceived self-efficacy to manage stressors plays a key role in anxiety arousal. Self-efficacy perceptions play an important mediating role in self-management activities, and also in adopting and maintaining health behaviour changes and health outcomes [73].

Studies have indicated that self-efficacy beliefs are closely related to clinical problems such as smoking behaviour change, weight loss and perceived labour pain management [72]. There is documented evidence of the relationship between self-efficacy and labour pain and medication usage, whereby the emotional and cognitive aspects of pain have been noted to be less painful for women with higher self-efficacy [75]. The self-efficacy beliefs shape the outcomes people

expect their efforts to produce. Those individuals with high self-efficacy expect to be able to realize more favourable outcomes.

Childbirth is a worrying experience and pregnant women cope with it in many different ways and with varying degrees of personal satisfaction [16]. A particularly important aspect of coping is the confidence one has in her ability to cope and results from different previous studies have shown that self-efficacy towards the estimated success in coping with labour is negatively correlated with the intensity of perceived pain during labour [24].

Generally, four main factors may influence self-efficacy for childbirth: Successful coping experiences with a specific situation (such as past childbirth or previous experience with pain), observation of successful coping by others (such as watching an actual birth or a birth film), encouragement of influential persons (such as childbirth educators and peer counsellors) and somatic reactions (such as nausea or panic) in response to autonomic arousal during anticipation or experience of a stressful event [76].

Studies have shown that childbirth self-efficacy is associated with improved perinatal outcomes. More specifically there are positive associations between the increase of antepartum and intrapartum childbirth self-efficacy enhancing interventions and greater childbirth self-efficacy and decreased childbirth emotional or cognitive distress during labour. More preliminary studies have linked greater childbirth self-efficacy with improved parenting outcomes [75].

The relationship between greater childbirth self-efficacy and pregnant women's intentions for care has been studied. There is an indication that women with greater childbirth self-efficacy have shown great intention to attempt vaginal birth after a caesarian section. Similar studies have also demonstrated that women with high maternal self-efficacy have a greater intention to use non-pharmacological pain coping strategies during labour.

Based on the existing literature, childbirth self-efficacy may be a psychosocial variable that can be strengthened during pregnancy, and increased strength may lead to better outcomes for pregnant women.

Childbirth self-efficacy would be increased through either prenatal yoga intervention or a childbirth educational intervention but the mode of delivery of the interventions may have an impact on the success of the intervention. In Europe, the question of how language may impact on a woman's self-efficacy in labour and birth has been studied using a grounded theory approach. In this study the researchers specifically examined the aims, language and actions of yoga for pregnancy teacher [77]. Four themes were identified from this study: building confidence, creating a sisterhood, modelling labour, and enhancing learning; and each of these themes had different subthemes. Of the four themes, building confidence involved the use of positive language, imagery and positive affirmations, to 'emphasize how strong and capable women's bodies were and how beautiful birth can be'. Creating a sisterhood integrated storytelling from other experienced mothers in the group and the childbirth educators. While enhancing learning included creating an atmosphere through tone of voice, soothing words, and use of metaphor. Modelling labour was another theme and focused on the repetition of words and postures in order to imbed phrases in the pregnant woman's mind. The language of encouragement was also highlighted as a way of stimulating positive motivation, with antenatal groups being identified as one opportunity where this can occur. This is particularly important because positive language has been linked to improved maternal outcomes.

In many regions globally, the traditional interventions associated with improved childbirth self-efficacy have radically changed over time. There is a proactive approach on focused group discussions, thus pregnant women have the opportunity to ask questions from the facilitators who in most cases are healthcare providers working in maternal and child health clinics where they go for routine antenatal clinics [78].

2.6 Health-related effects of the Fear of Childbirth for pregnant women

Pregnant women with fear of childbirth may be aggrieved with frequent, infuriating and painful thoughts during the day or night which make them feel tense, anxious or restless. They may suffer from nightmares, physical symptoms, and lack of concentration at work or home and they may have more daily stressors, fatigue and less social support [59].

Studies have shown that pregnant women with high or severe fear of childbirth receive significantly more psychotropic medication compared to women without fear of childbirth. Equally, they are more likely to experience induction during labour and also may prefer to give birth by CS [79].

A similar study has shown that women who are afraid of birth in their adolescent years and suffer from the fear of childbirth during pregnancy are more likely to experience unbearable pain and fear during childbirth, even when they have epidural anaesthesia. Consequently, prolonged duration of birth and a negative childbirth experience may be experienced [80].

The fear of childbirth during pregnancy is a significant risk factor for post-traumatic stress disorder one month after birth. Women with FOC may decide not to become pregnant again or delay further pregnancies. It is reported that FOC is one of the leading reasons for elective CS in both developed and developing countries [60].

The antenatal fear of childbirth may have adverse effects on uterine blood flow parameters and is closely related with an increased level of cortisol hormone in maternal blood due to the activation of the hypothalamic-pituitary-adrenal axis. This has the potential of causing harmful effects on the development of the infant both intrauterine and after delivery [53].

2.7. Interventions for reducing antenatal Fear of Childbirth

Studies have shown that the fear of childbirth has a potential of obscuring pregnancy and can cause manifestations of anxiety, depression and stress which may result in physical and

psychological disorders such as hypertension, and post-traumatic stress disorders [81]. A number of studies have assessed various interventions for reducing the fear of childbirth during and after pregnancy [7], [75], [82]–[84].

There exist a wide variety of names given to the provision of antenatal education and various terms are used to indicate similar offerings such as antenatal education, prenatal education, childbirth education, antenatal classes, prenatal classes, childbirth classes/birth classes, preparation for parenthood/parenting and birth preparation classes. Various researchers have applied different methodologies in undertaking the intervention and there are different terminologies that have been applied to demonstrate the interventions as discussed below.

2.7.1. Mindfulness-based childbirth education

This is an intervention which has been applied in reducing maternal stress and improving the psychological functioning of pregnant women during their pregnancy phase and has a potential to reduce the impact of stress, improve psychological well-being and increase positive effects, alleviate anxiety and depression, prevent relapse or recurrence of major depressive disorders and substance abuse. This method involves cultivation of moment-to-moment awareness and sharing experience with a non-judgmental attitude. The capability to direct one's attention in this way can be developed through exercising meditation [76]. In this regard, individuals participating in mindfulness-based childbirth education are encouraged to participate in the internal experiences occurring in each moment such as bodily sensation, thoughts and emotions [76].

In mindfulness- based childbirth classes, there is no judgment in terms of good or bad, true or false, health or sick on the phenomena that the study participants get to be aware of; such as perceptions, cognitions, emotions, or even sensations. Therefore, mindfulness is said to be a non-judgmental observation on the ongoing stream of internal and external stimuli as they

arise. There is sufficient evidence showing the merits of applying mindfulness- based intervention in the treatment and prevention of psychological dysfunction in a broad range of cohorts of people [85]. There have been positive reports from studies on the mental health benefits for expectant mothers, their couples and support partners as it helps in reducing anxieties, depression and negative thoughts about pregnancy and childbirth.

Studies have indicated that mindfulness- based childbirth education would be helpful in preventing major relapse of major depressive disorders. Practicing mindfulness- based childbirth training has a potential of changing the thought patterns or attitudes about someone's thoughts. Mindfulness training may enable formerly depressed individuals to notice depressogenic thoughts as to redirect attention to other aspects of the present moment such as breathing, walking or environmental sounds thereby avoiding rumination.

Equally, it has been noted that a realistic advantage of mindfulness-based skills in encouraging cognitive change is that they can be practiced at any time, including during periods of remission, when depressogenic thinking may be occurring too rarely to permit regular practice of traditional cognitive therapy exercises, such as identification and disputing of cognitive distortions [86].

2.7.2. Self-hypnosis

Self-hypnosis combines the creativity of imagery with self-regulation to achieve improved behavior and learning. Although this method does not directly address the main neurocognitive process of attention, it directly reduces anxiety and improves an individual's capacity to recognize associated difficulties, development of coping strategies and improved attitudes [84].

Hypnosis has been used for achieving relaxation, relieving pain, helping with physical discomfort (even chronic pain), and altering moods. Hypnosis is multidimensional and helps patients develop a heightened focus on an idea or image [85]. The process may be brief or may involve complex instructions depending on the subject, the goal, and the therapist. Hypnosis

has been shown to be effective in patients whose FOC is high and those whose symptoms have an emotional component.

Autogenic training technique is a form of self-hypnosis which is commonly used and it consists of a series of six mental exercises used to elicit the bodily sensation of the warmth and heaviness Autogenic training has the potential of producing the physiological changes of the relaxation response. The exercises should be practiced several times a day until the subject is able to shift voluntarily into this state of reduced stress [85].

Another form of self-hypnosis is guided imagery in which the fearful woman uses an image of her own creation after an initial relaxation period to help reduce FOC symptoms. This method is particularly effective with pregnant women with an active and vibrant imagination [87]. Studies have indicated that self- hypnosis technique can be effective since if well followed, a habit can be created in about 21-30 days. Within this short period, there is a possibility of reducing a variety of somatic symptoms as it facilitates systematic desensitization.

2.7.3. Psycho-education

Psychoeducation is a program in which health care providers use systematic and psychosocial techniques to create the desired behavior change. Psychoeducation programs include not only a didactic narrative of the situation but also specific cognitive and behavioral strategies and it aims at enabling the individual to understand and accept the essence of the problem [88], [89].

Studies have indicated that the programme has been an effective approach in reducing FOC. Psychoeducation programme aims at enabling the fearful pregnant women to understand and accept the essence of the problem (the current situation), to identify the interventions in dealing with the problem, and to actively participate in the solution process. Within the extent of the psychoeducation program, cognitive coping strategies are defined as individual awareness, supporting autonomy and independence, increasing functionality, and creating realistic expectations. Behavioral approach strategies are used along with cognitive approaches by using

the psychosocial and educational techniques in psychoeducation [90]. Cognitive approach strategies aim to help the individual explore different ways to solve the problem and to change his/her perception of the problem. Behavioral approach strategies include developing an action plan for the current situation through the development of problem-solving skills. Psychoeducation provides opportunities not only for information but also for providing a safe environment, expressing emotions, instilling hope, and developing strategies for self-recognition and new learning practices.

Studies have documented two forms of psychoeducation programmes meant for the reduction of FOC. The first one has seven steps identified by Rouhe et al., [82] and the second has four sessions and it is premised on the PRIME model (Promoting Resilience and Mothers' Emotion) that was developed by Fenwick et al.,[88].

2.8 Integrated antenatal education and the Fear of Childbirth

Integrated antenatal education is a formalized, defined, descriptive and goal-oriented programme with specific purpose and target audience [91]. There are several synonyms or terms that have been used to define integrated antenatal education such as childbirth educational programme, prenatal classes, and child preparation classes. Studies have demonstrated that antenatal educational interventions can provide information about the pregnancy and childbirth process. This could be on an individual or group basis and studies have reported that the mode of delivery could include home visit programme, peer education programme or clinic appointments [92].

Integrated antenatal educational programmes can be provided by specialist health professionals such as gynecologists, midwives or nurses, working in Public or private institutions. The programme is significant in preparing pregnant women for their pregnancy, delivery and parenthood.

Studies have researched the effects of an integrated antenatal education on pregnancy, delivery and post-partum period and have demonstrated clearly that pregnant women who undertake integrated antenatal education programmes show positive changes in their general health behavior and improved quality of life [24]. First-time parents, in particular, have fears and concerns about pregnancy and delivery. The purpose of integrated antenatal education is to help couples make the right decisions during pregnancy, delivery and postpartum period [93].

Although studies showed that integrated antenatal education increased maternal knowledge about birth, birth satisfaction, childbirth-related self-efficacy and sense of control in birth; most of these studies have been conducted in western countries and little has been done in developing countries. To the best of our knowledge, the integrated antenatal education programme has not been undertaken in Kenya and therefore, the study aimed at determining if there are any effects of integrated antenatal education programme on the fear of childbirth.

2.9 The role of midwives in the management of the Fear of Childbirth

The analysis of midwifery and nurses' care for pregnant women with high or severe FOC has progressively been the attention of researchers in recent years. Midwife-led pre-birth counselling for the fear of childbirth is customarily supposed to be offered in maternal and child health clinics during routine antenatal care clinics but this has not been the case in many developing countries although it is a common practice in developed countries. Unfortunately, in both cases, there are no standard training modules specifically focusing on the fear of childbirth [80].

The goal of midwifery care is to support pregnant women in their wish for a positive childbirth experience and safeguard the health of both the mother and the infant, regardless of the mode of delivery. When a pregnant woman expresses strong fear, a midwife should listen to her, provides counselling and supports her, enabling her to cope with her fear. The request for a CS due to the fear of childbirth is an indication that the pregnant woman needs help and therefore

as a matter of urgency, an antenatal care pathway including a detailed assessment of the underlying causes, the offer of tailored support and the promotion of evidence-based decisions about the mode of birth should be provided [94]. Referral to a specialist with expertise in perinatal mental health is an essential part of quality care that should be given; if the woman's desire for a CS persists after preliminary counselling, a planned CS would be offered. In this regard, therefore, when assessing the effectiveness of interventions for pregnant women with high or severe fear of childbirth, the relevant outcomes are not exclusively the vaginal birth rate, but the woman's physical and mental wellbeing during pregnancy and perinatally, her birth experience, and satisfaction with her evidence-based decision making [95].

CHAPTER 3: MATERIALS AND METHODS

3.1 Introduction

This chapter will be looking at the study methodology, steps and processes that were followed in conducting the current study.

3.2 Research Design, methodology and procedures applied

The current study employed a mixed-method research design by combining both qualitative and quantitative approaches [96]. Studies have shown that mixed-method research design enables triangulation of the study results as well as seeking to extend the breadth and range of inquiry by using different methods for different inquiry components [97].

3.3 The anatomy of the current study (study flow diagram)

The study comprises seven parts of which the first two and the last (study seven) are independent. The first study is evaluating the readability of W-DEQ-A, a common tool used in screening for the fear of childbirth. The seven scales used in the first study include: the Flesch Reading Ease Formula, the Flesch-Kincaid Grade Level, the FOG Scale, the SMOG Index, the Coleman-Liau Index (CLI), the Automated Readability Index (ARI) and the Linsear Write Formula.

The second study is looking at the psychometric properties of the W-DEQ-A. The questionnaire was translated and tested for its validity and reliability to be used in the Kenyan context. All the procedures of translation and validation were undertaken using exploratory and confirmatory factor analysis.

The third study was on the prevalence of the fear of childbirth on women of reproductive age in Kenya. The translated version of W-DEQ-A from study two was applied in this third study. This was a very important study as its findings informed the fourth and sixth study. Data analysis was critically performed so as to get the prevalence of the fear of childbirth among

women of reproductive age in Kenya.

The fourth study was linked with study three as those women who were found with high fear of childbirth were requested to be recruited in this study. This was a single blind randomized controlled study whereby the study participants were recruited as either intervention group or control group. The study participants in the interventional group underwent an integrated antenatal education on the fear of childbirth module that was developed through a rigorous review of the existing literature on the interventions on the fear of childbirth. Study participants in the control group underwent the routine antenatal clinics.

The fifth study was directly linked with the fourth study. Women who attended the integrated antenatal education were recruited voluntarily to this qualitative study which aimed to understand their experience regarding the integrated antenatal education and its effects on the fear of childbirth.

In the sixth study, the study participants who had participated in the third study and had given birth at the health facilities were asked to share their views on whether institutional maternity services contribute to the fear of childbirth. This was a qualitative study that applied thematic analysis methodology.

Finally, the seventh study was an independent study also closely related with the overall theme of the other studies (fear of childbirth). In this study the Fear of Birth Scale was used in data collection with the aim of understanding the rates of childbirth fears among pregnant women and their spouses. All these steps are diagrammatically presented in figure 2.

Each of these seven studies have been highlighted in the proceeding pages. The methodology used in recruiting study participants, the procedure of data collection, analysis and presentation have also been highlighted in detail.

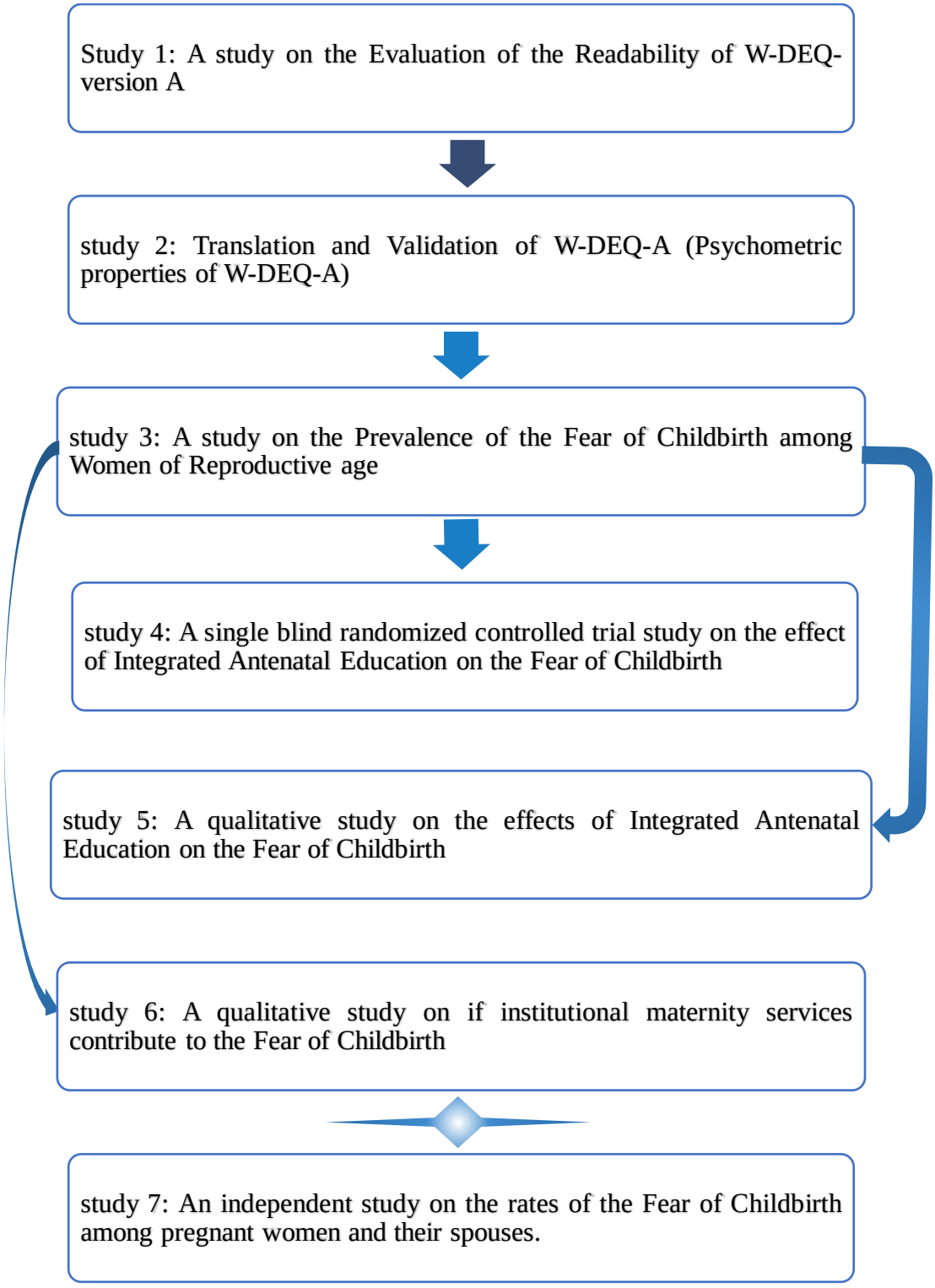


Figure 2: Anatomy of the study (study flow diagram)

3.4.1 Study 1: Evaluating the readability of Wijma Delivery Experience/Expectancy Questionnaire version A (W-DEQ-A) among pregnant women in Samburu County, Kenya

The first study aimed at exploring the fear of childbirth through evaluation of the readability of Wijma Delivery Expectancy Questionnaire Version A (W-DEQ-A). This study used a mixed-methods approach; first by evaluating the readability of the W-DEQ-A using 7 validated readability scales and then a focus group discussion (FGD) to validate the results derived from the readability scales. In the FGD part, a total of 26 women of reproductive age took part. The study participants had relatively homogenous socio-demographic characteristics. The first and second FGDs had seven participants each, while the third and fourth FGDs had six participants each. The recruitment was done in three selected geographical locations in Samburu Central Sub- County, comprising urban, peri-urban, and rural settings.

Before participating in the FGDs, the identified women were briefed about the purpose of the study and those who agreed to participate were given a specific date for the FGDs. This study took place between June and July 2019. The inclusion criteria for the study participants were: at least 18 years and not older than 45 years, having at least one successful pregnancy in the last three years, able to read, write, and speak in English. Each FGD took between 32-57 minutes. Study participants consented by signing a consent form. We excluded women with a history of miscarriages, psychiatric illnesses, perinatal losses, and those who had serious maternal medical conditions. Also, those who would not read, speak, and write in English were excluded from the study.

Data collection procedure

To evaluate the readability of the W-DEQ-A the 33 items in the W-DEQ-A tool [61] were converted into brief statements in prose form (Table 1). The brief statements were then entered into an online site [62] (https://readabilityformulas.com/free-readability-formula-tests.php),

which gave a readability score for each of the seven scales that were used. The seven validated readability scales used in this analysis are briefly defined and explained below.

1. ***The Flesch Reading Ease Formula****:* This has been cited as one of the oldest and most accurate readability formulae used to assess the difficulty of reading passages written in the English language. It uses the following formula: ***RE = 206.835 - (1.05 × ASL) - (84.6 × ASW),*** where RE = Readability Ease, ASL = Average Sentence Length, and ASW = Average number of Syllables per Word. In this formula, a score of between 90.0 and 100.0 is considered easily understood by an average 5^{th} grader, 60.0 and 70.0 easily understood by 8^{th} and 9^{th} graders respectively; while scores between 0.0 and 30.0 are considered easily understood by college graduates [63].

2. ***The Flesch-Kincaid Grade Level****:* Different articles refer this formula with different names such as; Flesch-Kincaid Index, Flesch-Kincaid Grade Level Score, Flesch-Kincaid Scale, Flesch-Kincaid Score, Flesch-Kincaid Readability Score, Flesch-Kincaid Readability Statistics, Flesch-Kincaid Grade Level Index, Flesch-Kincaid Readability Index, and Flesch-Kincaid readability equation. It employs the following formula: ***FKRA = (0.39 × ASL) + (11.8 × ASW) – 15.59***, where FKRA = Flesch-Kincaid Reading Age, ASL= Average Sentence Length, and ASW= average number of Syllables per Word. A higher score in this formula is an indication of a lower grade completed and vice versa, for example a 4^{th} grader will score between 90-100 while a college graduate will score between 0-30 [63].

3. ***The FOG Scale***: This formula is also known as the Gunning Fog Readability Formula and/or FOG index. In this scale the mathematical formula used is***; GL = 0.4 (ASL + PHW)***, where GL= Grade Level, ASL= Average Sentence Length, and PHW = Percentage of Hard Words. In this formula, the authors concluded that short sentences written in plain English language achieve a robust score compared to long sentences

written in complicated language. The ideal score should be either seven or eight. The scores above 12 are said to be too hard for most people to read [63].

4. ***The SMOG Index****:* In this index, a sentence is defined as a string of words punctuated with a period, an exclamation mark, or a question mark. The following formula is used: ***SMOG grade = 3 + Square root of polysyllabic count***. It is suggested that the more the total polysyllabic word count, the more advanced the grade level of the reader. A total polysyllabic word count of between 1-6 indicates that the text is understood by an average student in grade five and a total polysyllabic word count of 73-90 is suitable for grade 12 readers [63].

5. ***The Coleman-Liau Index (CLI)****:* In this formula, instead of syllables per word and sentence length, it relies on characters and it uses the computerized appraisal to comprehend characters more clearly and precisely. Coleman-Liau Index uses the following formula: ***CLI= 0.0588L – 0.296S – 15.8***, where L = average length of letters per 100 words and S is the average number of sentences per 100 words. For example, the 10.6 index means that the text is appropriate for a 10-11th grade reader [63].

6. ***Automated Readability Index (ARI)****:* Just like Coleman-Liau Index, the ARI relies on a factor of characters per word, and not syllables per word and sentence length. The index is premised on the assumption that the number of characters is more readily and precisely counted by computer programs than syllables. The following formula is used in calculating the **ARI: 4.71 (**$\frac{character}{words}$**) + 0.5 (**$\frac{words}{sentences}$**) – 21.43** where characters are the number of letters and numbers [63].

7. ***Linsear Write Formula***: Like many other readability formulas, this was initially designed for the United States (US) Air Force to guide them to compute the readability of their official manuals. The formula is used to calculate the grade level of a text

sample based on the length and number of words used in a sentence where there are three or more syllables [63].

After undertaking the readability assessment highlighted above, qualitative in-depth FGDs followed. A soft copy of W-DEQ-A in the English language was sent to the study participants before the start of the FGDs. The participants were required to read all the questions and note down any items/ questions or sentences that were not clearly understood, any difficult/confusing word/words, any statements that were perceived to be irrelevant, and also to make comments on the readability of the questionnaire. They were also tasked to make any observations, suggestions, or comments on how the W-DEQ-A can be improved.

The FGDs interviews were initially recorded and then transcribed by three transcriptionists and appraised by the first author. An independent assessor reviewed 30% of the transcripts for consistency and reliability. Credibility and trustworthiness were further verified by an independent reviewer.

Table 1: W-DEQ-A converted into brief statements for readability testing

I	**How do you think your labour and delivery will turn out as a whole?**
Extremely fantastic, not at all fantastic.	
Extremely frightful, not at all frightful	
II	**How do you think you will feel in general during the labour and delivery?**
Extremely lonely, not at all lonely	
Extremely strong, not at all strong	
Extremely confident, not at all confident	
Extremely afraid, not at all afraid	
Extremely deserted, not at all deserted	
II	**How do you think you will feel in general during the labour and delivery?**
Extremely weak. Not at all weak	
Extremely safe, not at all safe	
Extremely independent, not at all independent	
Extremely desolate, not at all desolate	
Extremely tense, not at all tense	
Extremely glad, not at all glad	
Extremely proud, not at all proud	
Extremely abandoned, not at all abandoned	
Extremely composed, not at all composed	
Extremely relaxed, not at all relaxed	
Extremely happy, not at all happy	
III	**What do you think you will feel during the labour and delivery?**
Extreme panic, no panic at all	
Extreme hopelessness, no hopelessness at all	
Extreme longing for the child, no longing for the child at all	
Extreme self-confidence, no self-confidence at all	
Extreme trust, no trust at all	
Extreme pain, no pain at all	
IV	**What do you think will happen when labour is most intense?**
I will behave extremely badly, I will not behave badly at all	
I will allow my body to take control, I will not allow my body to take control at all	
I will totally lose control of myself, I will not lose control of myself at all	
V	**How do you imagine it will feel the very moment you deliver the baby?**
Extremely enjoyable, not at all enjoyable	
Extremely natural, not at all natural	
Totally as it should be, not at all as it should be	
Extremely dangerous, not at all dangerous	
VI	**Have you, during the last month, had fantasies about the labour and delivery, for example**
Fantasies that your child will die during labour/delivery?	
Never, very often	
Fantasies that your child will be injured during labour/delivery?	
Never, very often	

3.4.2 Study 2: Testing the validity and reliability of translated Swahili version of the W-DEQ-A among the Swahili speaking pregnant women in Samburu County, Kenya

The second study aimed to translate and test the validity and reliability of the Wijma Delivery Expectancy/Experience Questionnaire version A (W-DEQ- A)][98] into Swahili language which is a popular language spoken in Kenya. Pregnant women who were attending antenatal care clinics in a county referral hospital were assessed for their suitability to take part in this study. The Samburu County Referral Hospital was chosen as it was the main health facility offering comprehensive emergency obstetric care services in the region and therefore, it attracted clients from both urban, peri-urban, and rural geographical areas.

A convenience sampling methodology was employed in recruiting study participants who were in their third trimester. The study included both nulliparous and multiparous women with single pregnancy aged between 18-45 years, who were able to read and write both in English and Swahili. Expectant women who had previous negative childbirth experiences and those highly vulnerable to obstetric complications were excluded from the study. The women with a history of psychiatric illness were also excluded. Also, the study excluded women who were unable to read and write in the two languages mentioned above. Expectant women who met the inclusion criteria and were voluntarily willing to take part in the study were recruited after signing an informed consent form.

Recruitment of the study participants took place between May and September 2019. A total of 628 expectant women participated in the current study. This sample size was derived from published articles, which suggests that a minimum of three hundred study participants are needed to successfully run exploratory and confirmatory factor analysis [99], [100], or a ratio of ten participants per item for factor analysis [101]. The authors were cognizant of sensitivity in the two analyses regarding missing data and therefore a larger sample was determined. Most of the collected data was used for Exploratory Factor Analysis (n=376), while the remaining

was used to run Confirmatory Factor Analysis (n=252). This sample was reached after excluding questionnaires that had missing data.

Procedure

In this study, the W-DEQ-A was used. Permission to translate and use the questionnaire was sought and granted by professor Wijma. The second step was to translate the English version of the questionnaire to the Swahili language which is a common language used by the study participants. A professor of linguistics was tasked to translate the questionnaire to Swahili, followed by a review of the translations for consistency and conformity. The initial wordings were done by an independent reviewer who was an expert in the two languages. Later, two independent bilingual translators were tasked to translate back to English. In cases where there were differences in opinion regarding the transcripts, a third independent bilingual translator was called to arbitrate. The final step was the harmonization of the questionnaire after undertaking a pre-test with 13 pregnant women.

Study measures used in the study

Demographic data included age, level of education, marital status, employment status, residency, and parity were collected through a structured questionnaire. The other instruments used for data collection include:

W-DEQ-A is a 33-item questionnaire developed in Sweden by Klaas Wijma and psychometric analysis has shown it to be valid and reliable for women of all parity [98]. The tool has been used widely to measure FOC during and after pregnancy by evaluating women's feelings about their experience during pregnancy (W-DEQ-A) and after childbirth (W-DEQ-B). In the analysis, all the 33 items are assessed on a six-point Likert scale ranging from 0 (not at all) to 5 (extremely) to evaluate women's cognitive appraisal of the upcoming birth in the antenatal period and evaluate their experience after birth in the postnatal period. The lowest possible

score is zero and the highest possible score is 165. A higher score during the assessment is an indication of high fear of childbirth. A Cronbach alpha score of 0.89 for primiparous and 0.99 for multiparous women indicated good reliability of the questionnaire. Respondents are asked to imagine how their labour and delivery are going to be and how they expect to feel. In the W-DEQ-A, items 2,3,6,7,8,11,12,15,19,20,24,25,27 and 31 are positively framed and must be reversed to get the individual sum [102].

The second tool used in this study was the Edinburgh Postnatal Depression Scale (EPDS) [103]. This scale comprises 10 items that are self-rating for postnatal depression. A respondent is asked to check off one of the four possible answers that closely resonates with how she felt during the past week. The responses are scored from 0 to 3 based on the reported seriousness of the symptoms. Three items on the scale namely items 3,5 and 10 are reverse scored (from 3 to 0). The total individual score is derived from adding the scores of each of the 10 items. A total score of 0 to 6 infers none/minimal depression, 7 to 13 is an indication of mild depression, 14 to 19 is an indication of moderate depression and a score of 20 to 30 indicates severe depression. EPDS has been validated for use in expectant women and postnatal mothers. The current study used the Swahili version of EPDS since the tool has been translated into the Swahili language in Kenya. Our study reported a Cronbach's alpha ranging from 0.89 to 0.91

The third tool used was the Beck Anxiety Inventory (BAI) [104], which is a self-reporting inventory that is used to measure severe anxiety. The questionnaire has 21 items and respondents have multiple choice answers to respond to the level in which they have been bothered by each of the 21 symptoms in the week preceding the interview. The highest possible score is 63 while the lowest possible score is 0. A cumulative score of between 0-7 is interpreted as a minimal level of anxiety; 8-15 as mild anxiety; 16-25 as moderate anxiety, and 26-63 as severe anxiety. This tool is psychometrically valid with internal consistency (Cronbach's alpha ranges from 0.92-0.94).

In this study, the English version of the BAI was translated into the Swahili language which is a common language used by the study participants. A professor of linguistics was tasked to translate the questionnaire to Swahili, followed by a review of the translations for consistency and conformity. The initial wordings were completed by an independent reviewer who was an expert in the two languages. Later, two independent bilingual translators were tasked to translate back to English. In cases where there were differences in judgment regarding the transcripts, a third independent bilingual translator was asked to arbitrate. The final step was the harmonization of the questionnaire after undertaking a pre-test with 13 pregnant women.

Data analysis

Construct validity of W-DEQ-A was assessed using EFA and CFA and this was done in two steps. In the first step, the Statistical Package for Social Sciences version 23 (SPSS Chicago, IL, USA) was used. The Kaiser- Meyer- Olkin (KMO) was used to confirm the suitability of the data used for EFA and the values above 0.6 were deemed acceptable [70] as well as significant Bartlett's test of sphericity [105]. For extraction of factors, Principal Components Analysis (PCA) was used and Promax with Kaiser Normalization as a rotation method. To identify the accurate number of factors to be retained, the following criteria were employed: (i) Kaiser's criterion [99] (ii), retention of eigenvalues above 1 (iii), Cattell's scree plot [106] and (iv) parallel analysis [107].

The second step was to undertake confirmatory factor analysis, done by running the data in AMOS 25 software [108] to determine the unidimensional fit of the original W-DEQ-A scale and to validate the factor structure solution derived from step one above. Overall model fit was assessed by various fit statistics in AMOS 25. Considering that chi-square statistics and the associated *p*-value is very sensitive to sample size, the chi-square test divided by its degrees of freedom was considered in the current study. Further, two incremental fit statistics namely; comparative fit index (CFI > 0.95 good fit) and goodness of fit index (GFI > 0.95 good fit)

were reported. Also, the root-mean-square error of approximation (RMSEA<0.08 good fit) [76], Tucker- Lewis index (TLI >0.95 good fit) [109], Akaike information criterion (AIC- the smaller the better), and the standardized root mean square residual (SRMR <0.08 acceptable) [108] were considered. A minimum of three of the fix statistics within acceptable ranges was adequate in analyzing the goodness of fit of the current study data. Internal consistency and reliability were assessed using Cronbach's alpha coefficient and a level of ≥ 0.7 0 was considered acceptable.

Convergent and divergent validity was assessed by Spearman's rank correlation coefficient. This was done to determine the level of correlation between the W-DEQ-A scale (and its factors) and other scales used in the current study (BAI and EPDS) and a *p*-value of <0.05 was set as statistically significant.

3.4.3 Study 3: To determine the prevalence of fear of childbirth between the primiparous and multiparous women in Samburu County, Kenya

This study aimed at investigating the prevalence of the fear of childbirth among pregnant women in Samburu County Kenya. The study consisted of 376 pregnant women that were coming for routine antenatal care visits in Samburu County, Kenya where the whole study was being undertaken. The sample size was obtained through multistage cluster sampling. The study region (Samburu County) which was selected through simple random sampling from the 47 counties in Kenya had three sub-counties namely Samburu North, Samburu East, and Samburu Central. Through simple random sampling, the Samburu Central Sub-County was selected. The Sub-County had seven administrative wards with approximately 2747 deliveries annually. The sample size (n=385) was divided by the total number of deliveries in the health facilities in the seven wards to obtain the required sample size in each ward, and the result was multiplied by the population covered by each section as indicated in Table 2. Each of the seven administrative wards had a health centre which had the capacity to offer maternal and child

health services such as maternity wards, functional laboratories, essential medicines and equipment.

In each of the administrative wards, the sample was obtained by selecting the health facility with the highest population of pregnant women. The pregnant women who visited the health facilities formed a research unit.

Table 2: Sampling frame for study respondents

Sampling Unit	**Sampled Population.**	
Health facilities offering maternal health services in each Ward	Total population	Calculated sample
1. Angata	110	16
2. Baawa	79	12
3. Lodokejek	422	58
4. Loosuk	250	35
5. Maralal	1347	184
6. Porro	100	14
7. Suguta Marmar	439	66
Total	2747	385

The study included pregnant women (both primigravida and multigravida women), between the ages of 18 to 45 years, between 17 to 28 weeks of gestation; who were mentally sound. Expectant women who were below 16 weeks of gestation and above 29 weeks were excluded from the study Also, women with history of maternal complications, drug and substance abuse and with psychiatric illnesses were excluded. Also, to determine the relationship between the predictor variables and the FOC, the study included the following independent variables: marital status, literacy, age, gestation age, physical activity, regular pregnancy check-up, the trust of gravida women in the healthcare providers, the preferred mode of delivery, and gravidity.

The study used Wijma Delivery Expectancy/Experience Questionnaire version A (WDEQ-A)

and a self-developed demographic characteristic criterion to collect data from pregnant women who met the inclusion study model outlined above and had accepted to participate by consenting. The English version of the WDEQ-A was translated into the Swahili language after receiving permission to use the tool from Professor Klaas Wijma. This was done by two bilingual obstetricians (forward translation) and was reviewed and discussed in the context of Kenyan culture. The Swahili version was translated back into English by an independent professor of linguistics. The two versions were compared for clarity and consistency to reach a consensus on the final version.

The WDEQ-A measures FOC by asking pregnant women to rate the depth of their feelings against 33 items. Answers are given on a six-point scale starting from "not at all" (score is given as 0) to "extremely" (scores given as 5). The total minimum score is zero and the maximum is one hundred and sixty-five (165). A lower score indicates less FOC and vice versa. Scores are categorized into four: below a score of 37 is considered low FOC, 38-65 is moderate FOC, 66-84 is considered as high FOC, and above a score of 85 is severe FOC [7]. Internal consistency for this study was found to have a Cronbach Alpha coefficient of 0.916.

Data analysis

Descriptive and analytical statistics were conducted in all data using SPSS version 22. The mean, percentages, and frequencies were used to describe the data. Chi-square and binary logistic regression were used to establish the association between the independent variables (maternal characteristics) and FOC measured as a binary variable (the four categories of fear of childbirth (low, moderate, high and severe FOC) were recoded into two categories; low and moderate FOC were recoded into a new category of no FOC; high and severe FOC recorded into FOC. Logistic Regression was used to establish predictors to fear of childbirth among respondents. All estimates were reported with 95% confidence intervals (95% CI). Statistical significance was assumed with P-values less than 0.05.

3.4.4 Study 4: To evaluate the effects of antenatal education on the fear of childbirth among pregnant women in Samburu County, Kenya

The fourth study aimed to examine the effects of integrated antenatal education on the fear of childbirth. This study which was conducted between September 2019 and December 2019 in a maternal and child health hospital in Kenya was a single-blind randomized controlled trial comparing a group of pregnant women who undertook an integrated antenatal education module as an intervention group and the other group that undertook routine antenatal clinics without an integrated antenatal education module. This was a continuation from the third study reported above which was looking at the prevalence of fear of childbirth in a sample of gravida women in Kenya where a sample size of 376 pregnant women was screened and 22.1% and 8.0% were found to be having high and severe FOC respectively.

The pregnant women who were found to have high and severe FOC were asked if they would be willing to participate voluntarily in the current study and those who accepted were recruited into this study. Since the total number of those who were screened and found to be having high and severe FOC was relatively low (n=91), the principal investigator decided to increase the number by 30% to cater for the loss to follow-up. Additional screening was done and a total of 28 pregnant women who had a W-DEQ-A score of 67 and above were added, making the current study sample to be 119.

Inclusion criteria

Primipara women aged 18 to 45 years with singleton low-risk pregnancy were included in the current study. They were also required to be between 22 to 26 gestation weeks with no history of mental illness and with the ability to read and write either in English or Kiswahili language as the tools used for data collection were only available in the two languages. Equally, the included study participants were required to have no previous history of drug and substance abuse and had to accept voluntarily to participate in both interviews.

Exclusion criteria

The study excluded the pregnant women who developed complications during their pregnancy or childbirth, were unable to complete all the integrated antenatal education modules (the intervention group), were unable to read and write either in English or Kiswahili and those that were unable to participate in both interviews. Also, any woman who had a history of psychiatric illnesses were excluded. For the control group, those who failed to attend at least four routine antenatal clinics were excluded.

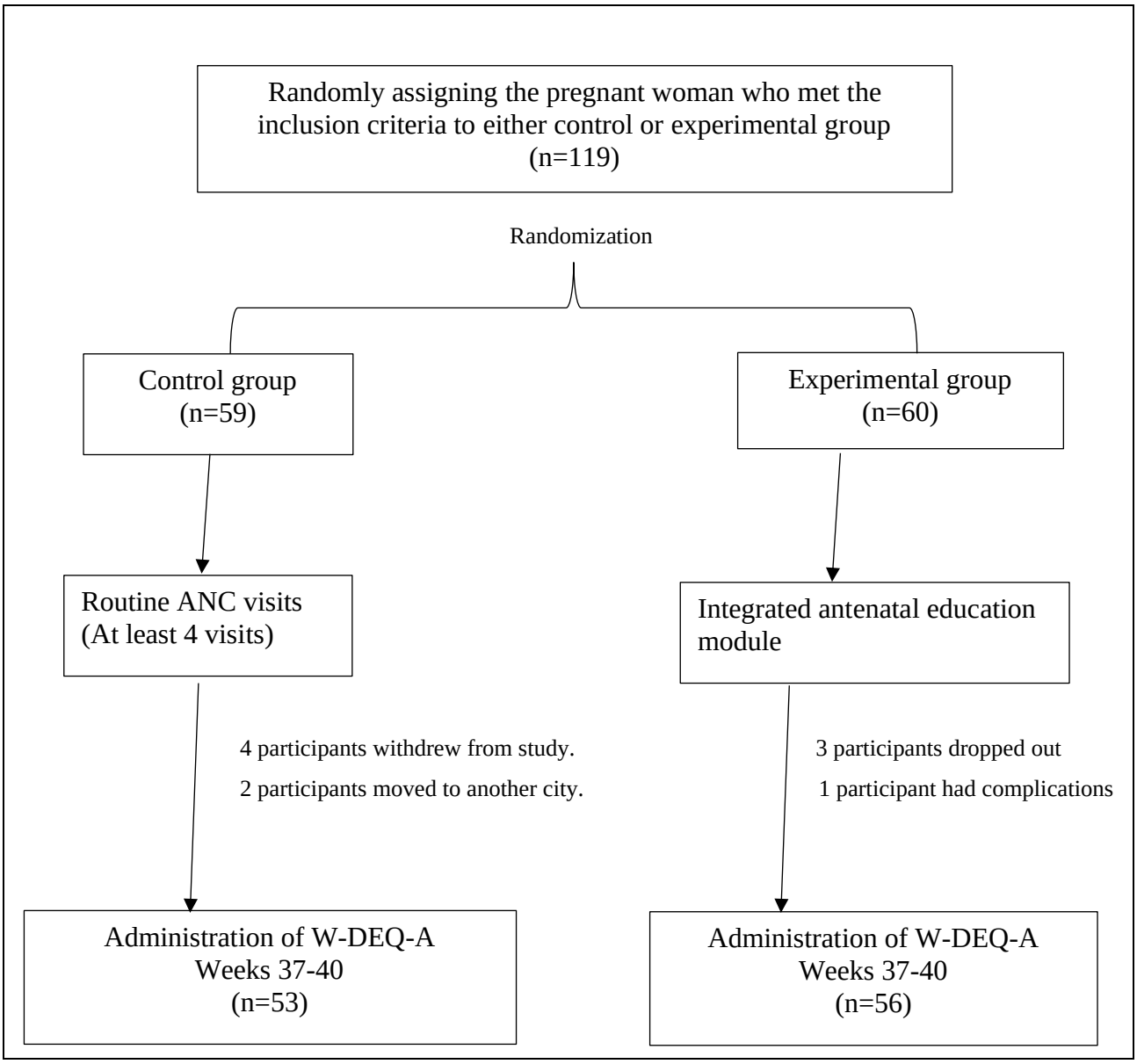


Figure 3: Single Blind Randomization

Randomization of the study participants

As indicated in Figure 3, this was a single-blind randomized controlled trial comparing a group of pregnant women who underwent an integrated antenatal education module and the control group that underwent routine antenatal clinics. The control group consisted of women who accepted voluntarily under the routine antenatal care clinic and met the inclusion criteria highlighted above while the intervention group consisted of women who voluntarily enrolled to the integrated antenatal education module and met the inclusion criteria.

Data collection

Data collection tools were administered via one-on-one interviews. Experienced midwives that had been trained interviewed both the control and the intervention group. The same methodology was applied in the second phase of data collection and the same midwives were tasked to do the data collection for consistency purposes.

Data collection tools

The Wijma Delivery Expectancy/Experience Questionnaire (W-DEQ-A) and demographic and obstetric data collection tools were used for data collection. The Demographic and obstetric Information Inventory consisted of items on personal characteristics such as age, level of education, marital status, residence, employment status, pregnancy status, and mode of delivery. The data collection was done twice for both groups. Before the initiation of the integrated antenatal education and after the completion of the integrated antenatal education.

Integrated Antenatal Education Training module

Studies have shown that there are doubts about the value of integrated antenatal education for managing pain and stress during childbirth. The approach to integrated antenatal education has not evolved at the same pace as obstetric practice. Nevertheless, integrated antenatal education continues to be a key activity of primary care midwives and nurses. It has been appreciated that

the integrated antenatal education is resource intensive and the demand has continued to grow. In the intensive review of literature, the current study wouldn't find any studies done in Africa evaluating its effectiveness and this necessitated the current study. The few studies done in North America, Australia, and Northern Europe tended to have methodological inadequacies, such as a relatively small sample size, failure to control for variables that might affect or influence the childbirth process and consideration of only one part of the birth process [24]. the beneficial effects of integrated antenatal education from the reviewed studies have indicated a relatively shorter delivery time, a better detection of labour, fewer interventions, a reduced desire for anesthesia, lower levels of anxiety and greater maternal satisfaction, lower rates of caesarean section [110],

The integrated antenatal education module in the current study comprised five modules of 120 minutes each with breaks in between. Each module had three sessions of 30 minutes each and a break of 10 minutes between the sessions. The integrated antenatal education module was planned to reduce antenatal fear of childbirth and also provide a conducive environment for a successful birth. The training sessions were conducted by four experienced midwives and four nurses who had been trained and also had participated in similar activities. Modes of delivery for the education modules were through visual aids, demonstrations, online videos and role plays. The participants also had a chance of visiting the delivery room so as to familiarize themselves with the processes that go on during childbirth. Each session had an average of 7 study participants. The training was carried out in one of the selected rooms in the maternity hospital and the contents of the training are highlighted in Table 3.

Table 3: Integrated Antenatal Training Module contents

Session	Topic/ Session content	Facilitator	Duration
1	Daily life in pregnancy and Raising women's awareness regarding antenatal emotional changes	Three trained midwives and one nurse in charge of Maternity	120 minutes
2	Birth and breathing exercise (this module included topics on triggering of labour, identification of onset of labour and when to attend the maternity unit, phases and course of normal childbirth, other types of delivery, possibility of instrumental delivery, breathing techniques, and epidural anesthesia)	Three trained midwives and one nurse in charge of Maternity	120 minutes
3	Health and nutrition including breastfeeding beliefs, myths, benefits and techniques, potential breastfeeding problems such as breast engorgement, nipple soreness, mastitis, breastfeeding twins and bottle-feeding	Three trained midwives and one nurse in charge of Maternity	120 minutes
4	Care for the mother and newborn during delivery, warning signs, affective development, acceptance of the newborn	Two trained midwives and two nurses in charge of Maternity	120 minutes
5	Postpartum periods and the care of the new-born including family planning	Three trained midwives and a gynecologist.	120 minutes

Key Messages on the application of the integrated antenatal education

• Maternal and infant health has been a priority long before the 1990s. Program implementation and activities are based on over a century of experience but integrated antenatal education on fear of childbirth has not been given much attention yet.

• A healthy start in life is a priority for all countries and a Safe Motherhood program is the best strategy to reach this goal.

• Family satisfaction with healthcare is a reliable indicator of the quality of medical care and overall quality of the healthcare system, more specifically the healthcare systems focusing on the mother and child.

• Women worldwide define quality perinatal care in the same ways. Effective technologies and tools are in place to prevent deaths and long-term disabilities related to delivery in most developed countries and all developing countries should not be left behind in this pursuit.

• Technology is defined as a combination of activities that includes evidence-based methods, procedures, and equipment applied systematically to solve a specific problem. Appropriate technology is effective, safe, affordable, feasible, adjusted to local conditions and good for both patients and providers. These technologies should be applicable and replicable across board.

• Perinatal care can be made better by improving client satisfaction, which involves increased family involvement as an instrument to encourage participation of the woman during pregnancy, delivery, postpartum period, and in newborn care

• Effective perinatal care should be evidence-based, which is a result of information obtained through modern clinical research and active involvement of the consumers of such care. There should be periodical reviews of the care so as to adapt to systemic changes in the healthcare systems.

Recommendations from reviewed literature on the approach and application of Integrated Antenatal Education on the fear of childbirth

1. Integrated antenatal education programmes should be developed and delivered using the principles of adult learning.
2. Integrated antenatal education facilitators should be adequately trained and prepared to deliver the programme modules in accordance with the principles of adult education and should possess well-developed group facilitation skills.
3. Integrated antenatal education should be delivered to small groups of participants at a time thus allowing for facilitated group interactions and active participation.
4. Integrated antenatal education should be regularly evaluated and consideration should be given to those pregnant women who may need more attention regarding their childbirth.
5. There is a need to undertake needs assessment in the community where the integrated antenatal education programme will be implemented to ensure it meets the local needs.
6. The integrated antenatal education programme should be developed and delivered in a culturally respectful and responsive manner and should recognize the diversity within the community and adjust to suit the specific needs of those who will be involved in it.
7. The programme should provide an opportunity for the participants to develop social networks and support and as such dedicated time to socialize within the programme should be a priority.
8. Preparing women for unexpected events in labour, at birth and the postnatal period is important and as such common complications and interventions should be discussed in antenatal education programs but a more individual and focused discussion should occur during antenatal care provision

9. Integrated antenatal education program content should provide a balance of information in regard to labour and birth, usual expectations and possible complexities and the transition to parenting and should aim to be strengths-based rather than fear-based.
10. Where practical, a range of integrated antenatal education programs should be offered and may include pre-pregnancy or early pregnancy programs and early parenting programs.
11. Integrated antenatal education program content should include the emotional transition to parenthood, with a focus on perinatal mental health and emotional wellbeing

Consideration of these recommendations in the review, development and delivery of integrated antenatal education programs will ensure pregnant women have access to high quality adult education that provides evidence-based information, supports the development of social networks and provides women and their supporters with correct and accurate information regarding pregnancy, childbirth and the early parenting period.

Data analysis

Analysis of the collected data was computed using SPSS software, version 22. Descriptive statistics such as mean median, mode and standard deviation, were analyzed. The *t-test* and chi-square test were applied in determining between-group differences. The study applied the Kolmogorov-Smirnov test to see whether the collected data were normally distributed. Since the scores were not in a normal distribution, the Mann-Whitney *U-test* was used to compare the intervention group and control group's fear of childbirth levels. Finally, the mean score for the fear of childbirth was compared using paired *t-test.* The significance threshold was set at 0.05.

3.4.5 Study 5: To qualitatively explore the pregnant women's experience from midwife-led integrated pre-birth training and its impact on fear of childbirth

The fifth study aimed at exploring women's experience of midwife led integrated antenatal education and its impacts on the fear of childbirth. The study was a qualitative interview study with a descriptive design. The study participants were recruited with the guide of the third and the fourth study. The pregnant women in study three who had a W-DEQ-A score of ≥ 67 which is considered as high FOC, were recruited to the intervention group in study four and they were asked if they would be willing to participate in this study, one month after successful delivery. Among them, 42 out of 56 consented in writing to participate in this qualitative study. Any woman who had exhibited psychiatric illnesses was excluded from the study.

Data collection

Interviews were conducted between December 15th 2019 and January 17th 2020. Eligible women received a call from the principal investigator and were reminded about the interview. The date and time for the interview was communicated to each participant. All the interviews were conducted in Swahili and auto-recorded. All the participants agreed to participate in the interview when coming for a postnatal clinic within the above data collection period.

The open-ended questions employed in this study aimed to obtain respondent's thoughts, perceptions and experience from integrated antenatal training they undertook before giving birth. Also, they were asked about their future expectations of childbirth. The duration of the individual interviews was between 18-35 minutes with an average of 25 minutes. Data collected was completed after 33 individual interviews when no unique insights were emerging [111].

Data analysis

The collected data was analyzed using thematic analysis [112], a method that arguably offers

an accessible, theoretically flexible and straightforward approach to analyzing qualitative data [113]. The analyses consisted of several steps: the initial text was read through several times and discussed at length with the intention of familiarizing with the collected data, this was followed by assigning preliminary codes to the text in order to describe the content that reflected the central message of the interviews. The next step was searching for patterns or themes in the preliminary codes across different interviews. The identified themes were later reviewed, defined and named.

3.4.6 Study 6: To establish whether institutional maternity services contribute to the fear of childbirth among pregnant women in Samburu County

This study aimed at understanding the perceptions and experiences of new mothers diagnosed with fear of childbirth; regarding the institutional maternity services and if they contribute to fear of childbirth.

The study enrolled a section of women who were part of the main study mentioned above. During their 32nd gestation week, participants were screened for the fear of childbirth and individuals who had a score of above 66, which is considered high fear of childbirth as per Wijma Delivery Experience Questionnaire (W-DEQ) version A scale [98], were asked if they would be willing to participate in a focus group interview after successful delivery. Approximately 46 women aged between 18-45 years accepted to take part and their details such as their mobile phone numbers, the expected date of delivery, physical address, and address of their spouse/guardians were recorded and kept by the principal investigator. The study included women who had a normal delivery, had live births and were willing to participate in the study after giving birth. Women who had experienced complications during childbirth, those who were unable to speak either in English or Kiswahili, and individuals who delivered at home were excluded from the study. Also, the study excluded any woman who had exhibited signs of psychiatric illnesses.

Study procedure

The 46 pregnant women who had expressed interest to participate in the study were contacted one month after childbirth and were asked about their childbirth experience, congratulated for successful childbirth (for those who had successful childbirth) and reminded of their participation in the focus group interview. In all, 17 new mothers declined to take part for various reasons such as birth complications (2 women), caesarean section (1 woman), home delivery (4 women) moved to other cities (5 women), and unwilling to participate (5 women). The remaining 29 new mothers who had successful childbirth participated in focus group interviews that were conducted between January and February 2020.

Focus group interviews

The study was undertaken through focus group interviews as this method has been widely used for collecting data on perceptions, attitudes and experiences of study participants [114]. The principal investigator desired a broad description and deeper understanding of the fear of childbirth concerning institutional deliveries, and therefore focus group interviews were preferable as opposed to individual interviews. It is appreciated that focus group interviews use group interactions to produce data and study participants influence each other in their joint discussion.

The focus group interview guide used in the current study was adopted from the Framework for Assessing the Quality of Care (FAQC) of institutional maternity services developed by the University of Southampton [115]. In this framework, quality of care would be achieved through the provision of care and the experience of care as demonstrated in Figure 3.

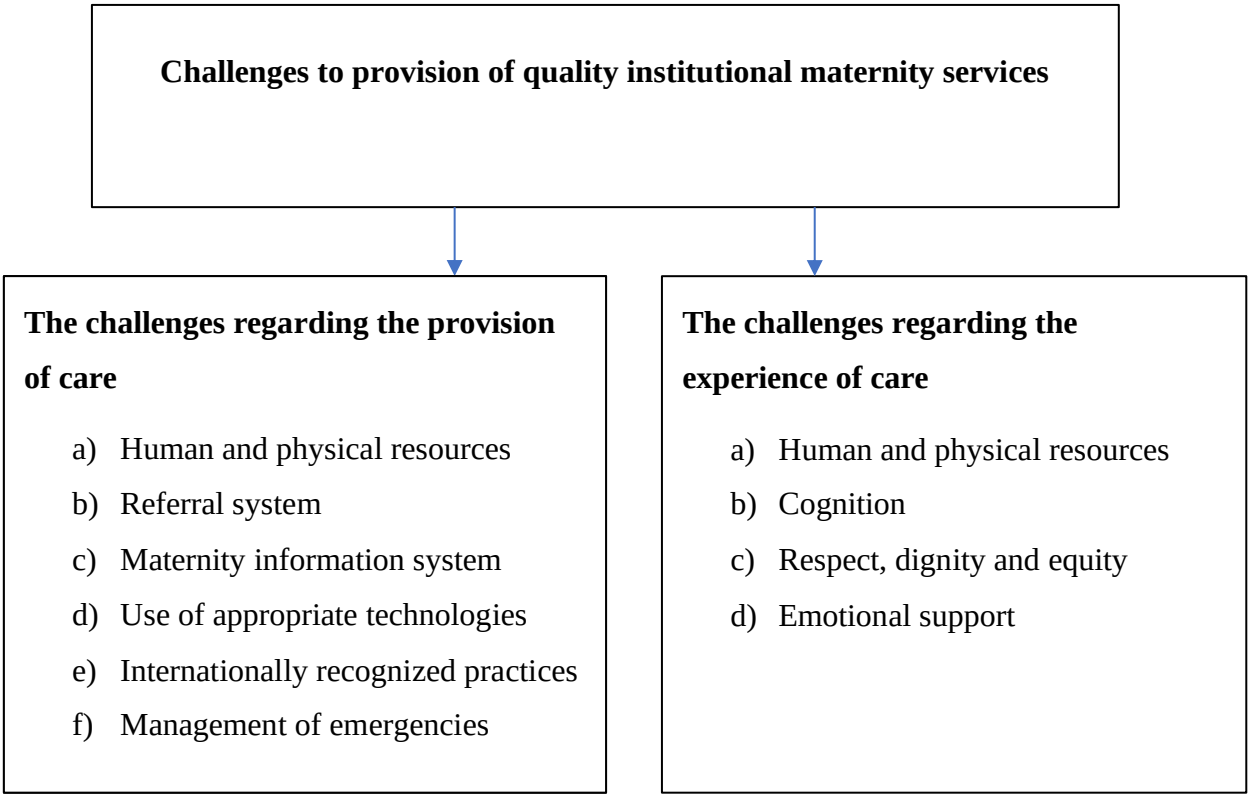


Figure 4: Framework for the Evaluation of Quality of Care (FEQC) in maternity services. Developed by the University of Southampton

In this regard, the items included in the focus group interview guide consisted of challenges experienced by study participants regarding the provision of care at the institutions where they gave birth and challenges in the experience of care at the maternity institutions. The discussions started with an open-ended question: “please tell us about your experience in your last institutional birth”. The participants were distributed between the four group interviews, with three groups having seven participants each and the fourth group with eight participants. The interview guide was pre-tested before being used and amendments were made as deemed appropriate. The focus group interview lasted 1.5 to 2.5 hours and was audio recorded. Two research assistants were in each focus group interview, with one leading the interview while the other took notes.

Thematic analysis

In this study, a qualitative descriptive approach was deemed appropriate [116]. The focus group data were transcribed and analyzed using thematic analyses [117]. The transcripts were carefully appraised by two reviewers to gain a full sense of their meaning. The initial concepts that arose were reviewed and coding was done to identify patterns of statements or words relevant to the study aim. This was followed by examining all codes and comparing them to clarify relationships. Various codes were later sorted into sub-themes. At this stage, there were consultations with all the researchers and there was consensus on the sub-themes generated. Finally, two themes were formulated to describe the perceptions and experiences of new mothers diagnosed with fear of childbirth; regarding the institutional maternity services and if they contributed to the fear of childbirth. Quotations that best illustrated the main themes were selected for inclusion as part of the results. An independent academic colleague read the transcripts and identified the themes which were similar to those identified by the researcher. This was aimed at providing a validity check for the data analysis procedure.

3.4.7 Study 7: To determine the rates of fear of childbirth among expectant women and their spouses in Samburu County, Kenya

This was the last study which used a different instrument for assessing the fear of childbirth. In the current study, a sample of 289 pregnant women and their spouses was computed using a method of sampling from a known population [32] In the study area 2737 women gave birth in the year 2019, from June to August 2019, a total of 289 pregnant women attending the antenatal clinic were invited to participate in the current study. The study was conducted in a maternal and child health clinic in a county referral hospital. After the antenatal care clinic sessions, the midwives (who were part of the study team and had been oriented on the objectives of the study and trained on data collection procedures) explained to the pregnant women about the study and requested them to participate voluntarily.

Often, men do not accompany their spouses to the antenatal care clinics. In that regard, the pregnant women were asked to discuss the study with their spouses and request them to accompany them in their subsequent antenatal care clinic appointments. Finally, 254 couples consented to participate.

Pregnant Women that could speak either in English or Swahili language, were between 17-22 weeks pregnant, were not having any psychiatric conditions and were at least 18 years of age were included in the study. For the spouses, the study included those above the age of 18, had no psychiatric problems and could read and write, either in English or Kiswahili. Pregnant women who were below 18 years old, were having psychiatric problems and wouldn't speak either in English or Swahili languages were excluded from the study.

Data collection

Data was collected using a researcher-developed questionnaire and Fear of Birth Scale (FOBS). A researcher-developed questionnaire captured the socio-demographic characteristics of pregnant women such as age, level of education, health insurance cover, residency, employment status, parity, pregnancy status, the preferred mode of delivery, previous childbirth experience, and feelings about the forthcoming baby. For their spouses, the questions included; age, level of education, residency, employment status, previous childbirth experience, and their feelings regarding the forthcoming baby.

FOBS is a visual analogue scale (VAS), initially developed and tried by Haines et al., [118] among pregnant women. The FOBS scale consists of two 100 mm visual analog scales (VAS), which are summed and averaged to get a score. The study respondents are required to answer the question "How do you feel right now about the approaching birth?" and are asked to place a mark on the two scales, which have the following words: calm/worried and no fear/strong fear. The cut-off points of ≥50 was used to classify respondents as having the fear of childbirth,

with those having a score of less than 50 having no FOC [119]. This cut-off point was used in the current study following the recommendation by the developers of the tool and the published studies on the same topic [118], [120], [121]. The FOBS questionnaire is a validated tool which is freely available for academic purposes.

Statistical analysis

Descriptive and analytical statistics were conducted for all data using SPSS version 23.0. The mean, percentages, and frequencies were used to describe data. Spearman's correlation coefficient was used to measure the strength of the relationship between FOC among the study participants. Mann-Whitney U test [122] and the Kruskal-Wallis test [123], which are nonparametric methods designed to detect whether, two or more samples come from the same distribution or to test whether medians between comparison groups are different, under the assumption that the shapes of the underlying distributions are the same were used in this study. All estimates were reported with 95% confidence intervals. Statistical significance was assumed for p-values<0.05.

3.5 Ethical consideration.

Ethical approval to conduct this comprehensive study (study 1 to study 7) was obtained from the Jaramogi Oginga Odinga Teaching and Referral Hospital Ethical Review Committee (ERC.IB/VOL.1/69). Research permit to conduct the comprehensive study in Kenya was sought and granted by the National Commission for Science and Technology and Innovation (NACOSTI/P/19/1182). All the respondents were informed of the objectives of the study and were required to consented before enrolment in the study. To ensure the confidentiality of the participants, they were given unique numbers and their names were not required.

CHAPTER 4: RESULTS

This chapter highlights the results of the individual studies (study 1 to study 7) in the order in which they have been illustrated in the introduction and methodology chapters.

4.1 Results of Study 1: Evaluating the readability of Wijma Delivery W-DEQ-A among pregnant women in Samburu County, Kenya

A total sample of 26 women of reproductive age participated in this study. Approximately 38.5% (n=10) were between the ages of 26-35 and a total of 61.6% (n=16) were from peri-urban areas. Those with a college diploma were 19% (n=5) while about 23.8% (n=6) had given birth six months before the current study as shown in Table 4.

Table 4: Demographic characteristics of study participants

	Demographic characteristics	**n (%)**
1	**Age**	
	18-25	9(34.6)
	26-35	10(38.5)
	36-45	7(26.9)
2	**Geographical location/residency**	
	Rural	7(26,92)
	Peri-urban	16(61,54)
	Urban	3(11,54)
3	**Academic level of participants**	
	Primary school certificate	5 (19)
	high school certificate	6 (24)
	College certificate	5 (19)
	College diploma & Degree graduates	10 (38)
4	**Occupation of participants**	
	Casual worker	10(38,46)
	Business women & Permanent employee	16(61.54)
5	**Parity**	
	Given birth 6 months ago	6(23,08)
	Given birth 7-12 months ago	10(38,46)
	Given birth 13-36 months ago	10(38,46)

4.1.1 Content validity of the W-DEQ-A readability scales

The readability of the W-DEQ-A was evaluated using seven validated readability scales. The results of each readability scale are given below.

i. Flesch Reading Ease Score

A score of 57.5 was recorded on this scale, an indication that the W-DEQ-A is fairly difficult to read according to the scoring matrix which shows that a score of between 60-70 is largely considered acceptable.

ii. Gunning Fog Index

A score of 11.5 was generated from the W-DEQ-A, an indication that it is fairly hard to read. The ideal score for readability with the Gunning Fog Index is seven or eight. If the score is more than 12, it is said to be too difficult for most people to read. The index estimates the years of formal education required to comprehend a particular test on a first reading.

iii. Flesch-Kincaid Grade Level Score

A score of 9 was generated from W-DEQ-A using the Flesch-Kincaid Grade test. This is an indication that the questionnaire can be read with ease if the reader has completed primary education (Standard 8) in the education system in Kenya (an equivalent of an eighth grade in the US education grading level). A score of 12.5 would indicate that the questionnaire can be understood with ease by a secondary school (form 4) graduate in Kenya (an equivalent of a 12^{th} grade in the US education system).

iv. The Coleman-Liau index

On this scale, the W-DEQ-A had a score of 9; an indication that the questionnaire would be read by a reader who has completed one year of secondary (form 1) education systems in Kenya

(An equivalent of a ninth grade in the US education system). This scale uses a factor of characters per word and not syllables per word.

v. The SMOG Index

The scale generated an index of 9.6, which is an indication that the W-DEQ-A can be read with ease by readers who are in their second year (form 2) in Kenya's secondary education system. (An equivalent of tenth grade in the US education system).

vi. Automated Reliability Index

This scale generated an index of 7.6; an indication that readers who have a primary school certificate in Kenya (class 8) education system (an equivalent of an eighth-grader in the US education system) can read W-DEQ-A with ease. Unlike the other indices, this scale relies on a factor of characters per word and not syllables per word.

vii. Linsear Write Formula

This scale generated an index of 9.4, an indication that the W-DEQ-A can be read with ease by readers in the first year of secondary education (form 1) in the Kenyan education system. (An equivalent of ninth grade in the US system of education).

4.1.2 Readability consensus

Based on the seven readability scales, there was consensus that the W-DEQ-A was readable by readers who have at least one year of secondary education in Kenya (an equivalent of ninth grade in the US education system). The text was found to be fairly difficult to read. Word statistics identified a total of 108 words to be unique while 254 words were repeated. The readability scoring matrix for the seven readability scales is shown in Table 5.

Table 5: The readability scales and their corresponding scoring matrix

SCALE		SCORE	AGE/ABILITY TO READ	GRADE LEVEL
1.	The Flesch Reading Ease Formula (scale 0-100)	90-100	N/A*	5th grade
		60-70	N/A*	8th-9th grade
		0-30	N/A*	College graduate
2.	Automated Readability Index	1	5-6	Kindergarten
		2	6-7	1st/2nd grade
		3	7-9	3rd grade
		4	9-10	4th grade
		5	10-11	5th grade
		6	11-12	6th grade
		7	12-13	7th grade
		8	13-14	8th grade
		9	14-15	9th grade
		10	15-16	10th grade
		11	16-17	11th grade
		12	17-18	12th grade
		13	18-24	College student
		14	Above 24 years	Professor
3.	The Flesch Kincaid Grade Level Scale (scale 0-100)	80-100	N/A*	4th to 5th grade
		60-80	N/A*	6th to 8th grade
		50-60	N/A*	High school
		30-50	N/A*	High school/college
		0-30	N/A*	College level
4.	The FOG scale	5	Readable	N/A*
		10	Hard	N/A*
		15	Difficult	N/A*
		20	Very difficult	N/A*
5.	The Linsear write formula	0-1	3-7	1st grade
		1-5	7-11	1st to 5th grade
		5-8	11-14	5th to 8th grade
		8-11	14-17	8th to 11th grade
		11 and above	17 and above	11th grade- college
6.	The Smog Index (Total polysyllabic word count)	1-6	N/A*	5th grade
		7-20	N/A*	6th to 7th grade
		21-56	N/A*	8th to 10th grade
		57-72	N/A*	11th to 12th grade
		73-240	N/A*	College level
7.	The Coleman Liau Index	5 and below	N/A*	5th grade and below
		6	N/A*	6th grade
		7-10	N/A*	7th to 10th grade
		11-12	N/A*	11th and 12th grade
		13-16	N/A*	College level
		Above 17	N/A*	Professionals

*N/A** Not applicable*

4.1.3 Validation of the W-DEQ-A readability scales through FGDs

The second part of the analysis was to validate the test results derived from the seven readability tools. The following results were reported:

Ease/difficulty in reading the W-DEQ-A by study participants

Women who had completed two years of college certificate (n=5), college diploma (n=5) and degree graduates (n=5) reported that the W-DEQ-A was readable with ease. Those who had a secondary education certificate (n=6) denoted that some words in the questionnaire were fairly difficult to read but generally readable. Finally, those who had a primary school certificate indicated that the questionnaire was very difficult to read with a few items being easily readable. The individual geographical location/residency did not have any influence on the ability of the study respondents to read the W-DEQ-A.

Comprehension of the words used in W-DEQ-A by the study participants.

The study participants were asked to make their comments on their ability to comprehend the words used in the questionnaire. Respondents with a college diploma (n=5) and university degree graduates (n=5) reported that the W-DEQ-A was easy to comprehend and the used words were not difficult at all. Study participants with secondary education (N=6), and college certificate (n=5) noted that some words were fairly difficult to comprehend as they are not commonly used in day-to-day English language conversations. Primary school graduates (n=5) noted that the words in the questionnaire were too difficult to comprehend. They mentioned that they were hearing words like *Desolate* for the first time.

4.1.4 Issues raised in regards to the W-DEQ-A's usability by study participants.

Several issues were raised in regards to the general sentence construction, wording and comprehension of specific words. A list of difficult words was given as follows: *Extremely desolate, extremely deserted, extremely composed,* and *extremely tense.* These words were

mainly mentioned by participants with primary and secondary education. There was also a list of words that were said to be similar thereby confusing the readers. These included: *strong/confident, composed/relaxed, lonely/deserted, desolate/deserted/abandoned* and *extreme self-confidence/extreme trust.*

Items not captured in the W-DEQ-A, but contributing to maternal fear of childbirth

The study participants raised important items that in their opinion were not directly captured in the W-DEQ-A. They include the following:

1. **Fears attributed to giving birth after a previous negative birth experience.**

The FGDs pointed out that expectant women who had a previous distressing birth experience were likely to develop FOC as the memories of their poor birth experience will be rekindled during labour of their current pregnancies, thereby bringing about panic, distress and anxiety. They noted that this question should be included in the W-DEQ-A.

2. **Fears attributed to culturally diverse norms and settings**

The FGDs noted that different cultural norms contribute directly and indirectly to FOC and it would have been useful to include an item in the W-DEQ-A related to cultural norms. Some of the issues that were noted missing included: The comfortability of expectant women to be assisted to deliver by male healthcare workers, foods appropriate or inappropriate during pregnancy according to the cultural diversity of pregnant women, cultural practices that prohibit physical activity during pregnancy, culturally acceptable way to express pain during active labour, culturally acceptable way of disclosing bad news following unsuccessful childbirth event, cultural norms in regards to precautions in handling infants and cultural practices such as handling the placenta. All these aspects were missing in the W-DEQ-A.

3. Fears attributed to trauma and maternal abuse

It was reported that several women who are sexually and emotionally abused when young, leading to unplanned pregnancies. Study participants noted that childhood sexual abuse brings a psychological burden that increases rates of sexual dysfunction, anorexia and post-traumatic stress disorders. In this regard, the study participants noted that it would have added value if an item focusing on trauma and maternal abuse would have been included in the W-DEQ-A.

4. Fear attributed to the inability of the body to give birth as a result of maternal age and underlying health conditions

The FGDs also noted that the W-DEQ-A does not ask about the maternal age of the interviewed expectant women as well as other underlying health conditions that they may be suffering from. The study participants noted that physical capacity and ability to carry a pregnancy was a concern more so to young pregnant women. They mentioned fears about the body size, the weight of the infant, positioning of the baby and physical strength to endure the pregnancy. It was stated that pregnant women with known underlying health conditions may develop a different kind of childbirth fear and not necessarily as a result of the reasons mentioned in the W-DEQ-A. It was thus stated that this is an important construct that was missing.

5. Fear of loss of life to expectant women

Study participants noted that although the W-DEQ-A mentions fantasies of the child being injured or dying during labour/ delivery, it fails to ask the same question to pregnant women. Study participants raised concerns about adverse effects following childbirth such as episiotomy, postpartum lower and upper abdomen pains, and postpartum depression which leads to sleeping difficulties, alteration of appetite, disproportionate fatigue, and recurrent mood changes; none of which was investigated in the W-DEQ-A.

6. **Fears related to the attitude of healthcare workers and the quality of available health facilities.**

In all the FGDs, there was consensus that healthcare workers play a key role in the realm of childbirth fears. Also, the participants mentioned that the status of the available health facilities was an important aspect that greatly contributed both directly and indirectly to FOC. In this regard, they cited that it would have been insightful if the W-DEQ-A had an item investigating the attitude of healthcare workers towards the expectant women and also the quality of available healthcare facilities.

4.2 Results of Study 2: To test the validity and reliability of the translated Swahili version of the W-DEQ-A among the Swahili speaking pregnant women in Samburu County, Kenya

A total of 628 pregnant women took part in the current study with 376 for EFA and 252 for CFA. The mean age for the EFA and CFA was 27 (SD=5.43) years. For the participants in EFA, approximately 37.8% (n=142) were between 25-29 years. About 31.6% (n=119) had college education, 76.6% (n=288) were married and 75.5% (n=284) were not employed. In terms of parity, 57.7% (n=217) of the participants in EFA were primiparous. For the participants in CFA, 40.9% (n=103) were between 25-29 years, with 48.4% (n=122) having secondary education and 80.6% (n=203) being married. In terms of employment, 85.3% (n=215) were not employed and in terms of parity, 69.8% (n=176) were multiparous (Table 6).

Table 6: Demographic characteristics of study participants

	Socio-demographic characteristics	Total Sample n (%)	EFA Sample n (%)	CFA Sample n (%)
1	**AGE (MEAN, SD)**	**27 (5.4**	**27 (5.4)**	**27(5.4)**
	18-24	191 (30.4)	122 (32.4)	69 (27.4)
	25-29	245 (39.0)	142 (37.8)	103 (40.9)
	30-34	145 (23.0)	85 (22.6)	60 (23.8)
	35-45	47 (0.7)	27 (7.2)	20 (7.9)
		628 (100.0)	376 (100.0)	252 (100.0)
2	**EDUCATION**			
	Primary	69 (10.9)	58 (15.4)	11 (4.4)
	Secondary	240 (38.2)	118 (31.4)	122 (48.4)
	College	217 (34.6)	119 (31.6)	98 (38.9)
	University	101 (16.8)	81 (21.5)	20 (7.9)
		628 (100.0)	376 (100.0)	252 (100.0)
3	**MARITAL STATUS**			
	Single	133 (21.2)	85 (22.6)	48 (19.0)
	Married	491 (78.2)	288 (76.6)	203 (80.6)
	Divorced	4 (0.0)	3 (0.8)	1 (0.4)
		628 (100.0)	376 (100.0)	252 (100.0)
4	**RESIDENCE**			
	Rural	379 (60.3)	212 (56.4)	167 (66.3)
	Peri-urban	161 (25.6)	104 (27.7)	57 (22.6)
	Urban	88 (14.0)	60 (16.0)	28 (11.1)
		628 (100.0)	376 (100.0)	252 (100.0)
5	**EMPLOYMENT STATUS**			
	Employed	129 (20.5)	92 (24.3)	37 (14.7)
	Not employed	499 (79.4)	284 (75.5)	215 (85.3)
		628 (100.0)	376 (100.0)	252 (100.0)
6	**PARITY (MEAN ±SD)**			
	Primiparous	393 (62.5)	217 (57.7)	176 (69.8)
	Multiparous	235 (37.4)	159 (42.3)	76 (30.2)
		628 (100.0)	376 (100.0)	252 (100.0)

4.2.1 Exploratory Factor Analysis (EFA)

The suitability for EFA was confirmed with a KMO measure of sampling adequacy of 0.883 and a significant Bartlett's Test of Sphericity (χ^2 = 11676.602; *p=<0.001).* As indicated in Table 7, EFA was performed through principal component analysis on the initial W-DEQ-A's 33 items. A 24 item, 5-factor solution with eigenvalues greater than 1 were identified. These factors included: (i) Self-efficacy (7 items), (ii) Fear (5 items), (iii) Negative emotions (5 items), (iv) Negative appraisals (4 items) and (v) Social isolation (3 items). Both the rotated component matrix, the scree plot and parallel analysis confirmed the 5-factor solutions which accounted for a cumulative variance of 74.19%. (i) Self-efficacy (7 items), (ii) Fear (5 items), (iii) Negative emotions (5 items), (iv) Negative appraisals (4 items) and (v) Social isolation (3 items Nine items that failed to load at ≥0.35 and those overlapping across the factors were removed. These items included the following: relaxed (17), hopelessness (20), longing for the child (21), behaving badly (25), funny (28), natural (29), obvious (30), the child will die (32) and child will be injured (33). The reliability of the internal consistency for the total scale was 0.914 while the individual factors had the following: lack of self-efficacy 0.962, fear 0.864, negative emotions 0.867, negative appraisal 0.899, and social isolation 0.967.

Table 7: Factor loadings using Rotated Component Matrix

	Factor				
Items	1. Lack of Self Efficacy	2. Fear	3. Negative Emotions	4 Negative Appraisals	5 Social Isolation
No. 4 Not strong	.986				
No. 5 Not confident	.918				
No. 9 Not safe	.975				
No. 10 Not independent	.989				
No. 16 Not composed	.857				
No. 22 No self-confidence	.809				
No. 26 Not let happen	.692				
No. 6 Afraid		.902			
No. 12 Tense		.977			
No. 19 Panic		.942			
No. 23 Trust		.924			
No. 27 Lose control		.939			
No. 2 Frightened			.538		
No. 8 Weak			.765		
No. 11 Desolate			.809		
No. 24 Pain			.885		
No. 31 Danger			.846		
No. 1 Not fantastic				.648	
No. 13 Not glad				.774	
No. 14 Not proud				.997	
No. 18 Not happy				.828	
No. 3 Lonely					.755
No. 7 Deserted					.705
No. 15 Abandoned					.706
Eigenvalues	8.555	7.319	2.282	1.898	1.327
Percentage of variance	30.555	26.138	8.148	6.779	4.739
Cronbach's alpha	0.962	0.864	0.867	0.899	0.967

Exploratory factor analysis: Maximum likelihood method and Promax with Kaiser Normalization was used as a rotational method. The rotation converged in five factors.

4.2.2 Confirmatory Factor Analysis (CFA)

In the current study, CFA using maximum likelihood (ML) was conducted to determine the unidimensional fit of the original W-DEQ-A scale as well as testing the five-factor structure realized by the EFA. The study evaluated the goodness of fit of the model by using fit indices in AMOS-25 software. The single factor model comprising of all the 33 items of the original W-DEQ-A resulted in a poor model fit ($\chi^{2/}$/df= 16.975, RMSEA=0.252, CFI=0.351, TLI=0.309) and as such the findings of the current study failed to support the unidimensional structure of the original W-DEQ-A. In the next step, we compared the five-factor solution comprising of 24 items retained from EFA, and this recorded much-improved fit indices ($\chi^{2/}$/df=6.06, RMSEA= 0.157, CFI=0.8661, TLI=0.841). The CFI and TLI were within the acceptable fit of ≥0.85 and ≥0.80 respectively (Figure 4) but RMSEA was greater than 0.08. Finally, we compared the original 33-item one-factor model with other factor models that have been published in studies from Malawi [18], Hungary [124], Norway [125], Australia [126], Japan [11], United Kingdom [127], Sweden [98], and Italy [128] (Table 9).

4.2.3 Internal consistency

Table 8 shows Cronbach's alpha coefficient of all five factors. Three of the five factors had all their values above 0.8, an indication of good reliability while the other two had values above 0.9 which is an indication of excellent reliability.

Table 8:Cronbach's alpha values of the five factors

	Factor				
	1. Lack of Self Efficacy	2. Fear	3.Negative Emotions	4. Negative Appraisals	5. Social Isolation
Cronbach's alpha	0.962	0.864	0.867	0.899	0.967

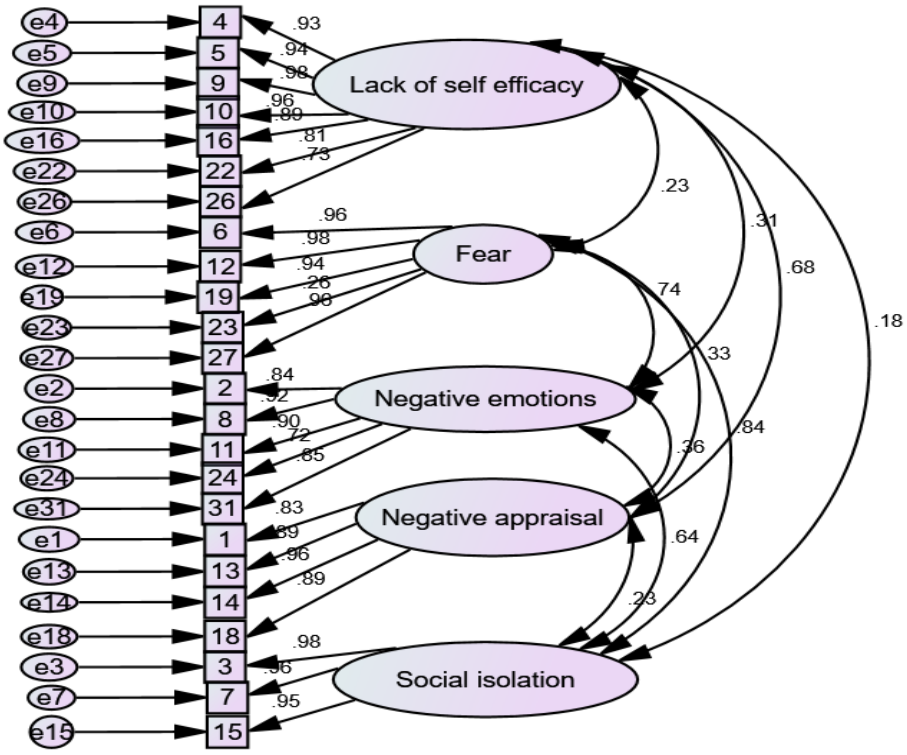


Figure 5:Confirmatory factor analysis model of the Swahili version of the W-DEQ-A 24 item- 5-factor model.

Table 9: Comparing fit statistics from CFA of W-DEQ-A factor models from other countries

Model	Country of study	Number of items	χ^2	df	p	RMSEA	CFI	TLI
1 - Factor	Sweden [64]	33	1204	495	<0.001	0.08	0.54	0.51
4 - Factor	UK [95]	33	2116	434	<0.001	0.141	0.513	0.546
4 - Factor	Japan [11]	33	2679.262	495	<0.001	0.136	0.520	0.550
4 - Factor	Australia [94]	27	2938.47	318	<0.001	0.11	0.90	0.89
6 - Factor	Norway [93]	25	1090.23	260	<0.001	0.044	0.94	0.93
4 - Factor	Hungary [92]	30	1118.406	378	<0.001	0.076	0.90	0.885
3 - Factor	Malawi [18]	23	571	227	<0.001	0.07	0.75	0.70
4- Factor	Italy [96]	16	504	147	<0.001	0.70	0.90	0.91
5 - Factor	Kenya[1]	24	1466.538	242	<0.001	0.157	0.861	0.841

Note: [1]the current study

4.2.4 Convergent Validity

We performed the Spearman's rank correlation coefficient between the five factors derived from EFA of the W-DEQ-A and EPDS and BAI. The result indicated a significantly strong correlation between the two scales and all the five factors of W-DEQ-A except social isolation and BAI which was 0.485 as indicated in Table 10.

Table 10: Spearman's product correlation coefficient of EPDS, BAI and W-DEQ-A factors

Measures	W-DEQ-A Factors				
	Lack of self-efficacy	Fear	Negative emotions	Negative appraisals	Social isolation
Edinburgh Postnatal Depression Scale	0.714**	0.657**	0.702**	0.674**	0.516**
Beck Anxiety Inventory	0.686**	0.620**	0.686**	0.674**	0.485**

**$p<0.01$

4.3 Results of Study 3: To determine the prevalence of fear of childbirth between the primiparous and multiparous women in Samburu County, Kenya

In the third study, from a population of 385 gravida women, 98% (n=376) participated and completed scoring individual W-DEQ (A) questionnaires. Most participants 76.6% (n=288) were married. The respondents' mean age was 27 years ±5.43 SD with approximately 37.8% (n=142) being between 25-29 years old. Among them, more than 50% (n=198) had their pregnancies planned and approximately 84.8% (n=273) preferred vaginal delivery. Also, 57.7% of the respondents (n=217) were multigravida while primigravida were 42.3% (n=159) of the total.

Comparing parity to socio-demographic characteristics, the results showed significant differences between parity; and age, education, marital status, and residence of respondents. However, there was no statistical significance between parity and employment status as shown in Table 11.

Table 11: Participants' psycho-socio-demographic & obstetrics characteristics by parity

	Socio-demographic characteristics	Total n (%)	Multigravida n (%)	Primigravida n (%)	Parity differences
1	**Age (mean ± SD)**	**27±5.43**	**28.2±5.48**	**25.7±5.03**	χ^2 =22.453 P=0.000
	18-24	122(32.4)	52(23.96)	70(44.3)	
	25-29	142(37.8)	83(38.25)	59(37.11)	
	30-34	85(22.6)	62(28.57)	23(14.47)	
	35-45	27(7.2)	20(9.22)	7(4.40)	
2	**Education**				χ^2 =22.481
	None	118(31.4)	89(41.0)	29(18.2)	P=0.000
	Primary	119(31.6)	61(28.1)	58(35.5)	
	Secondary	81(21.5)	38(17.5)	43(27.0)	
	Tertiary	58(15.4)	29(13.4)	29(18.2)	
3	**Marital status**				χ^2 =23.806
	Single	85(22.6)	30(13.8)	55(34.6)	P=0.000
	Married	288(76.6)	186(85.7)	102(64.2)	
	Divorced	3(0.8)	1(0.5)	2(1.3)	
4	**Residence**				χ^2 =25.804
	Rural	212(56.4)	145(66.8)	67(42.1)	P=0.000
	Peri-urban	104(27.7)	51(23.5)	53(33.3)	
	Urban	60(16.0)	21(9.7)	39(24.5)	
5	**Employment status**				χ^2 =0.071
	Employed	92(24.3)	52(24.0)	40(25.2)	P=0.809
	Not employed	284(75.5)	165(76.0)	119(74.8)	
	Obstetric characteristics				
6	**Gestation age**				χ^2 =4.118 P=0.249
7	**Parity (Mean ±SD)**	**22.99±1.03**	**22.97±1.02**	**23.17±1.06**	χ^2 =367.850
	Multigravida	217(57.7)			P=0.000
	primigravida	159(42.3)			
7	**Pregnancy status**				χ^2 =15.333
	Planned	198(52.7)	133(61.3)	65(40.9)	P=0.000
	Not planned	178(47.3)	84(38.7)	94(59.1)	
8	**Preferred Mode of delivery**				χ^2 =8.130
	Vaginal	273(84.8)	163(84.0)	110(85.9)	*P=0.02*
	Caesarean section	25(7.8)	11(5.7)	14(10.9)	
	undecided	24(7.5)	20(10.3)	4(3.1)	
9	**Last delivery experience (multigravida)**				χ^2 =0.854 P=0.355
	Positive	187(85.4)			
	Negative	32(14.6)			
10	**Going for regular antenatal check-ups**				χ^2 =51.448 P=0.000
	Yes	239(63.6)	171(78.8)	68(42.8)	
	No	127(36.4)	46(21.2)	91(57.2)	
11	**Attending child preparation classes**				χ^2 =43.229. P=0.000
	Yes	220(58.5)	158(72.8)	62(39.0)	
	No	156(41.5)	59(27.2)	97(61.0)	
12	**Having trust in healthcare providers**				χ^2 =35.536 P=0.000
	Yes	218(58.0)	154(71.0)	64(40.3)	
	No	158(42.0)	63(29.0)	95(59.7)	
13	**Participating in physical activity**				χ^2 =5.297 P=0.021
	Yes	175(46.5)	90(41.5)	85(53.5)	
	No	201(53.3)	127(58.5)	74(46.5)	

4.3.1 The prevalence of fear of childbirth

About 29.5% (n= 111) had low, 40.4% (n=152) moderate, 22.1% (n=83) high, and 8% (n=30) had severe FOC; as indicated in Table 12. The computed fear of childbirth ranged from 19-119. The mean score was 51.8 (SD=20.67) with the median being 47.0, skewness 0.785, and kurtosis 0.120. The majority of respondents were in the moderate fear of childbirth category (primigravida,39.6% (n=86) and multigravida; 41.5% (n=66).

Table 12: Prevalence of fear of childbirth in nulliparous and multiparous women

Level of fear of childbirth	**Multigravida** n (%)	**Primigravida** n (%)	**Total** n (%)
Low	83(38.2)	28(17.6)	111(29.5)
Moderate	86(39.6)	66(41.5)	152(40.4)
High	40(18.4)	43 (27.0)	83(22.1)
Severe	8(3.7)	22(13.8)	30(8.0)

The four categories of fear of childbirth were recoded into two categories. Low and moderate FOC were recoded into a new category of no FOC and high and severe FOC recoded into FOC. The results of Chi-square test revealed a statistically significant relationship between FOC and the following obstetric variables: having trust in healthcare providers ($P<0.001$), literacy status ($P<0.001$), regular check-up of pregnancy at health facility ($P=.003$), physical activity ($P<0.001$), marital status ($P=.045$), and parity ($P<0.001$). However, there was no significant statistical difference between preferred mode of delivery ($P=0.21$), and planned pregnancy ($P>0.05$), as shown in Table 13.

Table 13: Relationship between obstetric characteristics and fear of childbirth in a sample of Kenyan gravida women.

	Fear of childbirth/ obstetric characteristics	No FOC n (%)	FOC n (%)	Total n (%)	p - value
1	**Trust on the health worker**				χ^2 =12.50
	Yes	168 (63.9)	50 (44.2)	218 (58)	p=0.000
	No	95(36.1)	63(55.8)	158 (42)	
2	**Literacy status**				χ^2 =51.263
	Literate	147(55.9)	18(15.9)	165 (43.9)	p=0.000
	Illiterate	116 (44.1)	95(84.1)	211 (56.1)	
3	**Planned pregnancy**				χ^2 =2.859
	Yes	146(55.5)	52(46.0)	198(52.7)	p=0.091
	No	117(44.5)	61(54.0)	178(47.3)	
4	**Regular pregnancy check-up**				χ^2 =8.988
	Yes	180(68.4)	59(52.2)	239(63.6)	p=0.003
	No	83(31.6)	54(47.8)	137(36.4)	
5	**Participating in physical activity**				χ^2=119.15 p=0.000
	Yes	189(94.0)	12(6.0)	201(53.5)	
	No	74(42.3)	101(57.7)	175(46.5)	
6	**Preferred Mode of delivery**				χ^2 =7.768
	Vaginal delivery	195 (84.4)	78 (85.7)	273(84.8)	p=0.21
	Caesarean section	14 (6.1)	11(12.1)	25(7.7)	
	Undecided	22(9.5)	2(2.2)	24(7.5)	
7	**Marital status**				χ^2 =4.026
	Single	54 (20.5)	34 (30.1)	88 (23.4)	p=0.045
	Married	209 (79.5)	79 (69.9)	288(76.6)	
8	**Attending childbirth preparation classes**				χ^2 =5.277 p=0.024
	Yes	160 (60.8)	60 (53.1)	220 (58.5)	
	No	103 (39.2)	53 (46.9)	156 (41.5)	
9	**Parity**				χ^2=15.364
	Multigravida	169 (64.3)	48(42.5)	217(57.7)	p=0.000
	Primigravida	94(35.7)	65(57.5)	159(42.3)	

Also, logistic Regression was carried out, where variables comprising literacy level of participants, trusting healthcare providers by expectant women, attending childbirth preparation classes, participating in physical activity, regular check-up of pregnancy, preferred mode of delivery and marital status as predictors of FOC were included. The odds of FOC in gravida women that had trust in the health care providers were 2% less than those that did not (p=0.027). Similarly, the fear of gravida women who had participated in physical activity was 3% less than those who did not % (P<0.001). The odds of FOC among literate women were 61% less than those of the illiterate women (P<0.001). Finally, the level of fear among gravida women that went for regular check-up of their pregnancy was 42% less than those who did not (P=0.001); as shown in Table 14.

Table 14: Predictors for fear of childbirth in a sample of Kenyan gravida women.

	Fear of childbirth		
Factors	**F**	**R^2**	**B (95%CI)**
Literacy level of participants	21.595	6.156	1.817** (2.86,13.249)
Trusting healthcare providers by expectant women	5.039	.252	-1.378* (40.076,0.84)
Attending childbirth preparation classes	2.583	.343	-1.071 (0.93,1.265)
Participating in physical activity	54.515	.027	-3.595** (0.01,0.071)
Regular check-up of pregnancy	10.119	4.230	1.442* (1.74,10.28)
Constant	1.904	13.114	2.574

* P < 0.05,
**P < 0.01

4.4 Results of Study 4: To evaluate the effects of integrated antenatal education on the fear of childbirth among pregnant women in Samburu County, Kenya

There were no significant statistical differences between the control and intervention group in regards to socio-demographic characteristics. The mean age of the study participants in the control and intervention group were 26.64 ±6.236 and 26.92±6.164 respectively. In regards to education level, the majority of the study participants in both groups had secondary education (51.8% for control and 41.5% for interventional study). In terms of marital status, the majority were married (75.0% for control group and 81.1% for intervention group). In regards to obstetric characteristics, the majority of the respondents in the control group were primigravida (60.7%), while in the interventional group, the majority were multigravida (52.8%). In regards to whether the study participant's pregnancy was planned or not, the majority of the study participants in the control group had unplanned pregnancy (57.1%) while in the intervention group, the majority had planned pregnancy (58.5%). Both groups preferred vaginal delivery and, majority of the study had participated in physical activity (60.7% for control group and 50.9% for intervention group) as indicated in Table 15.

Table 15: Socio-demographic and Obstetric characteristics

characteristics	Control group	Intervention group	p-value
Age (mean ± SD)	**26.64 ±6.236**	**26.92±6.164**	**0.985**
Education			
Primary	11(19.6)	16(30.2)	χ^2=1.838, p=0.399
Secondary	29(51.8)	22(41.5)	
Tertiary	16(28.6)	15(28.3)	
Marital status			χ^2=0.596, p=0.442
Single	14 (25.0)	10(18.9)	
Married	42(75.0)	43(81.1)	
Residency			χ^2=4.182, p=0.124
Rural	21(37.5)	29(54.8)	
Peri-urban	22(39.3)	12(22.6)	
Urban	13(23.2)	12(22.6)	
Employment status			χ^2=0.148, p=0.700
Employed	21(37.5)	18(34.0)	
Not employed	35(62.5)	35(66.0)	
Obstetric characteristics			
Parity			χ^2=2.012, p=0.156
Multigravida	22(39.3)	28(52.8)	
primigravida	34(60.7)	25(47.2)	
Pregnancy status			χ^2=2.662, p=0.103
Planned	24(42.9)	31(58.5)	
Not planned	32(57.1)	22(41.5)	
Preferred Mode of delivery			χ^2=0.437, p<0.509
Vaginal	49(87.5)	44(83.0)	
Caesarean section	7(12.5)	9(17.0)	
Participating in physical activity			χ^2=1.055, p=0.304
No	22(39.3)	26(49.1)	
Yes	34(60.7)	27(50.9)	

A paired sample t-test was conducted to compare the W-DEQ-A mean scores before and after the integrated health education module. There was a significant difference in the W-DEQ-A mean scores before (*M=79.897, SD=10.667)* and after the integrated antenatal education *(M=66.7570, SD=19.6924, t(106)=7.329, p<0.001)*

Childbirth experience was less frightening among the women who underwent integrated antenatal education compared to the control group.

4.5 Results of Study 5: To qualitatively explore the pregnant women's experience from midwife-led integrated pre-birth training and its impact on the fear of childbirth

A total of 33 women of reproductive age participated in this qualitative study with 16 primiparous and 17 multiparas. Among them, the majority were married. Seven women had primary education, 10 secondary educations, 13 had college diplomas, and three had university degrees as indicated in Table 17.

The explored data mainly described the women's views and experience of midwife-led integrated pre-birth training and its impact on childbirth fear. The overall theme 'Midwife led pre-birth training caused constructive inclination and enhanced trust in the process of childbearing' was generated and it was segmented into three themes and nine sub-themes as indicated in Table 16. Each of the themes and its subsequent sub-themes are further explained.

Table 16: Overall theme and sub-themes

Overall theme: Midwife led pre-birth training brought positive inclination and improved trust in the process of childbearing	
Themes	**Sub-theme**
Significance of midwife-led pre-birth training	1) The training handled my shame and guilt 2) The midwife understood me without judgment 3) The training sessions were more practical than theoretical
Significance of interactive conversations**.**	1) The midwife gave useful medical advice in all sessions 2) The conversations were open, informative and real 3) The training was integrated
Adapting to procedures for positive future childbirth experience.	1) Professional support beyond pregnancy and childbirth 2) Individualized psychologic/obstetric support 3) Improved assertiveness towards childbirth

Table 17: Demographic characteristics of respondents.

Codes	Age	Marital status	Level of education	Parity	W-DEQ-A Score	Mode of delivery
R1	22	Married	College certificate	Primipara	86	Normal vaginal
R2	24	Married	Secondary certificate	Primipara	82	Normal vaginal
R3	18	Married	Primary certificate	Primipara	89	Normal vaginal
R4	20	Married	College certificate	Primipara	90	Normal vaginal
R5	25	Married	College certificate	Multipara	76	Normal vaginal
R6	27	Married	Primary certificate	Multipara	76	Caesarean section
R7	33	Married	Secondary certificate	Multipara	99	Normal vaginal
R8	21	Married	College certificate	Primipara	69	Normal vaginal
R9	35	Single	Degree	Multipara	68	Normal vaginal
R10	21	Married	Secondary certificate	Multipara	70	Emergency caesarean section
R11	27	Married	Primary certificate	Multipara	79	Normal vaginal
R12	30	Married	College certificate	Primipara	69	Normal vaginal
R13	32	Married	Secondary certificate	Multipara	66	Normal vaginal
R14	22	Single	College certificate	Primipara	82	Emergency caesarean section
R15	24	Married	Primary certificate	Primipara	87	Normal vaginal
R16	25	Married	College certificate	Multipara	70	Normal vaginal
R17	20	Married	Secondary certificate	Multipara	71	Normal vaginal
R18	30	Married	College certificate	Multipara	76	Normal vaginal
R19	23	Married	Primary certificate	Primipara	89	Normal vaginal
R20	19	Single	Secondary certificate	Primipara	102	Normal vaginal
R21	22	Single	College certificate	Primipara	87	Normal vaginal
R22	29	Married	Secondary certificate	Multipara	68	Normal vaginal
R23	30	Married	Degree	Multipara	72	Normal vaginal
R24	31	Single	College certificate	Multipara	68	Normal vaginal
R25	39	Single	Secondary certificate	Multipara	67	Caesarean section
R26	20	Married	Primary certificate	Primipara	76	Emergency caesarean section
R27	21	Single	College certificate	Primipara	77	Normal vaginal
R28	25	Single	Secondary certificate	Multipara	74	Normal vaginal
R29	22	Married	College certificate	Primipara	88	Normal vaginal
R30	38	Married	Degree	Multipara	67	Normal vaginal
R31	36	Married	Secondary certificate	Multipara	69	Normal vaginal
R32	18	Single	College certificate	Primipara	91	Emergency caesarean section
R33	26	Single	Primary certificate	Primipara	87	Normal vaginal

4.5.1 Theme 1: Significance of midwife-led pre-birth training

All participants acknowledged the contribution of midwife-led pre-birth training in reducing severe fear of childbirth. This theme generated three sub-themes, which are in the form of participants' comments.

i. The training handled my shame, guilt and fears

Multiparous women acknowledged that the pre-birth training adequately addressed their shame and fears. Due to sharing during the sessions, they related to other women that had similar experiences in their previous pregnancy. For the primipara, they mentioned that the training made them feel safe, thus reducing the uncertainty among them.

> *"I feel happy that I am not alone in this……I have lived a life of shame, guilt and fear since my first pregnancy" (R5,)*

ii. The midwife understood me without judgment.

Most respondents noted that the midwife who attended to them during the pre-birth training was understanding, caring, sympathetic and considerate. They mentioned that they felt comfortable as they listened without judgment. They appreciated trainers' professionalism when listening to their stories, worries, anxieties, and concerns about childbirth.

> *"The trainers were very understanding, professional and caring. They were able to listen without judging any of us. They treated us as human beings during the training." (R1)*

iii. The training sessions were more practical than theoretical.

The women acknowledged that the training contained real-life examples that made it relatable. The midwives used visual aids, videos, role plays, and practical examinations, which made the participants more apprised with the entire process of labour and delivery. The training sessions

consisted of a tour to maternity and delivery rooms, with step-by-step explanation of what happens at each point, and what is expected of the expectant women. Primiparous women revealed that the health facility tours gave them more confidence and a sense of security.

> *"I was particularly impressed by the study tour to maternity and delivery rooms. The midwife was able to explain to us exclusively about what happens at each section. This was very useful to me." (R19)*

4.5.2 Theme 2: Significance of interactive conversations.

Study participants noted that their constructive engagements and conversations with midwives about pregnancy, labour and delivery were useful. This theme generated three sub-themes.

i. The midwife gave useful medical advice in all sessions.

Participants noted that the midwives gave useful medical advice both in their one on ones, and as a group. Also, the midwives were willing to have personalized conversations after the training. These interactions greatly reduced the misconceptions, myths, and unnecessary worries about childbirth. The midwives would also give referrals for specialized attention to expectant women that experienced maternal complications.

> "*They were very professional. They gave medical advice to us all and those who needed specialized medical attention were referred to a medical specialist who can handle them.*" (R13).

ii. The conversations were open, informative and real

It was noted that the facilitators of the pre-birth training preferred an open dialogue methodology. This method would allow participants to express their feelings, stress factors, and anxiety within a safe space. In that regard, the trainers understood the common issues, which facilitated their objectives within the entire training period. As a result, both the women that opened up and them that did not received insightful advice. Their self-esteem, excitement,

and anticipation for a positive childbirth experience were enhanced.

"I am a shy person, but I gained a lot from the open conversations." (R32).

iii. The training was integrated

Due to integration of the training, the participants gained useful insights beyond pregnancy and childbirth. The participants acknowledged several topics covered including health in pregnancy, birth and breathing exercise, breast-feeding, care for the new-born, postpartum period, family planning, personal hygiene and sanitation. Furthermore, the interactions between primiparous and multiparous women affirmed the goal of these sessions.

"This was a special training. Apart from gaining insights about how to tackle my childbirth fears, I also learned a lot about how to take care of myself and my baby". (R18)

4.5.3 Theme 3: Adapting to procedures for positive future childbirth experience.

The third theme was about the management of antenatal fear of childbirth beyond the midwife-led pre-birth training. Three sub-themes were identified within this theme.

i. Professional support beyond pregnancy and childbirth

Study participants reported that after successful completion of the pre-birth training, the midwives assured them of continued monitoring and follow-ups. They were given a list of available professionals to contact within the hospital in case of any medical issues.

"They assured us that we can still seek professional help from the hospital even after the end of the pre-birth training and therefore, I am hopeful that in case of any complication, I can be helped." (R11)

ii. Individualized psychologic/obstetric support

The participants also noted being introduced to a medical psychologist and gynecologist that were willing to support them in case of any complications before and after birth. They reported that through these training sessions, they obtained crucial information about childbirth complications. Also, they acknowledged development of trust in the healthcare system, thus reducing their worries and concerns about childbirth.

> *"They have instilled confidence in us by even allowing us to have medical psychologists to help us even after delivery. I now have more confidence." (R30)*

iii. Improved assertiveness towards childbirth

The participants noted that midwife-led pre-birth training improved their assertiveness on childbirth. Their changed attitudes led some to prefer having more children naturally. Also, compared to before the pre-birth training, most women had developed confidence for the childbirth process. Factually, most participants that had preferred caesarean section as mode of delivery before enrolling in the training had already changed their preference to natural delivery. This change was perhaps due to the elaborate information that was shared during the pre-birth training sessions.

4.6 Results of Study 6: To establish whether institutional maternity services contribute to the fear of childbirth among pregnant women in Samburu County

A total of 29 new mothers aged between 18 - 34 years participated in this study. The demographic characteristics of the study participants are given below. (Table 18).

Table 18: Demographic characteristics of the respondents

Code	Age	Education	Residency	Marital status	Employment	No of children
RP1	18	Primary	Rural	Single	Formal	1
RP2	23	Secondary	Peri-urban	Married	Formal	1
RP3	25	College	Rural	Married	Formal	1
RP4	30	College	Peri-urban	Single	self-employed	2
RP5	19	Secondary	Urban	Married	self-employed	1
RP6	31	Primary	Rural	Married	self-employed	2
RP7	26	Secondary	Urban	Married	self-employed	1
RP8	20	college	Peri-urban	Single	Formal	1
RP9	27	College	Rural	Married	self-employed	1
RP10	32	Primary	Urban	Single	self-employed	3
RP11	30	College	Peri-urban	Married	self-employed	4
RP12	21	Secondary	Rural	Married	Formal	1
RP13	28	Primary	Urban	Married	Housewife	2
RP14	33	Secondary	Peri-urban	Married	Housewife	3
RP15	31	Primary	Urban	Married	Formal	3
RP16	22	Primary	Rural	Single	self-employed	1
RP17	34	Secondary	Urban	Married	self-employed	1
RP18	29	College	Rural	Married	self-employed	1
RP19	25	Primary	Peri-urban	Married	Formal	1
RP20	23	College	Rural	Single	Formal	1
RP21	30	Primary	Urban	Married	Housewife	3
RP22	26	Secondary	Peri-urban	Married	Self-employed	1
RP23	31	College	Urban	Married	Formal	2
RP24	24	Secondary	Peri-urban	Single	Housewife	2
RP25	27	Secondary	Rural	Married	Formal	2
RP26	32	College	Urban	Single	Housewife	3
RP27	28	College	Peri-urban	Married	Housewife	2
RP28	24	College	Rural	Married	self-employed	2
RP29	29	Primary	Peri-urban	Single	self-employed	2

4.6.0 Perceptions and experience regarding the quality of institutional maternity services

All the focus group interviews revealed that indeed there were challenges regarding the quality of institutional maternity services and two themes with eight sub-themes were identified (Table 19).

Table 19: Themes and sub-themes generated from focus group interviews

Category	subcategory
1. Challenges to the provision of care	a) Inadequacies related to human and physical resources b) Inadequate referral systems c) Challenges with internationally recognized best practices d) Challenges in the management of emergencies.
2. Challenges related to the experience of care	a) Lack of enough human resources for health and inadequate investment in physical resources b) Lack of cognition c) Lack of respect, dignity and equity d) Inadequate emotional support

4.6.1 Theme 1: Challenges regarding the provision of care at maternity institutions.

Although the quality of care framework identifies six elements related to the provision of care at the maternity institutions namely: human and physical resources; the referral system; the appropriate use of available technologies; internationally recognized best practices; and management of emergencies, the responses from the focus group interviews elicited four elements (therein referred as sub-themes); namely: (i) challenges with human and physical resources, (ii) challenges relating with referral systems, (iii) challenges with internationally recognized best practices, and (iv) challenges with the management of emergencies. The four sub-themes are expounded below.

i. Challenges with human and physical resources

Participants elucidated that they experienced challenges related to patient flow at the maternity wings, inadequate staffing at the maternity wing, unclear signage of labour, delivery and postpartum sections of the maternity wing, and inadequate infrastructure of the maternity institutions. They described their frustration with how the flow of patients was being handled. They implored that due to unclear patient flow, much time was lost in finding their way within the maternity institutions. This was commonly reported by women who were giving birth for the first time.

> *"I did not clearly understand the patient flow…this was my first pregnancy". [RP22]*
>
> *"During antenatal visits, the nurses should guide us on the flow of patients". [RP12]*
>
> *"The nurses were very few compared to the number of women delivering" [RP7].*

Participants reported that the maternity institutions did not have clear signage. Also, they noted that the direction to labour wards, delivery rooms and postpartum sections of the maternity wing was not well labelled and this made it difficult for those who were visiting those sections for the first time.

"There was no clear signage, I got lost at first but the maternity staff assisted me" [RP2]

ii. Challenges with referral system

From the focus group interviews, it was noted that there were challenges with the time taken to be admitted, timely examination and referral of women presenting with birth complications. Four participants experienced a very slow admission procedure, which led to a delayed referral to a more advanced institution.

"They are slow, I had complications, and my chances of surviving were low. Luckily, I was able to arrive at the referral maternity institution because my cousin had a private car that we used" [RP28].

Also, there were reports of challenges with reliable transport on a 24-hour basis. Participants mentioned that due to rough terrains particularly in rural settings, it was challenging to get means of transport more so at night. Although the maternity institution was reported to be having more than one ambulance, it was mentioned that they were unreliable.

"Ambulances in the maternity institution are unreliable, they do not respond on time and sometimes they don't receive our calls," [RP25].

"I called and they said the ambulance had gone for another referral" [RP11].

In regards to the availability of staff, essential drugs and equipment at the public health facilities to stabilize expectant women with complications before referral, the participants reported that the local public health facilities such as dispensaries and some of the health centres were not operating on a 24 hours basis due to staff shortage.

"Our dispensary is closed at night and during weekends. There is only one health worker who cannot work during day and night" [RP20].

iii. Challenges with internationally recognized best practices

Allowing a pregnant woman to have social support of her own during labour and childbirth and assessment of women's physical well-being throughout labour are among the globally recommended best practices. In this study participants reported that they were not allowed to be accompanied into labour and delivery wards by persons of their choice and in two focus group interviews, it was said that some health care workers did not give attention to the assessment of pregnant women's physical well-being when they visited the antenatal care clinics.

> *"The maternity does not allow anyone to be accompanied by a relative or family member to labour wards and delivery rooms" [RP15]*

iv. Challenges with the management of emergencies

Two participants mentioned that they were aware of three of their relatives who had birth complications and had lost their lives as a result of late reporting to the maternity institution which led to delays in managing the emergency. Also, they mentioned that unsafe abortion was common but the local health facilities could not handle emergency abortions as they did not operate on a 24 hours basis.

> *"There are women in our villages who have lost their lives due to unsafe abortions and other pregnancy complications because the maternity is far from rural areas" [RP13].*

4.6.2 Theme 2: The experience of care at the public health facilities

Based on the quality-of-care framework used for drafting the focus group interview guide, our interest was on the challenges related to the study participant's experience of care at the maternity institutions, namely: (i) human and physical resources, (ii) cognition, (iii) respect, dignity and equity, and (iv) emotional support. Participants cited a litany of challenges and inadequacies related to these sub-themes as discussed below

i. Challenges related to human and physical resources

The in-depth interviews were aligned towards the physical infrastructure, overall maternity environment, contact time with qualified healthcare workers, cultural norms regarding the gender of midwives and the competence of healthcare workers to offer quality maternal services. Concerns were raised over the state of wards, more specifically the quality of beds and bedsheets, meals, toilets and bathrooms.

"There is a need to improve the quality of maternity linen and beds" [RP19]

"I wish they can improve the quality of meals they offer to inpatients" [RP14].

Regarding contact time with qualified healthcare workers, the majority of the participants noted that the maternity institution was understaffed and this made it difficult for the available healthcare workers to have quality contact time with the expectant women

"Only one doctor and about three nurses in the labour ward. We were seven" [RP10].

Cultural norms regarding the gender of midwives assisting women during delivery were mentioned in all four focus group interviews. All participants preferred to be assisted by female midwives and doctors but lamented that the maternity had mostly male healthcare workers.

"The maternity had only male nurses and there were no options to choose from." [RP17].

"In our culture, men are not supposed to touch women during childbirth, I was uncomfortable being assisted to give birth by a male doctor. [RP09]

ii. Challenges related to cognition

In this study, participants noted that necessary information regarding their scheduled childbirth was not relayed effectively in a language they all understood. Equally, participants reported that they were not fully prepared for the childbirth process and they did not understand the

existing options. Regarding postpartum care, the participants reported that they were not psychologically prepared for all possible outcomes of their pregnancy.

"They only looked at my maternity card and told me to go to the labour ward" [RP8].

"Although I had questions, I wouldn't ask because I was worried" [RP23].

iii. Challenges regarding respect, dignity and equity

In the current study, fear of hostile treatment from midwives and nursing staff was repeated by study participants in all four focus group interviews. Study participants who had a negative experience of hostile treatment by the maternity staff narrated their ordeals during the past pregnancies.

"The nurses aren't kind, compared to the traditional birth attendants" [RP18].

"Most midwives do not treat women with dignity" [RP24].

In contrast to their often-negative impressions of facility-based midwives, participants largely submitted that the care provided by traditional birth attendants was of compassion, humility and absolute psychosocial support. They stated that traditional birth attendants encouraged them during labour and assisted them with tenderness and compassion.

"Traditional birth attendants will speak with you with kindness" [RP25]

"My experience was inspiring; the traditional birth attendant was empathetic" [RP3]

It was reported that the effects of not attending all the required antenatal care clinics during pregnancy created anxiety and fear among some study participants. Similarly, other participants explained how they had heard stories from women delivering in health facilities that caused fear and anxiety. In some cases, study participants confessed that these fears discouraged many of their peers from going for health facility deliveries

"There are stories of women being slapped during labour" [RP26].

Participants also stated that the health facility did not have a designated office responsible for assessing the socio-economic and cultural needs of the expectant women. Also, most of the study participants felt that they did not receive appropriate respect from the healthcare providers.

Participants noted that cultural practices that do not interfere with the quality of care such as being assisted to give birth by a female healthcare worker were not adhered to. Participants reported that not all expectant women were treated with the same standard of care. They said that those who were well known by the healthcare workers received better treatment than the ordinary women. Also, it was said that some women were physically examined in an environment that was not conducive, in some cases, there was no privacy and this was noted in the focus group interviews as a gross violation of the basic human rights of the expectant women.

"We were not treated equally, some received better treatment than others" [RP27].

iv. Challenges with emotional support

In the current study, participants were asked if: (i) they were able to freely choose the social support they were comfortable with, (ii) if they were treated with honesty, kindness and understanding, and (iii) if the health staff were cognizant of their supportive role in the provision of care during labour, delivery and the postpartum period.

None of the participants reported having a companion of their choice during labour and delivery. The maternity was said to have strict protocols that would not allow such practices.

Participants reported that most midwives did not offer any physical, or emotional support during labour and childbirth, and this was largely a result of understaffing.

"The nurses were overwhelmed. We were seven and there were only three" [RP4].

4.7 Results of Study 7: To determine the rates of fear of childbirth among expectant women and their spouses in Samburu County, Kenya

A total of 254 pregnant women and their spouses participated, which is a response rate of 88%. The mean age of the pregnant women and their spouse was 25.27 ± 4.008 and 30.04 ± 19.73, respectively. Among pregnant women, 36.61% (n=93) had a primary education certificate, 25.20% (n=64) had health insurance cover, and 56.69% (n=144) were residing in rural areas. For spouses, 35.43% (n=90) had a secondary school certificate as indicated in Table 20.

Table 20: Demographic characteristics of study participants

Variable	***Description***	***Pregnant women (n=254)***	***Spouses (n=254)***
Age	Mean	25.27 ± 4.008	30.04 ± 19.73
	None	65 (25.9)	52(20.47)
Education	Primary	93(36.61)	76(29.92)
	secondary	49(19.29)	90 (35.43)
	Tertiary	47(18.50)	36(14.17)
Residency	Rural	144(56.69)	147(57.87)
	Peri-urban	73(28.74)	64(25.20)
	Urban	37(14.57)	43(16.93)
Religion	Christian	232(91.34)	230(90.55)
	Muslim	9(3.54)	11(4.33)
	No religion	10(3.94)	7(2.76)
	Traditional	3(1.18)	6(2.36)
Health insurance	Yes	64(25.20)	51(20.08)
	No	190(74.80)	203(79.92)
Employment	Yes	110(43.32)	107(42.13)
	No	144(56.69)	147(57.87)
Economic challenges	No	98(38.58)	99(38.98)
	yes	156(61.42)	155(61.02)

4.7.1 Relationship of antenatal fear of childbirth among pregnant women and their spouses

The relationship of fear of birth scores between pregnant women and their spouses were tested. The result indicated that 58.6% (median=50) of the pregnant women and 45.7% (median=50) of their spouses had reported having fear of childbirth. Spearman correlation was performed, and the results indicated a significant positive correlation between antenatal fear of childbirth among pregnant women and their spouses ($r = 0.182$, $p<0.001$) as shown in Table 21.

Table 21: Relationship of FOBS among pregnant women and their spouses

Fear of childbirth	***Pregnant women n (%)***	***Spouses n (%)***	***statistics***	***Correlation statistics***
Fear (FOBS ≥ 50)	149 (58.6)	116 (45.7)	z = -2.928	r = 0.182[a]
No Fear (FOBS<50)	105 (41.3)	138 (54.3)	p = 0.003	
FOBS Median	50	50		

[a] Spearman correlation test.

4.7.2 Factors associated with antenatal fear of childbirth among pregnant women

Respondent's level of education ($p = 0.022$), residency ($p<0.001$), having health insurance cover ($p<0.001$), feelings about the forthcoming birth ($p<0.001$), pregnancy check-up ($p<0.001$) were significantly associated with FOC. Pregnant women whose level of education was low and those that did not have health insurance cover, were more likely to have higher FOC compared with those who had. Also, Pregnant women who did not attend regular antenatal check-ups had a higher level of FOC compared with those who attended. Equally, the previous mode of delivery ($p<0.001$), parity ($p<0.001$), and planned pregnancy were significantly associated with antenatal FOC. Pregnant women whose pregnancy was not planned had a higher FOC. There was no significant association between religion ($p=0.075$); employment status ($p=0.892$); and preferred mode of delivery ($p=0.595$), and FOC as indicated in Table 22.

Table 22: Factors associated with childbirth-related fears of pregnant women

Variable	*Description*	*n (254)*	*FOBS Median*	*Statistics*	*p*
***Education*[1]**	None	65	40	$\chi2 = 5,209$	0.022
	Primary	93	50		
	secondary	49	50		
	Tertiary	47	50		
***Residency*[1]**	Rural	144	30	$\chi2 = 36,432$	< 0.001
	Peri-urban	73	50		
	Urban	37	60		
***Religion*[1]**	Christian	232	47	$\chi2 =6.900$	0.075
	Muslim	9	40		
	No religion	10	50		
	Traditional	3	60		
Health insurance	Yes	64	40	Z = -3,942	< 0.001
	No	190	50		
***Employment*[2]**	Yes	110	50	Z = -,135	0.892
	No	144	40		
***Feelings forthcoming birth*[1]**	Positive	173	45	$\chi2 = 19,021$	< 0.001
	Somewhat positive	42	45		
	Not positive	59	50		
***Preferred mode of birth*[2]**	Vaginal birth	193	40	Z = -,531	0.595
	Caesarean Section	61	50		
***Regular check-up*[2]**	Yes	163	35	Z = -4,938	< 0.001
	No	91	53		
***Previous mode of birth*[2]**	Vaginal birth	111	30	Z = -7,628	< 0.001
	Caesarean Section	22	60		
***Parity*[2]**	Primipara	122	60	Z = -11,819	< 0.001
	Multipara	132	30		
***Participate in P. A*[2]**	Yes	113	40	Z = -1,718	0.086
	No	141	50		
***Planned pregnancy*[2]**	Yes	130	40	Z =-2,101	0.036
	No	124	50		

[1] Mann-Whitney U test
[2] Kruskal- Wallis test

4.7.3 Factors associated with antenatal fear of childbirth among spouses

Factors contributing to FOC among spouses of pregnant women were also investigated. Spouses who had low levels of education (p = 0.001), and those residing in rural areas (p<0.001), recorded high FOC. Equally so, the spouses who had no health insurance cover (p=0.002) and had a less positive experience from the previous childbirth (p<0.001), were noted to have high FOC. Furthermore, spouses who had no positive feelings about the forthcoming birth (p<0.001) had high FOC. The respondents' employment status (p=0.5), religion (p=0.367) and economic challenges (p=0.485) did not have any association with fear of childbirth among the spouses (Table 23).

Table 23: Factors associated with FOC of spouses

Variable	*Description*	*(n=254)*	*FOBS median*	*Statistics*	*P*
Education[1]	Primary	76	40	$\chi 2$ = 11,924, df=1	<0.001
	secondary	52	50		
	Tertiary	36	50		
Residency[1]	Rural	147	30	$\chi 2$ = 24,516, df =1	< 0.001
	Peri-urban	64	50		
	Urban	43	60		
Religion[1]	Christian	230	47	$\chi 2$ = ,814, df = 1	0.367
	Muslim	11	40		
	No religion	7	50		
	Traditional	6	60		
Health insurance	Yes	51	40	Z = -3,158	0.002
	No	203	50		
Employment[2]	Yes	107	50	Z= -,674	0.500
	No	147	40		
Economic challenge[2]	Yes	155	50	Z = -,699	0.485
	No	99	40		
Previous birth experience[2]	positive	124	20	Z = -11,528	< 0.001
	Less positive	36	60		
Feelings about forthcoming birth[1]	Positive	143	40	$\chi 2$ = 17,747, df = 1	< 0.001
	Somewhat positive	42	50		
	Not positive	69	50		

[1]Mann-Whitney U test
[2]Kruskal- Wallis test

CHAPTER 5: DISCUSSION

This chapter discusses the seven studies but in prose form, as most of the points highlighted are interrelated and therefore to avoid repetition, the key issues will be discussed in this chapter.

The first study intended to explore fear FOC in a sample of women of reproductive age in Kenya by evaluating the readability of the W-DEQ-A and validating its contents. Seven validated readability test scales were applied in this study with three of the seven scales (SMOG index, The Coleman-Liau index, and Linsear Write Formula) indicating that W-DEQ-A was readable by readers who have attained at least one year of secondary education in Kenya (an equivalent of ninth grade in the US education grading). Two of the scales (The gunning fog index and Flesch Reading Ease Score) indicated that the W-DEQ-A was fairly difficult to read, while the remaining two scales (Flesch-Kincaid Grade Level Score and Automated Reliability Index) were suitable for primary school graduates (eighth grade in the US grading system).

In this regard, there was a consensus that the W-DEQ-A was readable by readers who have at least one year of secondary education in Kenya (an equivalent of ninth grade in the US education system). This finding concurs with similar studies that have found most patient materials to be written at a higher grade although it is recommended that they should be aimed at an eighth-grade level or lower [129].

In the current study, the SMOG index produced a readability score of 9 which is an equivalent of readers in their second year of secondary education in Kenya (an equivalent of grade 12 in the US education system) while the Flesch-Kincaid Grade Level Score produced a readability score of 8, an equivalent of a class eight reader in the Kenya education system (grade eight in the US education grading). Similar findings of relatively higher-grade levels when SMOG index and Flesch-Kincaid Grade Level Score are used in a similar text have been documented [130].

In this study, the geographical location of the study respondents did not have an impact on their ability to read and comprehend the items in the W-DEQ-A. This finding echoes studies undertaken in the past [99]. However, this should be interpreted cautiously as the selected study respondents were required to have the ability to read, write and speak in English. The study participants identified several items that were missing in the W-DEQ-A that would have contributed to the versatility of the tool. From the FGDs, it was noted that women with a previous history of distressing childbirth experiences were more likely to be fearful. This has been reported in similar studies [110]. It was also reported by the study participants that trauma and maternal abuse contributed significantly to FOC and in this regard, it would have been valuable to include a question on this thematic area since many studies agree with this finding [131].

Fear attributed to the inability of the body to give birth as a result of low maternal age and underlying health conditions was another valid construct that was reported missing in the W-DEQ-A. The FGDs noted that these fears may have a unique impact on the childbirth process especially if the underlying health conditions are known. This finding agrees with similar studies suggesting that midwives should be able to undertake counselling to expectant women who have underlying health issues and those with young maternal age [81].

The second study was performed to validate the Swahili version of the W-DEQ-A scale in pregnant women in the wider East and Central African region which predominantly uses the Swahili language and more particularly in Kenya since Swahili is used as a national language. The results of the analyses confirmed the multidimensionality of the W-DEQ-A and produced five-factor solutions namely: lack of self-efficacy, fear, negative emotions, negative appraisals, and social isolation. In the final model, 9 items were removed from the original 33-item scale, which had shown a poor model fit; to achieve an overall model fit that was satisfactory. The confirmation of the multidimensionality of the W-DEQ-A in the current study has been

demonstrated in numerous studies undertaken in various parts of the world [11], [18], [124]–[126], [18], [92]–[94], [96].

Initially, the original W-DEQ-A was translated to the Swahili version of W-DEQ-A through a rigorous process similar to other studies that validated the tool in other languages. This process was meticulously done to uphold the cognitive equivalence, as per the established procedures [132]. The five-factor solutions obtained in the current study were coherent but not fully identical with those identified in other studies on the W-DEQ-A. The factor loadings in a recent study in Malawi [18] identified the three-factor model and four-factor loadings were obtained in similar studies in Hungary, Japan, and Australia. There was also a six-factor model in a similar study in Norway.

In the current study, the first-factor loading was named "lack of self-efficacy" which had seven items namely; strong (item 4), confident (item 5), safe (item 9), independent (item 10), composed (item 16), self-confidence (item 22), and let happen (item 26). Similar factor loadings were deduced in similar studies conducted in Norway [125] and Malawi [18] with identical items as the current study. However, Malawi's study identified three more items namely: funny (item 28), longing for the child (item 21), and trust (item 23). A similar study in Italy had three items, two of which are similar to the current study (item 9 and 22) but the authors named the factor loading as "lack of confidence" [128].

Our second-factor loading was named "fear" and had five items. Similar studies in Malawi, Hungary, Japan, Italy, and Norway have identified similar item loadings. In particular, items 12 (tense) and 6 (afraid) were observed in all the five studies mentioned above. Items 27 (lose control), and 19 (panic) were common among the Japanese, Italian, and Norwegian studies. The third-factor loading was named "negative emotions" with 5-items and this finding was similar to a study in Australia [126], which had at least 3 items similar to the current study.

The fourth-factor loading was named “negative appraisal” and the same name was given in similar studies in Hungary and Malawi. In both studies, items 1 (fantastic), 13 (glad), and 14 (proud) were similar. Lastly, the fifth-factor loading was named “social isolation” with three items. The same name has been given in similar studies undertaken in Australia, Japan, and Hungary. Although the item loadings in a similar Norwegian study is identical with the current study, the factor loading was named “loneliness”. Similarly, the factor loading in the Hungarian study was named “isolation” with at least two items agreeing with the current study.

There are other factor loadings such as lack of positive anticipation, the moment of birth, riskiness, and concern for the child, reported in various studies that our model was not able to deduce. This might be due to cultural differences influencing understanding and interpretation of some of the items in the original W-DEQ-A questionnaire as documented in an Australian study [7].

In the initial stage of EFA, 9 items were removed to get an acceptable model fit. Some of the items that were removed include items 17 (relaxed), 20 (hopelessness), 21 (longing for the child), 25 (behave badly), 28 (funny), 29 (natural), 30 (obvious), 32 (the child will die) and 33 (the child will be injured). The removal of these items particularly those about the possibility of pregnant women longing for the child, thoughts of death or injury to the child is an indication that these were not important sources of childbirth fear among the sampled population. This finding agrees with similar studies in Hungary, Malawi, Australia, and Italy. Also, it is worth noting that this finding disagrees with a previous study that reported that the concerns of pregnant women regarding the health and well-being of their unborn baby are among the most significant sources of childbirth fears [25]. The disagreement would be as a result of socio-cultural dynamics in different regions and variance in socio-demographic indicators as reported in a similar study in Russia [133], which noted that FOC is subjective and highly individualistic.

Critically looking at the five-factor loadings in the current study, factor domains such as “negative emotions” (frightful, weak, desolate, pain and dangerous) and “social isolation” (lonely, deserted and abandoned) might provide a significant predictor of the challenges pregnant women face during pregnancy. Therefore, available healthcare models should proactively identify expectant women exhibiting these characteristics to prioritize their maternal needs such as antenatal counselling during antenatal care clinics. A recent study done in Kenya agrees with this finding [134].

The concurrent/convergent validity of the Swahili version of the W-DEQ- A indicated that the scale correlates well and within the acceptable levels with the other two measures of child-birth related depression (EPDS) and anxiety (BAI). This result agrees with a similar study in Hungary which used BAI, and in Norway, which used EPDS. Our adopted model also indicated good internal consistency and reliability; the same was noted in the studies undertaken in Hungary and Norway. The Cronbach alpha of the Swahili version of W-DEQ-A was 0.951, an indication of an excellent internal consistency of the instrument. This also demonstrates the robust reliability of the Swahili version of the W-DEQ-A scale.

The main focus of the third study was to determine the prevalence of FOC among gravida women in the Kenyan region. The result indicated that the prevalence of severe FOC was more on primigravida women than multigravida women. Several author-guided studies have related a higher prevalence of FOC among primigravida women to their transition into motherhood, which is curbed by numerous expectations and anxieties. These results agree with other studies conducted in other countries and regions [49], [118], [135]–[138].

Also, compared to other countries such as Denmark and Sweden [138], the prevalence of FOC levels recorded in these countries were slightly higher than the current study findings. The findings from this study indicated a similar value on the prevalence of severe FOC across the rest of Europe at 8% (95% CI 0.04– 0.13) [139]. Notably, the prevalence in the current study

was lower than from similar studies conducted in Australia [10], for example 23% (95% CI 0.07–0.39) (I2 = 98.63%, p<0.001). Also, compared to studies conducted in America, the prevalence of the current study was lower compared to 11% (95% CI 0.03–0.20) (I2 = 92.97%, p<0.001). Finally, the prevalence levels retrieved from studies in Asia were the highest at 25% (95% CI 0.11–0.40) (I2 = 97.69%, p<0.001) compared to the current study.

In addition, the study found that the literacy status of the respondents was associated with FOC, where those with no education were more fearful than those with education. These findings agree with other similar studies [140].

In this study, parity was statistically significant (P<0.001). This finding agrees with numerous studies conducted in other regions [127], [141]. Although it has been documented that the preferred mode of delivery is significantly associated with FOC [142], this study did not find correlations between preferred mode of delivery and FOC.

The findings from this study expressed no significant relationship between FOC and socio-demographic variables including age, gestation age, and employment status. These findings agree with studies undertaken by Nilsson et al., and Akhlaghi et al., [143], [144].

In this study, several obstetric variables influencing fear of childbirth were used. Gravida women who went for a regular check-up of their pregnancy were less likely to have FOC relative to those that did not. Additionally, gravida women who participated in physical activity and childbirth preparation classes were less likely to develop FOC relative to those that did not. Also, having trust in healthcare providers was an indicator of FOC reduction. Therefore, when gravida women's awareness of childbirth increases, their fears of childbirth levels decrease. Connately, encouraging expectant women to attend childbirth preparation classes provide an excellent opportunity to create awareness about the entire process of childbirth. Therefore, these four variables are determining modifiers of childbirth fears [75],

[145]. This finding agrees with similar studies conducted in the United States of America in 2003 [140].

In the fourth study which was looking at the effects of integrated antenatal education on the fear of childbirth, pregnant women who enrolled in the intervention group and received the integrated antenatal education had significantly lower W-DEQ-A score when compared with the control group; and therefore, integrated antenatal education was effective in reducing the FOC. Similar studies have indicated that pregnant women who undergo childbirth preparation classes were found to be less anxious and reduced FOC. These studies have indicated that childbirth education was associated with significant improvements in maternal self- efficacy, women empowerment and elated sense of belonging and confidence [26], [75], [84], [146]–[149].

The overall purpose of the fifth study was to explore women's experience of midwife-led integrated antenatal education and its impact on childbirth fears. To the best of our knowledge, this was the first qualitative study on this topic to be undertaken in a developing country. We found that midwife-led antenatal education of pregnant women with high fear of childbirth brought positive inclination and improved trust in the process of childbearing. The interviewed women expressed their satisfaction with this training. The study participants noted that the midwives understood them without prejudice as they offered practical skills on handling their pregnancy, their anticipations, general fears and anxieties. This stimulated a feeling of serenity and composure, thus reducing their childbirth fears to manageable levels. Similar studies have indicated such programme to reduce women's anxiety during pregnancy and labour [24], [76]

A common statement from the women interviewed was that the midwives who were training them were professionally knowledgeable and this enabled them to gain knowledge which dispelled or alleviated fears associated with pregnancy and childbirth. Similar studies have noted that professional support by healthcare professionals has been found to be significant in

dispelling fears associated with pregnancy and childbirth [150]. The sessions were able to dispel some rumors, myths and misconceptions about pregnancy and childbirth thereby making them more assertive when facing labour and childbirth. This shows that integrated antenatal education increases women's self-control, confidence, and self-efficacy. These findings coincide with similar studies [75].

Additionally, besides the medical and technical resources from the training, expectant women's emotional well-being during and after pregnancy was assured. Also, it included opportunities for professional consultations and meeting with diverse social support groups. From other studies evaluated, these interactions and social support are noted to ease expectant women's fears of childbirth [151].

The interviewed women learnt how to develop labour-related self-reliance, labour pain perseverance, and how to implement relaxation techniques. The gained knowledge enabled them to develop their self-confidence, which enabled them to have a positive childbirth experience. Similar studies have indicated that comprehensive antenatal education would greatly improve the childbirth experience among fearful expectant women [75].

From the results, there was a reduction in fears among severely affected women especially due to specific topics that were covered by cognitive behavioral therapists. This intervention enhanced self confidence among the women who had high fear of childbirth. Also, the training emphasized active coping strategies. These findings agree with similar studies conducted in Sweden [56].

Also, integrated antenatal education offered a complementary approach to fear management, which equip expectant women with effective ways of coping with pain. This has been found to be true in other studies [26]. Therefore, there exists a possible reduction in the rates of caesarean section, thus increasing preference for vaginal births, especially among primiparous

women. This finding agrees with a study by Saisto et al., [152].

The sixth study aimed at understanding the perceptions and experiences of new mothers diagnosed with the fear of childbirth in Kenya; regarding the institutional maternity services offered and if they contribute to the fear of childbirth. In this study, participants voiced their concerns regarding the quality of maternity healthcare service offered and its contribution to the fear of childbirth. Undeniably, all the 29 study participants admitted experiencing challenges during labour and childbirth. These findings are consistent with the findings from a study in Namibia which reported that expectant women had similar concerns regarding the quality of institutional maternity services [153].

Regarding the findings on the challenges in the provision of care, the study highlighted four sub-themes. Human resources for health comprise the quantity and quality of health and non-health personnel employed for providing and supporting the delivery of healthcare in maternity institutions. It also includes staff arrangement, management styles, and internationally accepted staffing norms. The same challenges have been reported in a similar study [154]. In this study, there were concerns regarding understaffing, unclear signage, the ambiguous organizational management structure of the maternity wing and poor management of patient flow in the maternity institutions. Similar challenges with human resources for health have been reported from studies conducted in other developing countries [155], [156].

In regards to physical resources, there were inadequacies with physical infrastructures, such as depilated state of the maternity and wards, poor quality of maternity beds and beddings, poor quality of meals and general unhygienic environment. There are similar studies that have shown infrastructural challenges that hamper better maternal health services [157], [158].

This study highlighted a myriad of challenges emanating from erratic and unreliable referral systems from the lower-level health facilities. There were also reports of inadequate

ambulances, poor coordination of the existing ambulatory services and unreliable communication system. These findings are in tandem with a similar study carried out in Ghana which was looking at the views of women, healthcare providers, public and quasi-private sectors regarding maternal care shortcomings [159].

Regarding the internationally recognized best practices, the current study noted that currently there exist numerous procedures in maternal healthcare that have, through cautiously designed randomized controlled trials, been shown to be of value to the mothers and their infants. It was however reported that expectant women were not allowed to have the social support of their own during labour and childbirth. The effects of social support during labour and childbirth have been reported to have a considerable impact on new mothers, and this may persist into the postpartum periods [21]. Also, it was noted that essential equipment and drugs were not available in lower-level facilities, and this finding agrees with similar studies that have identified substandard emergency obstetric care which contributes to maternal deaths [160].

Whereas the quality of the provision of care is essential in guaranteeing effective maternal healthcare, expectant women's experience of care is equally significant. If their overall experience is such that it dissuades them from returning for subsequent institutional maternity births, or leads to speculations to the same effect in the wider community, then the definite quality of healthcare provided is questionable.

The proportion of male to female healthcare workers was also a concern as the majority of the participants wished to be attended by female healthcare workers but the majority were male. The findings of this study agree with similar studies [48].

Cognition entails seamless communication between a patient and healthcare provider regarding both diagnosis and the determination of preferences for treatment. The relationship between these two parties should be depicted through empathy, privacy, discretion, informed choice,

trustworthiness, discernment and compassion. In the current study, less than half of the study participants were explained by the healthcare workers in their local dialect. The majority of them noted that the nurses did not explain to them the diagnosis and procedures they underwent. Also, regarding postpartum care, the information was not conveyed, and this contributed to anxiety and depression, leading to a preference for caesarean delivery. This result agrees with a similar study on the cognitive factors related to childbirth and their effects on women's delivery preference, that was taken in Tehran [161].

Respect, dignity and equity are fundamental principles and basic human rights that all expectant women should enjoy irrespective of the prevailing circumstances. participants noted that the healthcare workers did not observe privacy during physical examinations, late labour and delivery, and according to them, this was a violation of their rights. Similar studies have indicated that most women in public health facilities are not treated with dignity and respect as they ought to be [162]–[165].

According to study participants, cultural norms and practices that do not interfere with high-quality care such as preference for female nurses to assist women during childbirth were denied. Our study agrees with a mixed-methods systematic review on the mistreatment of women during childbirth in health facilities globally [165].

Finally, the current study looked at the challenges with the emotional support of expectant women during labour and childbirth. It was noted that women were not allowed to choose freely the social support they receive during labour and delivery. Also, there were reported instances where women were not treated with kindness, honesty and understanding. Although all healthcare workers working in maternity are supposed to undertake a supportive role in the provision of care during labour, childbirth and the postpartum period, the in-depth interview revealed that a high percentage of women were not satisfied with the interpersonal care

accorded to them by the healthcare workers. There is a need for continued emotional support during labour and childbirth as has been demonstrated in similar studies [166], [167].

The seventh study sought to discern the antenatal FOC and contributing factors among pregnant women and their spouses in Kenya. This was the first study on the FOC among pregnant couples in Kenya. A total of 254 couples took part in this cross-sectional analytical study. A researcher-developed questionnaire was used alongside the FOBS to collect data.

The result indicated that 58.6% of pregnant women had FOC. Similar studies have given varying results with a study in Malawi reporting relatively similar findings [75]. Also, a recently published study in Turkey [120] indicated FOC among pregnant women at 82.6%, which is somewhat higher compared to the findings of this study. Also, in Iran [100], in a similar study conducted in 2016, 89.3% of participants (studied pregnant women) reported childbirth fears. Comparing the FOC in the above countries with the findings from developed countries such as Denmark, Norway, and Finland [168], the FOC is relatively low in developed countries. Researchers have argued that the nature of the available healthcare systems and the cultural dynamics could cause high rates of fear among pregnant women in developing countries [169].

In this study, significant relationships between FOC and a previous mode of childbirth, parity, level of education, routine antenatal clinic check-ups, and having a planned pregnancy were reported. Similar results have been documented in other studies indicating a positive and significant relationship between the individual's level of education and FOC [144]. However, other studies have given contrary results to these findings [170].

In this study, the FOC was manifested more among primipara women compared to multipara women. Zar et al., and other studies found similarities with the current findings, but other studies have shown no differences [118]. Several reasons can explain the relatively high FOC

among first-time mothers. They include: uncertainties of childbirth outcomes; cultural expectations among communities where expectant women live, especially in rural communities; shared experience from mother mentors; and previous life-threatening medical conditions before becoming pregnant [169]. In this study, pregnant women with high FOC preferred a less painful mode of delivery. A study by Saito et al., noted that women with high FOC have a longer duration of active labour, which may lead to postpartum depression hence a relatively higher chance of opting for caesarean delivery [171]. Pregnant women in the current study that had positive feelings about their forthcoming child reported lower levels of FOC. Previous studies have reported similar findings [2].

The level of FOC among men in the study was 45.7%. Similar studies have indicated different levels of FOC among men. In South Africa [172], men who exhibited fear of childbirth were 13%. In Sweden, a qualitative study on an intense fear of childbirth among men indicated fear to be mainly associated with the health and life of both their partner and child. However, the main concern was the wellbeing of their wives [121].

In the current study, participants' residency, level of education, having health insurance cover, the experience of previous childbirth of their spouses, and feelings about the forthcoming birth were significantly associated with antenatal FOC among spouses. The respondents that had a lower level of education indicated a higher level of FOC. These findings disagree with similar studies in Turkey, which stated that a higher level of education was associated with higher levels of FOC [120].

The current study found that men felt uncomfortable, fearful, and helpless during childbirth. Their thoughts were correlated with anxieties about their spouses' aptitude to handle the childbirth pains. These findings agree with a similar Finnish study on fathers' experience of childbirth [173].

In this study, high FOC was exhibited among spouses that had less positive childbirth experience from the previous childbirth. Similar studies have indicated similar findings [174]. Therefore, psychosocial support to the couples during antenatal care clinics, especially to those who have had a previously less positive childbirth experience is needed. In the current study, couples that exhibited high FOC preferred caesarean section. Similar studies agree with the current findings [149].

5.1 METHODOLOGICAL CONSIDERATIONS

To meet the aims and objectives of the dissertation, both quantitative and qualitative methods were used. Quantitative methods were used to investigate the prevalence of the fear of childbirth and the effects of integrated antenatal education on the fear of childbirth. A qualitative approach was used to gain a deeper understanding of the study participant's opinions on the impact of integrated antenatal education on the fear of childbirth. In addition, there was also an attempt to understand the pregnant women's views on whether or not institutional maternity services contribute to the fear of childbirth. Although this is a comprehensive study on this important topic, there are both methodological strengths and limitations to this thesis that the readers should consider.

5.1.1 Validity and Reliability

These are concepts used to evaluate the quality of research. They indicate how well a method, technique or test measure something. Reliability is about the consistency of a measure while validity refers to the extent to which an instrument measures what it is intended to measure. In this study, internal validity was ensured as the same instrument (W-DEQ-A) was used throughout the data collection process. In regards to external validity, the generalization of the results should be done cautiously as women with previous negative birth experiences were excluded from the entire study and also those who gave birth at home did not participate in studies five and six.

Regarding the reliability of the data collection tool, the study used a valid tool (W-DEQ-A) which had been translated and validated in the Swahili speaking population and the translation and validation were carried out by a professor of linguistic and technical persons with expertise in maternal and child health.

5.1.2. Trustworthiness

Since there were two qualitative studies undertaken, the trustworthiness of the data collected was considered at all phases of its analysis and four important criteria were put in place; namely: credibility, dependability, conformability and transferability.

To increase credibility, semi-structured interviews were considered to be the most appropriate data-collection method for qualitative data. Relevant sample size was selected in a bid to ensure the credibility of the process. To ensure the dependability of the collected data, the analysis was done immediately after the first interviews were completed when saturation was reached. Conformability means that the data represent what the participants have stated and that the interpretations of those statements are not invented or biased by the researcher. The data analysis was performed primarily by one researcher but discussed in the research group on regular basis in an attempt to achieve conformability. Moreover, quotes from the interviews were presented to confirm that the categories and sub-categories were grounded in the data. Lastly, transferability was assured by providing thorough descriptions of the context and participants, as well as the data collection, and process of analysis and study findings.

5.2 CONCLUSIONS

Based on the findings of this comprehensive study (study1 to study 7), the following conclusions are deduced:

1. The fear of childbirth is not necessarily individual thoughts or feelings but a more comprehensive phenomenon having many socio-cultural arrays of causal factors and effects.
2. The Swahili version of the W-DEQ-A scale was confirmed to be a valid and reliable instrument for assessing FOC among the Swahili-speaking pregnant women in Kenya and the wider East and Central African region based on the derived acceptable internal consistency of the instrument.
3. Five domains of childbirth fears were derived from the factor analysis in the current study, a confirmation that W-DEQ-A is multidimensional instrument, and therefore the traditional way of calculating the total scale score of the original 33-item W-DEQ-A might be inappropriate.
4. The FOC levels were found to be higher among the primigravida women compared to multigravida women and the prevalence of severe FOC among pregnant women in Kenya is in line with similar studies conducted in other countries and regions in the world.
5. Physical activity, regular pregnancy check-ups, having trust in healthcare providers, and attending childbirth preparation classes are the strongest predictors in reducing FOC.
6. Integrated antenatal education classes on fear of childbirth are effective in reducing antenatal fear of childbirth and its inclusion in the routine antenatal clinics is highly recommended.

7. As a result of integrated antenatal education, there were fewer CS and improved childbirth experiences in the intervention group that undertook the integrated antenatal education classes.
8. The quality of the institutional maternity services can greatly determine the maternal outcomes and institutional maternity services can contribute to the fear of childbirth.
9. Finally, the study found a significant positive correlation between the fear of childbirth among pregnant women and their spouses.

5.3 RECOMMENDATIONS

1. The W-DEQ-A should be enlarged to accommodate new emerging constructs of FOC. Also, there is a need to take into consideration the ability of the study respondents to comprehend the questionnaire since this will greatly contribute to the generation of true positive results.

2. Where possible, the W-DEQ-A questionnaire should be translated into a language that can be understood by study respondents with ease.

3. Pregnant women screened and found with high fear of childbirth should be identified and offered special support such as integrated antenatal education besides their routine antenatal clinics.

4. The systemic challenges identified in relation to the provision of maternal care and the experience of care in the institutional maternity services should be analyzed critically as this will improve the uptake of maternity services.

5. There is a need to address the fear of childbirth not only among pregnant women but also among their spouses. This might help to reduce the fear of childbirth, considering the significant role men play in supporting their spouses in the family as well as agents of change.

6. There is a need to introduce Integrated antenatal education as a subject in the curriculum of nurses and midwives.

5.4 SUGGESTIONS FOR FURTHER RESEARCH

More research is required to determine which is the correct gestation period to undertake screening for the fear of childbirth and also the correct treatments for reducing the fear of childbirth should be studied. The form of treatment should be a multidisciplinary approach should be used when identifying the form of treatment most preferred.

Studies should be undertaken on the impact of routine screening for the fear of childbirth specifically during pregnancy as this would provide more information on how the fear changes over time and what mechanism to put in place at what time and in which way.

There is a need to undertake qualitative studies on the pregnant women who have had negative childbirth experiences to understand what areas to improve to reduce the childbirth fears in their subsequent pregnancies.

5.5 A SUMMARY OF NOVEL FINDINGS FROM THE CURRENT STUDY

1. Based on the seven readability scales, there was consensus that the W-DEQ-A was readable by readers who have at least one year of secondary education in Kenya (an equivalent of ninth grade in the US education system).
2. Regarding the translation and validation of the Swahili version of W-DEQ version A, the Exploratory Factor Analysis and Confirmatory Factor Analysis of the Swahili version of W-DEQ-A identified five-factor loadings namely: lack of self-efficacy, fear, negative emotions, negative appraisal, and social isolation. The resultant model failed to support the unidimensional structure of the original W-DEQ-A. The Swahili version of the W-DEQ-A correlated well with EPDS and BAI at acceptable levels. The Cronbach alpha values of the subscales ranged from 0.867 to 0.967, an indication of an excellent internal consistency of the instrument.
3. Regarding the prevalence of fear of childbirth, about 29.5% (n= 111) had low, 40.4% (n=152) moderate, 22.1% (n=83) high, and 8% (n=30) had severe FOC; as indicated in Table 12. The computed fear of childbirth ranged from 19-119. The mean score was 51.8 (SD=20.67) with the median being 47.0, skewness 0.785, and kurtosis 0.120. The majority of respondents were in the moderate fear of childbirth category (primigravida,39.6% (n=86) and multigravida; 41.5% (n=66).
4. Regarding the effects of integrated antenatal education, a paired sample t-test was conducted to compare the W-DEQ-A mean scores before and after the integrated antenatal education module. There was a significant difference in the W-DEQ-A mean scores before (*M=79.897, SD=10.667)* and after the integrated antenatal education *(M=66.7570, SD=19.6924, t(106)=7.329, p<0.001)*, an indication that the integrated antenatal education had an impact on the fear of childbirth.
5. Regarding institutional maternity services, it was found that institutional maternity

services contributed directly and indirectly to fear of childbirth. The direct contribution included the performance of unintended caesarean sections, severe and prolonged labour pains and negative attitudes of healthcare providers. The indirect contribution was in the form of challenges in the provision of care and the experience of care in the maternity institutions. In the provision of care; human and physical resources, inadequate referral systems, and inadequate management of emergencies were reported. In the experience of care; lack of cognition, respect, dignity, equity and inadequacies in emotional support were reported.

5.6 LIST OF ORIGINAL PUBLICATIONS

Original publication from the current study objectives

1. Onchonga D, Hammoud S, Kuriakose S, Muhammad EAK. Exploring fear of childbirth in Kenya through evaluation of the readability of Wijma Delivery Expectancy/Experience Questionnaire Version A (W-DEQ-A). Sex Reprod Healthc 2021;28:100605. https://doi.org/10.1016/j.srhc.2021.100605
2. Onchonga D, Várnagy Á, Keraka M, Wainaina P. Midwife-led integrated pre-birth training and its impact on the fear of childbirth. A qualitative interview study. Sex Reprod Healthc 2020;25:100512. https://doi.org/10.1016/j.srhc.2020.100512
3. Onchonga D, MoghaddamHosseini V, Keraka M, Várnagy Á. Prevalence of fear of childbirth in a sample of gravida women in Kenya. Sex Reprod Healthc 2020;24:100510. https://doi.org/10.1016/j.srhc.2020.100510
4. Onchonga D. Prenatal fear of childbirth among pregnant women and their spouses in Kenya. Sex Reprod Healthc 2021:100593. https://doi.org/10.1016/j.srhc.2020.100593
5. Onchonga D, Várnagy Á, Amer F, Viktoria P, Wainaina P. Translation and validation of the Swahili version of the Wijma Delivery Expectancy/Experience Questionnaire version A (W-DEQ-A). Sex Reprod Healthc 2021;29:100626. https://doi.org/10.1016/j.srhc.2021.100626
6. Onchonga D, Keraka M, MoghaddamHosseini V, Várnagy Á. Does Institutional Maternity Services contribute to Fear of Childbirth? A Focus Group Interview study. Sex Reprod Healthc 2021;30:100669. https://doi.org/10.1016/j.srhc.2021.100669

Other published studies

1. Onchonga D. A Google Trends study on the interest in self-medication during the 2019 novel coronavirus (COVID-19) disease pandemic. Saudi Pharm J 2020;28:903–4. https://doi.org/10.1016/j.jsps.2020.06.007
2. Onchonga D, Omwoyo J, Nyamamba D. Assessing the Prevalence of Self-Medication among Healthcare Workers before and during the 2019 SARS-CoV-2 (COVID-19) Pandemic in Kenya. Saudi Pharm J 2020. https://doi.org/10.1016/j.jsps.2020.08.003
3. Onchonga D, Khatatbeh H, Thuranira M, Lennox K, Venkatesh MBR. Assessing the usability of a Willingness to Quit smoking questionnaire in a sample of active tobacco smokers: A qualitative study. J Addict Dis 2020:1–8. https://doi.org/10.1080/10550887.2020.1800891
4. Onchonga D. Novel 2019 coronavirus disease pandemic (COVID-19) and mental health: challenges to homeless children and youths 2020
5. Onchonga D, Alfatafta H, Ngetich E, Makunda W. Health-seeking behaviour among pregnant women during the COVID-19 pandemic: A qualitative study. Heliyon 2021;7:e07972. https://doi.org/10.1016/j.heliyon.2021.e07972
6. Onchonga D, Ngetich E, Makunda W, Wainaina P, Wangeshi D, viktoria P. Anxiety and depression due to 2019 SARS-CoV-2 among frontier healthcare workers in Kenya. Heliyon 2021;7:e06351. https://doi.org/10.1016/j.heliyon.2021.e06351
7. Smith S, Koech R, Nzorubara D, Otieno M, Wong L, Bhat G, et al. Connected diagnostics: Linking digital rapid diagnostic tests and mobile health wallets to diagnose and treat brucellosis in Samburu, Kenya. BMC Med Inform Decis Mak 2019;19. https://doi.org/10.1186/s12911-019-0854-4.

8. Khatatbeh H, Pakai A, Al-Dwaikat T, Onchonga D, Amer F, Prémusz V, et al. Nurses' burnout and quality of life: A systematic review and critical analysis of measures used. Nurs Open 2021:nop2.936. https://doi.org/10.1002/nop2.936
9. Alfatafta H, Onchonga D, Alfatafta M, Zhang lu, Boncz I, Lohner S, et al. Effect of using knee valgus brace on pain and activity level over different time intervals among patients with medial knee OA: systematic review. BMC Musculoskelet Disord 2021;22:687. https://doi.org/10.1186/s12891-021-04513-0
10. Hoang HH, Tran ATN, Nguyen VH, Nguyen TTB, Nguyen TAP, Le DD, et al. Attention Deficit Hyperactivity Disorder (ADHD) and Associated Factors Among First-Year Elementary School Students. J Multidiscip Healthc 2021;Volume 14:997–1005. https://doi.org/10.2147/JMDH.S301091
11. Khatatbeh H, Al-Dwaikat T, Oláh A, Onchonga D, Hammoud S, Amer F, et al. The relationships between paediatric nurses' social support, job satisfaction and patient adverse events. Nurs Open 2021;8:3575–82. https://doi.org/10.1002/nop2.907
12. Hammoud S, Onchonga D, Amer F, Kocsis B. The Burden of Communicable Diseases in Lebanon: Trends in the Past Decade. Disaster Med Public Health Prep 2021:1–3. https://doi.org/10.1017/dmp.2021.200

REFERENCES

[1] B. Areskog, N. Uddenberg, and B. Kjessler, “Fear of Childbirth in Late Pregnancy,” *Gynecol. Obstet. Invest.*, vol. 12, no. 5, pp. 262–266, 1981.

[2] T. Saisto, E. Halmesmaki, and E. Halmesmäki, “Fear of childbirth: a neglected dilemma,” *Acta Obstet. Gynecol. Scand.*, vol. 82, no. 3, pp. 201–208, Mar. 2003.

[3] B. Areskog, B. Kjessler, and N. Uddenberg, “Identification of women with significant fear of childbirth during late pregnancy.,” *Gynecol. Obstet. Invest.*, vol. 13, no. 2, pp. 98–107, 1982.

[4] H.-L. Melender, “Experiences of fears associated with pregnancy and childbirth: a study of 329 pregnant women.,” *Birth*, vol. 29, no. 2, pp. 101–11, Jun. 2002.

[5] K. Nieminen, G. Andersson, B. Wijma, E. L. Ryding, and K. Wijma, “Treatment of nulliparous women with severe fear of childbirth via the Internet: A feasibility study,” *J. Psychosom. Obstet. Gynecol.*, vol. 37, no. 2, pp. 37–43, 2016.

[6] J. Fenwick, J. Toohill, D. K. Creedy, J. Smith, and J. Gamble, “Sources, responses and moderators of childbirth fear in Australian women: A qualitative investigation,” *Midwifery*, vol. 31, no. 1, pp. 239–246, Jan. 2015.

[7] J. Fenwick, J. Gamble, E. Nathan, S. Bayes, and Y. Hauck, “Pre-and postpartum levels of childbirth fear and the relationship to birth outcomes in a cohort of Australian women,” *J. Clin. Nurs.*, 2009.

[8] T. Saisto, R. Kaaja, O. Ylikorkala, and E. Halmesmäki, “Reduced pain tolerance during and after pregnancy in women suffering from fear of labor.,” *Pain*, vol. 93, no. 2, pp. 123–7, Aug. 2001.

[9] S. S. Adams, M. Eberhard-Gran, and A. Eskild, “Fear of childbirth and duration of

labour: a study of 2206 women with intended vaginal delivery," *Br. J. Obstet. Gynaecol.*, vol. 119, no. 10, pp. 1238–46, Sep. 2012.

[10] H. Haines, J. F. Pallant, A. Karlström, and I. Hildingsson, "Cross-cultural comparison of levels of childbirth-related fear in an Australian and Swedish sample," *Midwifery*, vol. 27, no. 4, pp. 560–567, Aug. 2011.

[11] M. Takegata *et al.*, "Translation and validation of the Japanese version of the Wijma Delivery Expectancy/Experience Questionnaire version A," *Nurs. Heal. Sci.*, 2013.

[12] V. MoghaddamHosseini, A. Makai, K. Varga, P. Ács, V. Prémusz, and Á. Várnagy, "Assessing fear of childbirth and its predictors among Hungarian pregnant women using Wijma Delivery Expectancy/Experience Questionnaire subscales," *Psychol. Health Med.*, vol. 24, no. 7, pp. 879–889, Aug. 2019.

[13] N. K. Lowe, "Self-efficacy for labor and childbirth fears in nulliparous pregnant women," *J. Psychosom. Obstet. Gynecol.*, vol. 21, no. 4, pp. 219–224, Jan. 2000.

[14] W. A. Hall, Y. L. Hauck, E. M. Carty, E. K. Hutton, J. Fenwick, and K. Stoll, "Childbirth Fear, Anxiety, Fatigue, and Sleep Deprivation in Pregnant Women," *J. Obstet. Gynecol. Neonatal Nurs.*, vol. 38, no. 5, pp. 567–576, Sep. 2009.

[15] M. C. Klein *et al.*, "The Attitudes of Canadian Maternity Care Practitioners Towards Labour and Birth: Many Differences but Important Similarities," *J. Obstet. Gynaecol. Canada*, vol. 31, no. 9, pp. 827–840, Sep. 2009.

[16] P. Tan *et al.*, "Increased psychological trauma and decreased desire to have children after a complicated pregnancy," *J. Turkish Ger. Gynecol. Assoc.*, vol. 14, no. 1, pp. 11–14, 2013.

[17] M. Khwepeya, G. T. Lee, S. R. Chen, and S. Y. Kuo, "Childbirth fear and related factors among pregnant and postpartum women in Malawi," *BMC Pregnancy*

Childbirth, vol. 18, no. 1, Oct. 2018.

[18] M. Khwepeya, H. C. Huang, G. T. Lee, and S. Y. Kuo, "Validation of the Wijma delivery expectancy/experience questionnaire for pregnant women in Malawi: A descriptive, cross-sectional study," *BMC Pregnancy and Childbirth*, vol. 20, no. 1. BioMed Central Ltd, p. 455, 08-Aug-2020.

[19] T. Gelaw, T. G. Ketema, K. Beyene, M. K. Gurara, and G. G. Ukke, "Fear of childbirth among pregnant women attending antenatal care in Arba Minch town, southern Ethiopia: a cross-sectional study," *BMC Pregnancy Childbirth*, vol. 20, no. 1, pp. 1–7, Dec. 2020.

[20] S. Kujawski, G. Mbaruku, L. P. Freedman, K. Ramsey, W. Moyo, and M. E. Kruk, "Association Between Disrespect and Abuse During Childbirth and Women's Confidence in Health Facilities in Tanzania," *Matern. Child Health J.*, vol. 19, no. 10, pp. 2243–2250, Oct. 2015.

[21] C. Trotter, W.-L. Wolman, J. Hofmeyr, C. Nikodem, and R. Turton, "The Effect of Social Support during Labour on Postpartum Depression," *South African J. Psychol.*, vol. 22, no. 3, pp. 134–139, Sep. 1992.

[22] G. S. Avortri and L. M. Modiba, "Women's perspective of facility-based childbirth services in Ghana: A qualitative study," *African J. Prim. Heal. Care Fam. Med.*, vol. 10, no. 1, Jul. 2018.

[23] A. O. Adewuya, B. A. Ola, O. O. Aloba, A. O. Dada, and O. O. Fasoto, "Prevalence and correlates of depression in late pregnancy among Nigerian women.," *Depress. Anxiety*, vol. 24, no. 1, pp. 15–21, 2007.

[24] A. J. Gagnon and J. Sandall, "Individual or group antenatal education for childbirth or parenthood, or both," *Cochrane Database Syst. Rev.*, no. 3, p. CD002869, Jul. 2007.

[25] N. Matinnia, I. Faisal, M. Hanafiah Juni, A. R. Herjar, B. Moeini, and Z. J. Osman, "Fears Related to Pregnancy and Childbirth Among Primigravidae Who Requested Caesarean Versus Vaginal Delivery in Iran," *Matern. Child Health J.*, vol. 19, no. 5, pp. 1121–1130, May 2015.

[26] M. A. Miquelutti, J. G. Cecatti, and M. Y. Makuch, "Antenatal education and the birthing experience of Brazilian women: a qualitative study.," *BMC Pregnancy Childbirth*, vol. 13, no. 1, p. 171, Sep. 2013.

[27] P. Larkin, C. M. Begley, and D. Devane, "Women's experiences of labour and birth: an evolutionary concept analysis.," *Midwifery*, vol. 25, no. 2, pp. e49-59, Apr. 2009.

[28] U. Waldenström, I. Hildingsson, C. Rubertsson, and I. Rådestad, "A negative birth experience: prevalence and risk factors in a national sample.," *Birth*, vol. 31, no. 1, pp. 17–27, Mar. 2004.

[29] P. Serçekuş and H. Okumuş, "Fears associated with childbirth among nulliparous women in Turkey.," *Midwifery*, vol. 25, no. 2, pp. 155–62, Apr. 2009.

[30] H. M. Fabian, I. J. Rådestad, and U. Waldenström, "Characteristics of Swedish women who do not attend childbirth and parenthood education classes during pregnancy," *Midwifery*, vol. 20, no. 3, pp. 226–235, Sep. 2004.

[31] J. L. Cox, J. M. Holden, and R. Sagovsky, "Detection of postnatal depression. Development of the 10-item Edinburgh Postnatal Depression Scale.," *Br. J. Psychiatry*, vol. 150, pp. 782–6, Jun. 1987.

[32] L. Brindis, C.D., Sattley, D., Ma,mo, "From Theory to Action: Frameworks for Implementing Community-Wide Adolescent Pregnancy Prevention Strategies. San Francisco, CA: University of California, San Francisco," *Bixby Cent. Reprod. Heal. Res. Policy, Dep. Obstet. Gynecol. Reprod. Sci.*, 2005.

[33] S. Gurunath, Z. Pandian, R. A. Anderson, and S. Bhattacharya, “Defining infertility—a systematic review of prevalence studies,” *Hum. Reprod. Update*, vol. 17, no. 5, pp. 575–588, Sep. 2011.

[34] K. Anderson, … V. N.-A. and N., and undefined 2010, “Lifestyle factors in people seeking infertility treatment–a review,” *Wiley Online Libr.*, vol. 50, no. 1, pp. 8–20, Feb. 2010.

[35] L. Kimberly, A. Case, A. Cheung, … S. S.-… of gynaecology and, and undefined 2012, “Advanced reproductive age and fertility,” *Int. J. Gynaecol. Obstet.*, vol. 117, no. 1, pp. 95–102, Apr. 2012.

[36] F. Petraglia, G. I. Serour, and C. Chapron, “The changing prevalence of infertility,” *Int. J. Gynecol. Obstet.*, vol. 123, no. SUPPL. 2, Dec. 2013.

[37] L. Pal and N. Santoro, “Age-related decline in fertility,” *Endocrinol. Metab. Clin. North Am.*, vol. 32, no. 3, pp. 669–688, 2003.

[38] A. F. Stewart and E. D. Kim, “Fertility Concerns for the Aging Male,” *Urology*, vol. 78, no. 3, pp. 496–499, Sep. 2011.

[39] J. Varshini *et al.*, “Poor sperm quality and advancing age are associated with increased sperm DNA damage in infertile men,” *Andrologia*, vol. 44, no. SUPPL.1, pp. 642–649, May 2012.

[40] G. Homan, M. Davies, R. N.-H. reproduction update, and undefined 2007, “The impact of lifestyle factors on reproductive performance in the general population and those undergoing infertility treatment: a review,” *Hum. Reprod. Update*, vol. 13, no. 3, pp. 209–223, Jan. 2007.

[41] R. Sharma, K. R. Biedenharn, J. M. Fedor, and A. Agarwal, “Lifestyle factors and reproductive health: Taking control of your fertility,” *Reprod. Biol. Endocrinol.*, vol.

11, no. 1, pp. 1–15, Jul. 2013.

[42] B. Kroon, K. Harrison, N. Martin, B. Wong, A. Y.-F. and sterility, and undefined 2011, “Miscarriage karyotype and its relationship with maternal body mass index, age, and mode of conception,” *Fertil. Steril.*, vol. 95, no. 5, pp. 1827–1929, Apr. 2011.

[43] Y. Li, H. Lin, Y. Li, J. C.-F. and sterility, and undefined 2011, “Association between socio-psycho-behavioral factors and male semen quality: systematic review and meta-analyses,” *Fertil. Steril.*, vol. 95, no. 1, pp. 116–123, Jan. 2011.

[44] A. Gollenberg, F. Liu, C. Brazil, E. Drobnis, D. G.-F. and sterility, and undefined 2010, “Semen quality in fertile men in relation to psychosocial stress,” *Fertil. Steril.*, vol. 93, no. 4, pp. 1104–1111, Mar. 2010.

[45] M. Mutsaerts, H. Groen, … H. H.-H., and undefined 2012, “The influence of maternal and paternal factors on time to pregnancy—a Dutch population-based birth-cohort study: the GECKO Drenthe study,” *Hum. Reprod.*, vol. 27, no. 2, pp. 583–593, Feb. 2012.

[46] A. Domar, D. Clapp, E. Slawsby, J. Dusek, B. K.-F. and sterility, and undefined 2000, “Impact of group psychological interventions on pregnancy rates in infertile women,” *Fertil. Steril.*, vol. 73, no. 4, pp. 805–811, Apr. 2000.

[47] S. Munné, K. Held, C. Magli, B. Ata, D. W.-F. and sterility, and undefined 2012, “Intra-age, intercenter, and intercycle differences in chromosome abnormalities in oocytes,” *Fertil. Steril.*, vol. 97, no. 4, pp. 935–942, Apr. 2012.

[48] A. Srivastava, B. I. Avan, P. Rajbangshi, and S. Bhattacharyya, “Determinants of women’s satisfaction with maternal health care: A review of literature from developing countries,” *BMC Pregnancy Childbirth*, vol. 15, no. 1, pp. 1–12, Dec. 2015.

[49] M. A. O’Connell, P. Leahy-Warren, A. S. Khashan, L. C. Kenny, and S. M. O’Neill,

"Worldwide prevalence of tocophobia in pregnant women: systematic review and meta-analysis," *Acta Obstet. Gynecol. Scand.*, vol. 96, no. 8, pp. 907–920, Aug. 2017.

[50] Y. Richens, D. T. Lavender, and D. M. Smith, "Fear of birth in clinical practice: A structured review of current measurement tools," *Sex. Reprod. Healthc.*, vol. 16, no. August 2017, pp. 98–112, 2018.

[51] N. B. Allen, P. M. Lewinsohn, and J. R. Seeley, "Prenatal and perinatal influences on risk for psychopathology in childhood and adolescence.," *Dev. Psychopathol.*, vol. 10, no. 3, pp. 513–29, 1998.

[52] G. Sydsjö, L. Angerbjörn, … S. P.-A. O. et, and undefined 2013, "Secondary fear of childbirth prolongs the time to subsequent delivery," *Wiley Online Libr.*

[53] H. Bayrampour, E. Ali, D. A. McNeil, K. Benzies, G. MacQueen, and S. Tough, "Pregnancy-related anxiety: A concept analysis," *Int. J. Nurs. Stud.*, vol. 55, pp. 115–130, Mar. 2016.

[54] F. L. Challacombe, S. Nath, K. Trevillion, S. Pawlby, and L. M. Howard, "Fear of childbirth during pregnancy: associations with observed mother-infant interactions and perceived bonding," *Arch. Womens. Ment. Health*, vol. 24, no. 3, pp. 483–492, Jun. 2021.

[55] J. Jolly, J. Walker, and K. Bhabra, "Subsequent obstetric performance related to primary mode of delivery," *Br. J. Obstet. Gynaecol.*, vol. 106, no. 3, pp. 227–32, Mar. 1999.

[56] K. Nieminen, A. Malmquist, B. Wijma, E.-L. Ryding, G. Andersson, and K. Wijma, "Nulliparous pregnant women's narratives of imminent childbirth before and after internet-based cognitive behavioural therapy for severe fear of childbirth: a qualitative study," *BJOG An Int. J. Obstet. Gynaecol.*, vol. 122, no. 9, pp. 1259–1265, Aug. 2015.

[57] C. A. Anderson and M. Gill, “Childbirth related fears and psychological birth trauma in younger and older age adolescents.,” *Appl. Nurs. Res.*, vol. 27, no. 4, pp. 242–8, Nov. 2014.

[58] M. Laursen, M. Hedegaard, and C. Johansen, “Fear of childbirth: predictors and temporal changes among nulliparous women in the Danish National Birth Cohort,” *BJOG An Int. J. Obstet. Gynaecol.*, vol. 115, no. 3, pp. 354–360, Feb. 2008.

[59] K. Hofberg and M. Ward, “Tokophobia Tokophobia: A Profound Dread and Avoidance of Childbirth (When Pathological Fear Effects the Consultation),” in *Psychological Challenges in Obstetrics and Gynecology*, London: Springer London, 2007, pp. 165–172.

[60] N. Matinnia, I. Faisal, M. Hanafiah Juni, A. R. Herjar, B. Moeini, and Z. J. Osman, “Fears Related to Pregnancy and Childbirth Among Primigravidae Who Requested Caesarean Versus Vaginal Delivery in Iran,” *Matern. Child Health J.*, vol. 19, no. 5, pp. 1121–1130, May 2015.

[61] B. D. Kamath, J. K. Todd, J. E. Glazner, D. Lezotte, and A. M. Lynch, “Neonatal outcomes after elective cesarean delivery,” *Obstet. Gynecol.*, vol. 113, no. 6, pp. 1231–1238, Jun. 2009.

[62] J. M. Guise *et al.*, “Vaginal birth after cesarean: New insights on maternal and neonatal outcomes,” *Obstet. Gynecol.*, vol. 115, no. 6, pp. 1267–1278, Jun. 2010.

[63] H. L. McLachlan *et al.*, “The effect of primary midwife-led care on women’s experience of childbirth: Results from the COSMOS randomised controlled trial,” *BJOG An Int. J. Obstet. Gynaecol.*, vol. 123, no. 3, pp. 465–474, 2016.

[64] G. Ayano, G. Tesfaw, and S. Shumet, “Prevalence and determinants of antenatal depression in Ethiopia: A systematic review and meta-analysis,” *PLoS One*, vol. 14,

no. 2, p. e0211764, Feb. 2019.

[65] A. Asefa and D. Bekele, “Status of respectful and non-abusive care during facility-based childbirth in a hospital and health centers in Addis Ababa, Ethiopia,” *Reprod. Health*, vol. 12, no. 1, p. 33, Apr. 2015.

[66] O. M.A. *et al.*, “Interventions for fear of childbirth (Tocophobia),” *Cochrane Database Syst. Rev.*, vol. 2019, no. 5, 2019.

[67] K. F. E. van de Loo *et al.*, “Depression and anxiety during pregnancy: The influence of maternal characteristics,” *Birth*, vol. 45, no. 4, pp. 478–489, Dec. 2018.

[68] J. C. H. van Bussel, B. Spitz, and K. Demyttenaere, “Women’s mental health before, during, and after pregnancy: a population-based controlled cohort study.,” *Birth*, vol. 33, no. 4, pp. 297–302, Dec. 2006.

[69] J. Melville, A. Gavin, Y. Guo, M. Fan, and W. Katon, “Depressive disorders during pregnancy: prevalence and risk factors in a large urban sample,” *Obstet. Gynecol.*, vol. 116, no. 5, 2010.

[70] B. Gelaye, M. B. Rondon, R. Araya, and M. A. Williams, “Epidemiology of maternal depression, risk factors, and child outcomes in low-income and middle-income countries.,” *The lancet. Psychiatry*, vol. 3, no. 10, pp. 973–982, Oct. 2016.

[71] C. D. Mathers and D. Loncar, “Projections of Global Mortality and Burden of Disease from 2002 to 2030,” *PLoS Med.*, vol. 3, no. 11, p. e442, Nov. 2006.

[72] E. L. Tilden, A. B. Caughey, C. S. Lee, and C. Emeis, “The Effect of Childbirth Self-Efficacy on Perinatal Outcomes,” *J. Obstet. Gynecol. Neonatal Nurs.*, vol. 45, no. 4, pp. 465–480, Jul. 2016.

[73] W.-Y. Ip, C. S. Tang, and W. B. Goggins, “An educational intervention to improve

women's ability to cope with childbirth," *J. Clin. Nurs.*, vol. 18, no. 15, pp. 2125–2135, Aug. 2009.

[74] A. Bandura, "Social Foundations of Thought and Action: A Social Cognitive Theory.," no. Englewood Cliffs, NJ: Prentice Hall., 1986.

[75] J. Toohill *et al.*, "A Randomized Controlled Trial of a Psycho-Education Intervention by Midwives in Reducing Childbirth Fear in Pregnant Women," *Birth*, vol. 41, no. 4, pp. 384–394, 2014.

[76] J. Byrne, Y. Hauck, C. Fisher, S. Bayes, and R. Schutze, "Effectiveness of a mindfulness-based childbirth education pilot study on maternal self-efficacy and fear of childbirth," *J. Midwifery Women's Heal.*, vol. 59, no. 2, pp. 192–197, 2014.

[77] Lisa Cutajar, Michelle Miu, Julie-Anne Fleet, Allan M. Cyna, and Mary Steen, "Antenatal education for childbirth: Labour and birth," *Eur. J. Midwifery*, vol. 4, Apr. 2020.

[78] S. Ljungdahl and S. G. Bremberg, "Might extended education decrease inequalities in health?—a meta-analysis," *Eur. J. Public Health*, vol. 25, no. 4, pp. 587–592, Aug. 2015.

[79] E. E. Van Dinter-Douma, N. E. De Vries, M. Aarts-Greven, E. Aarts-Greven, C. A. I. Stramrood, and M. G. Van Pampus, "trauma and anxiety recognition: knowledge, management and attitudes amongst gynecologists regarding women with fear of childbirth and postpartum posttraumatic …," *Taylor Fr.*, vol. 33, no. 16, pp. 2759–2767, Aug. 2020.

[80] S. Striebich, E. Mattern, and G. Ayerle, "Support for pregnant women identified with fear of childbirth (FOC) / tocophobia – a systematic review of approaches and interventions," *Midwifery*, vol. 61, pp. 97–115, 2018.

[81] P. Slade, K. Balling, K. Sheen, and G. Houghton, “Establishing a valid construct of fear of childbirth: Findings from in-depth interviews with women and midwives,” *BMC Pregnancy Childbirth*, vol. 19, no. 1, p. 96, Mar. 2019.

[82] H. Rouhe *et al.*, “Group psychoeducation with relaxation for severe fear of childbirth improves maternal adjustment and childbirth experience-a randomised controlled trial,” *J. Psychosom. Obstet. Gynecol.*, vol. 36, no. 1, pp. 1–9, 2015.

[83] J. J. Newham, A. Wittkowski, J. Hurley, J. D. Aplin, and M. Westwood, “Effects of antenatal yoga on maternal anxiety and depression: A randomized controlled trial,” *Depress. Anxiety*, vol. 31, no. 8, pp. 631–640, 2014.

[84] V. Moghaddam Hosseini, M. Nazarzadeh, and S. Jahanfar, “Interventions for reducing fear of childbirth: A systematic review and meta-analysis of clinical trials,” *Women and Birth*, vol. 31, no. 4, pp. 254–262, 2018.

[85] A. Werner, N. Uldbjerg, R. Zachariae, C. Sen Wu, and E. A. Nohr, “Antenatal hypnosis training and childbirth experience: A randomized controlled trial,” *Birth*, vol. 40, no. 4, pp. 272–280, 2013.

[86] C. Buss, E. P. Davis, L. T. Muftuler, K. Head, and C. A. Sandman, “High pregnancy anxiety during mid-gestation is associated with decreased gray matter density in 6-9-year-old children.,” *Psychoneuroendocrinology*, vol. 35, no. 1, pp. 141–53, Jan. 2010.

[87] J. Ireland, “Self-hypnosis for intrapartum pain management (SHIP) in pregnant nulliparous women: A randomised controlled trial of clinical effectiveness,” *Pract. Midwife*, vol. 18, no. 11, pp. 34–39, 2015.

[88] J. Toohill, J. Fenwick, J. Gamble, D. K. Creedy, A. Buist, and E. L. Ryding, “Psycho-Social Predictors of Childbirth Fear in Pregnant Women: An Australian Study,” *Open J. Obstet. Gynecol.*, vol. 04, no. 09, pp. 531–543, 2014.

[89] C. Fisher, Y. Hauck, and J. Fenwick, “How social context impacts on women’s fears of childbirth: A Western Australian example,” *Soc. Sci. Med.*, vol. 63, no. 1, pp. 64–75, 2006.

[90] B. K. Sarker, M. Rahman, T. Rahman, J. Hossain, L. Reichenbach, and D. K. Mitra, “Reasons for Preference of Home Delivery with Traditional Birth Attendants (TBAs) in Rural Bangladesh: A Qualitative Exploration,” *PLoS One*, vol. 11, no. 1, p. e0146161, Jan. 2016.

[91] Ö. Karabulut, D. Coşkuner Potur, Y. Doğan Merih, S. Cebeci Mutlu, and N. Demirci, “Does antenatal education reduce fear of childbirth?,” *Int. Nurs. Rev.*, vol. 63, no. 1, pp. 60–67, Mar. 2016.

[92] P. Serçekuş and H. Başkale, “Effects of antenatal education on fear of childbirth, maternal self-efficacy and parental attachment,” *Midwifery*, vol. 34, no. 2014, pp. 166–172, 2016.

[93] M. C. Chikalipo, E. M. Chirwa, and A. S. Muula, “Exploring antenatal education content for couples in Blantyre, Malawi,” *BMC Pregnancy Childbirth*, vol. 18, no. 1, p. 497, Dec. 2018.

[94] P. Jha, M. Larsson, K. Christensson, and A. S. Svanberg, “Fear of childbirth and depressive symptoms among postnatal women: A cross-sectional survey from Chhattisgarh, India,” *Women and Birth*, vol. 31, no. 2, pp. e122–e133, Apr. 2018.

[95] B. Larsson, A. Karlström, … C. R.-S. & R., and undefined 2016, “Counseling for childbirth fear–a national survey,” *Sex. Reprod. Healthc. *, vol. 8, pp. 82–87, Jun. 2016.

[96] J. C. Greene, V. J. Caracelli, and W. F. Graham, “Toward a Conceptual Framework for Mixed-Method Evaluation Designs:,” *http://dx.doi.org/10.3102/01623737011003255*, vol. 11, no. 3, pp. 255–274, Nov. 2016.

[97] S. P. Silal, L. Penn-Kekana, B. Harris, S. Birch, and D. McIntyre, “Exploring inequalities in access to and use of maternal health services in South Africa,” *BMC Health Serv. Res.*, vol. 12, no. 1, p. 120, 2012.

[98] K. Wijma, B. Wijma, and M. Zar, “Psychometric aspects of theWDEQ; a new questionnaire for the measurement of fear of childbirth. Journal of Psychosomatic,” *J. Psychosom. Obstet. Gynecol.*, vol. 19, no. 2, pp. 84– 97., 1998.

[99] B. Williams, A. Onsman, and T. Brown, “Exploratory factor analysis: A five-step guide for novices,” *J. Emerg. Prim. Heal. Care*, vol. 8, no. 3, pp. 1–13, Aug. 2010.

[100] H. B. L. Andrew L. Comrey, *A First Course in Factor Analysis*, 2nd ed. New York: Lawrence Erlbaum, 1992.

[101] R. C. MacCallum, K. F. Widaman, S. Zhang, and S. Hong, “Sample size in factor analysis,” *Psychol. Methods*, vol. 4, no. 1, pp. 84–99, Mar. 1999.

[102] M. F. Ö Körükcü, K Kukulu, “The reliability and validity of the Turkish version of the Wijma Delivery Expectancy/Experience Questionnaire with pregnant women,” *J. Psychiatr. Ment. Heal. Nursing*, 2008.

[103] J. Gibson, K. McKenzie-McHarg, J. Shakespeare, J. Price, and R. Gray, “A systematic review of studies validating the Edinburgh Postnatal Depression Scale in antepartum and postpartum women,” *Acta Psychiatr. Scand.*, vol. 119, no. 5, pp. 350–364, May 2009.

[104] P. L. Hewitt and G. R. Norton, “The Beck Anxiety Inventory: A Psychometric Analysis,” *Psychol. Assess.*, vol. 5, no. 4, pp. 408–412, 1993.

[105] H. F. Kaiser, “An index of factorial simplicity,” *Psychometrika*, vol. 39, no. 1, pp. 31–36, Mar. 1974.

[106] R. B. Cattell, “The scree test for the number of factors,” *Multivariate Behav. Res.*, vol. 1, no. 2, pp. 245–276, Apr. 1966.

[107] L. R. Zientek, “Exploratory and Confirmatory Factor Analysis: Understanding Concepts and Applications,” *Struct. Equ. Model. A Multidiscip. J.*, vol. 15, no. 4, pp. 729–734, Oct. 2008.

[108] B. Byrne, *Structural equation modeling with AMOS Basic concepts, applications, and programming (Multivariate Applications Series)*, 2nd ed. New York: Routledge, 2006.

[109] B. M. Byrne, “Structural Equation Modeling With AMOS, EQS, and LISREL: Comparative Approaches to Testing for the Factorial Validity of a Measuring Instrument,” *Int. J. Test.*, vol. 1, no. 1, pp. 55–86, Mar. 2001.

[110] F. Soltani, Z. Eskandari, B. Khodakarami, P. Parsa, P. Parsa, and G. Roshanaei, “Factors contributing to fear of childbirth among pregnant women in Hamadan (Iran) in 2016,” *Electron. Physician*, vol. 7, no. 7, pp. 4725–4731, Jul. 2017.

[111] B. Saunders *et al.*, “Saturation in qualitative research: exploring its conceptualization and operationalization,” *Qual. Quant.*, vol. 52, no. 4, pp. 1893–1907, Jul. 2018.

[112] V. Braun and V. Clarke, “Using thematic analysis in psychology,” *Qual. Res. Psychol.*, vol. 3, no. 2, pp. 77–101, 2006.

[113] J. Mcleod, *Qualitative Research In Counselling And Psychotherapy*. 2015.

[114] M. Krueger, R., Casey, *Focus Groups: a Practical Guide for Applied Research*, 3rd ed. Thousand Oaks, CA: Sage Publications,Inc., 2000.

[115] L. A. Hulton, Z. Matthews, and W. Stones, “A framework for the evaluation of quality of care in maternity services,” 2000.

[116] M. Sandelowski, “Whatever happened to qualitative description?,” *Res. Nurs. Health*,

vol. 23, no. 4, pp. 334–340, Aug. 2000.

[117] P. Burnard, P. Gill, K. Stewart, E. Treasure, and B. Chadwick, “Analysing and presenting qualitative data,” *Br. Dent. J.*, vol. 204, no. 8, pp. 429–432, Apr. 2008.

[118] H. Haines, J. Pallant, A. Karlström, and L. Hildingsson, “Cross-cultural comparison of levels of childbirth-related fear in an Australian and Swedish sample,” *Midwifery*, vol. 27, no. 4, pp. 560–567, 2011.

[119] A. N. Ingegerd Hildingssona, Helen Hainesa, Annika Karlströmb, “Presence and process of fear of birth during pregnancy—Findings from a longitudinal cohort study | Elsevier Enhanced Reader,” *Women and Birth*, 2017. [Online]. Available: https://reader.elsevier.com/reader/sd/pii/S1871519217300252?token=A10E7B22017FF3EDA3AD8C7D09D044BD8D8D0032980A47C64A5AE00BFF3953E210AE95370BF31A6767532EFD5F9501D4. [Accessed: 11-Jun-2020].

[120] P. Serçekuş, O. Vardar, and S. Özkan, “Fear of childbirth among pregnant women and their partners in Turkey,” *Sex. Reprod. Healthc.*, vol. 24, p. 100501, Jun. 2020.

[121] C. Eriksson, P. Salander, and K. Hamberg, “Men’s experiences of intense fear related to childbirth investigated in a Swedish qualitative study,” *J. Men’s Heal. Gend.*, vol. 4, no. 4, pp. 409–418, Dec. 2007.

[122] W. W. HW Kruskal, “On a test of whether one of two random variables is stochastically larger than the other,” *Ann. Math. Stat.*, vol. 18, no. 1, pp. 50–60, 1947.

[123] W. H. Kruskal and W. A. Wallis, “Use of Ranks in One-Criterion Variance Analysis,” *J. Am. Stat. Assoc.*, vol. 47, no. 260, pp. 583–621, 1952.

[124] V. MoghaddamHosseini, A. Makai, D. Dweik, and Á. Várnagy, “Factor analysis study of the Hungarian translation of Wijma Delivery Expectancy/Experience Questionnaire (version A),” *Curr. Psychol.*, no. Ayers 2014, 2018.

[125] S. Garthus-Niegel, H. T. Størksen, L. Torgersen, T. Von Soest, and M. Eberhard-Gran, "The Wijma Delivery Expectancy/Experience Questionnaire – a factor analytic study," *J. Psychosom. Obstet. Gynecol.*, vol. 32, no. 3, pp. 160–163, Sep. 2011.

[126] J. F. Pallant *et al.*, "Assessment of the dimensionality of the Wijma delivery expectancy/experience questionnaire using factor analysis and Rasch analysis," *BMC Pregnancy Childbirth*, vol. 16, no. 1, p. 361, Dec. 2016.

[127] R. Johnson and Slade Pauline, "Does fear of childbirth during pregnancy predict emergency caesarean section?," *BJOG An Int. J. Obstet. Gynaecol.*, vol. 109, no. 11, pp. 1213–1221, Nov. 2002.

[128] V. Fenaroli and E. Saita, "Fear of childbirth: A contribution to the validation of the Italian version of the Wijma Delivery Expectancy/Experience Questionnaire (WDEQ)," *TPM - Testing, Psychom. Methodol. Appl. Psychol.*, vol. 20, no. 2, pp. 131–154, 2013.

[129] M. C. Dowe, P. A. Lawrence, J. Carlson, and T. C. Keyserling, "Patients' use of health-teaching materials at three readability levels," *Appl. Nurs. Res.*, vol. 10, no. 2, pp. 86–93, May 1997.

[130] M. C. Freda, "The readability of American Academy of Pediatrics patient education brochures," *J. Pediatr. Heal. Care*, vol. 19, no. 3, pp. 151–156, 2005.

[131] K. Hofberg and M. R. Ward, "Fear of pregnancy and childbirth," *Postgrad. Med. J.*, vol. 79, no. 935, pp. 505–510, Sep. 2003.

[132] D. Wild, A. Grove, M. Martin, … S. E.-V. in, and undefined 2005, "Principles of good practice for the translation and cultural adaptation process for patient-reported outcomes (PRO) measures: report of the ISPOR Task Force for," *Wiley Online Libr.*

[133] O. G. Lopukhova and E. V. Kashshapova, "Fear of childbirth in pregnant women:

External and internal factors," *Psychol. Russ. State Art*, vol. 8, no. 4, pp. 114–125, 2015.

[134] D. Onchonga, "Prenatal fear of childbirth among pregnant women and their spouses in Kenya," *Sex. Reprod. Healthc.*, p. 100593, Jan. 2021.

[135] S. Ajinkya, P. R. Jadhav, and N. N. Srivastava, "Depression during pregnancy: Prevalence and obstetric risk factors among pregnant women attending a tertiary care hospital in Navi Mumbai.," *Ind. Psychiatry J.*, vol. 22, no. 1, pp. 37–40, Jan. 2013.

[136] K. Demšar, M. Svetina, I. Verdenik, N. Tul, I. Blickstein, and V. Globevnik Velikonja, "Tokophobia (fear of childbirth): prevalence and risk factors," *J. Perinat. Med.*, vol. 46, no. 2, pp. 151–154, Feb. 2018.

[137] E. Ternström, I. Hildingsson, H. Haines, and C. Rubertsson, "Higher prevalence of childbirth related fear in foreign born pregnant women – Findings from a community sample in Sweden," *Midwifery*, vol. 31, no. 4, pp. 445–450, Apr. 2015.

[138] H. Kjærgaard, K. Wijma, A. Dykes, and S. Alehagen, "Fear of childbirth in obstetrically low-risk nulliparous women in Sweden and Denmark," *J. Reprod. Infant Psychol.*, vol. 26, no. 4, pp. 340–350, Nov. 2008.

[139] M. Lukasse, B. Schei, E. L. Ryding, and Bidens Study Group, "Prevalence and associated factors of fear of childbirth in six European countries," *Sex. Reprod. Healthc.*, vol. 5, no. 3, pp. 99–106, Oct. 2014.

[140] J. A. Kish, "The Development of Maternal Confidence for Labor Among Nulliparous Pregnant Women," Nov. 2003.

[141] H. Rouhe, K. Salmela-Aro, E. Halmesmäki, and T. Saisto, "Fear of childbirth according to parity, gestational age, and obstetric history," *BJOG An Int. J. Obstet. Gynaecol.*, vol. 116, no. 1, pp. 67–73, Jan. 2009.

[142] M. L. B. S. E Ryding, “Fear of childbirth – does it affect mode of delivery. The BIDENS study – results from six countries,” *Acta Obs. Gynecol Scand*, vol. 91, p. 38, 2012.

[143] C. Nilsson, I. Lundgren, A. Karlström, and I. Hildingsson, “Self reported fear of childbirth and its association with women’s birth experience and mode of delivery: A longitudinal population-based study,” *Women and Birth*, vol. 25, no. 3, pp. 114–121, Sep. 2012.

[144] A. Farideh, M. Naghmeh, S. M. Taghi, and S. Fatemeh, “Relation between depression, anxiety, self-esteem, marital satisfaction, demographical factor and maternal complications with fear of childbirth in nulliparous women,” *J. Fundam. Ment. Heal.*, vol. 14, no. 254, pp. 122–131, Jan. 2012.

[145] P. Wadhwa, … C. D.-S.-P., and undefined 1996, “Prenatal psychosocial factors and the neuroendocrine axis in human pregnancy,” *journals.lww.com*.

[146] M. Bergström, H. Kieler, and U. Waldenström, “Effects of natural childbirth preparation versus standard antenatal education on epidural rates, experience of childbirth and parental stress in mothers and fathers: A randomised controlled multicentre trial,” *BJOG An Int. J. Obstet. Gynaecol.*, vol. 116, no. 9, pp. 1167–1176, 2009.

[147] S. Haapio, M. Kaunonen, M. Arffman, and P. Åstedt-Kurki, “Effects of extended childbirth education by midwives on the childbirth fear of first-time mothers: an RCT,” *Scand. J. Caring Sci.*, vol. 31, no. 2, pp. 293–301, 2017.

[148] M. Navaee and Z. Abedian, “Effect of role play education on primiparous women’s fear of natural delivery and their decision on the mode of delivery.,” *Iran. J. Nurs. Midwifery Res.*, vol. 20, no. 1, pp. 40–6, 2015.

[149] T. Uçar and Z. Golbasi, “Effect of an educational program based on cognitive behavioral techniques on fear of childbirth and the birth process,” *J. Psychosom. Obstet. Gynecol.*, vol. 40, no. 2, pp. 146–155, Apr. 2019.

[150] C. G. Dragonas T, “Prenatal care. Clin Psychol Rev,” vol. 18, pp. 127–42, 1998.

[151] E. Severinsson, M. Haruna, M. Rönnerhag, and I. Berggren, “care Events and Near-Misses in Obstetric Care-A Systematic Literature Review Patient Safety, Adverse Healthcare Events and Near-Misses in Obstetric Care-A Systematic Literature Review,” *Advers. Heal. Open J. Nurs.*, vol. 5, pp. 1110–1122, 2015.

[152] T. Saisto, K. Salmela-Aro, J. E. Nurmi, and E. H. T Saisto, K Salmela-Aro, J Nurmi, T Kononen, “A randomized controlled trial of intervention in fear of childbirth,” *Obstet. Gynecol.*, vol. 98, no. 5(1), pp. 820–826, 2001.

[153] N. Diamond-Smith, M. Sudhinaraset, and D. Montagu, “Clinical and perceived quality of care for maternal, neonatal and antenatal care in Kenya and Namibia: The service provision assessment,” *Reprod. Health*, vol. 13, no. 1, 2016.

[154] W. De Geyndt, *Managing the Quality of Health Care in Developing Countries*. The World Bank, 1995.

[155] B. Salami, F. O. Dada, and F. E. Adelakun, “Human Resources for Health Challenges in Nigeria and Nurse Migration,” *Policy, Polit. Nurs. Pract.*, vol. 17, no. 2, pp. 76–84, May 2016.

[156] I. Mathauer and I. Imhoff, “Health worker motivation in Africa: The role of non-financial incentives and human resource management tools,” *Hum. Resour. Health*, vol. 4, Aug. 2006.

[157] H. Essendi *et al.*, “Infrastructural challenges to better health in maternity facilities in rural Kenya: Community and healthworker perceptions,” *Reprod. Health*, vol. 12, no.

1, Nov. 2015.

[158] S. Bhattacharyya, A. Issac, P. Rajbangshi, A. Srivastava, and B. I. Avan, "'Neither we are satisfied nor they'-users and provider's perspective: A qualitative study of maternity care in secondary level public health facilities, Uttar Pradesh, India," *BMC Health Serv. Res.*, vol. 15, no. 1, Sep. 2015.

[159] M. A. Ayanore, M. Pavlova, R. Biesma, and W. Groot, "Stakeholders' views on maternity care shortcomings in rural Ghana: An ethnographic study among women, providers, public, and quasiprivate policy sector actors," *Int. J. Health Plann. Manage.*, vol. 33, no. 1, pp. e105–e118, Jan. 2018.

[160] B. L. Sorensen, P. Elsass, B. B. Nielsen, S. Massawe, J. Nyakina, and V. Rasch, "Substandard emergency obstetric care - a confidential enquiry into maternal deaths at a regional hospital in Tanzania," *Trop. Med. Int. Heal.*, vol. 15, no. 8, pp. 894–900, Jun. 2010.

[161] S. . ChoobMasjedi, J. Hasani, M. Khorsandi, and M. Ghobadzadeh, "Cognitive factors related to childbirth and their effect on women's delivery preference: a comparison between a private and public hospital in Tehran," *East. Mediterr. Heal. Journal*, vol. 18, no. 11, pp. 1127–1133, 2012.

[162] D. Bowser and K. Project, "Exploring evidence for disrespect and abuse in facility-based childbirth," 2010.

[163] C. E. Warren, R. Njue, C. Ndwiga, and T. Abuya, "Manifestations and drivers of mistreatment of women during childbirth in Kenya: Implications for measurement and developing interventions," *BMC Pregnancy Childbirth*, vol. 17, no. 1, pp. 1–14, Mar. 2017.

[164] M. L. Betron, T. L. McClair, S. Currie, and J. Banerjee, "Expanding the agenda for

addressing mistreatment in maternity care: a mapping review and gender analysis," *Reprod. Health*, vol. 15, no. 1, p. 143, Dec. 2018.

[165] M. A. Bohren *et al.*, "The Mistreatment of Women during Childbirth in Health Facilities Globally: A Mixed-Methods Systematic Review," *PLOS Med.*, vol. 12, no. 6, p. e1001847, Jun. 2015.

[166] A. Alexander *et al.*, "Social support during delivery in Rural Central Ghana: A mixed methods study of women's preferences for and against inclusion of a lay companion in the delivery room," *J. Biosoc. Sci.*, vol. 46, no. 5, pp. 669–685, 2014.

[167] J. Kennell, M. Klaus, S. Mcgrath, S. Robertson, and C. Hinkley, "Continuous Emotional Support During Labor in a US Hospital: A Randomized Controlled Trial," *JAMA J. Am. Med. Assoc.*, vol. 265, no. 17, pp. 2197–2201, May 1991.

[168] H. Rouhe, K. Salmela-Aro, R. Toivanen, M. Tokola, E. Halmesmäki, and T. Saisto, "Obstetric outcome after intervention for severe fear of childbirth in nulliparous women - Randomised trial," *BJOG An Int. J. Obstet. Gynaecol.*, vol. 120, no. 1, pp. 75–84, Jan. 2013.

[169] D. Onchonga, Á. Várnagy, M. Keraka, and P. Wainaina, "Midwife-led integrated pre-birth training and its impact on the fear of childbirth. A qualitative interview study," *Sex. Reprod. Healthc.*, vol. 25, p. 100512, Oct. 2020.

[170] R. Heimstad, R. Dahloe, I. Laache, E. Skogvoll, and B. Schei, "Fear of childbirth and history of abuse: implications for pregnancy and delivery," *Acta Obstet. Gynecol. Scand.*, vol. 85, no. 4, pp. 435–440, Jan. 2006.

[171] H. Nerum, L. Halvorsen, T. Sørlie, and P. Øian, "Maternal request for cesarean section due to fear of birth: Can it be changed through crisis-oriented counseling?," *Birth*, vol. 33, no. 3, pp. 221–228, Sep. 2006.

[172] B. Chalmers and D. Meyer, “What men say about pregnancy, birth and parenthood,” *J. Psychosom. Obstet. Gynaecol.*, vol. 17, no. 1, pp. 47–52, 1996.

[173] K. Vehviläinen-Julkunen and A. A Liukkonen, “Fathers’ experiences of childbirth,” *Midwifery*, vol. 14, no. 1, pp. 10–17, 1998.

[174] J. Fenwick, S. Bayes, and M. Johansson, “A qualitative investigation into the pregnancy experiences and childbirth expectations of Australian fathers-to-be,” *Sex. Reprod. Healthc.*, vol. 3, no. 1, pp. 3–9, 2012.

APPENDICES

Appendix I: Informed Consent for the control group

My name is DAVID ONCHONGA; I am a PhD student from University of Pécs Hungary. I am conducting a study on "ANTENATAL DEPRESSION AND FEAR OF CHILDBIRTH IN KENYA: IMPROVING THE CONTINUUM THROUGH INTEGRATED ANTENATAL EDUCATION". This study will help the Ministry of Health and other stakeholders to put measures to reduce the burden of antenatal depression and fear of childbirth in Kenya and beyond.

Procedures to be followed

Participation in this study will require that I ask you some questions and I will record the information from you in a questionnaire. You have the right to refuse participation in this study. Please remember that participation in the study is voluntary. You may ask questions related to the study at any time. You may refuse to respond to any questions and you may stop an interview at any time. You may also stop being in the study at any time without any consequences.

Discomforts and risks

Some of the questions you will be asked may be embarrassing or make you uncomfortable. If this happens, you may refuse to answer these questions if you so choose. You may also stop the interview at any time.

Benefits

If you participate in this study you will help us to learn how to provide effective services that can improve the health of antenatal women and reduce the effects of antenatal depression and fear of childbirth.

Reward: There will be no reward given for participating in this survey.

Confidentiality

The interviews and examinations will be conducted in a private setting. Your name will not be recorded on the questionnaire. The questionnaires will be kept safely and everything will be kept private.

Contact information

If you have any questions you may contact, Dr. Ákos Várnagy Supervisor 1. On +3672536001 or Professor Keraka Supervisor 2. On +2548710901 or the Doctoral School of Health Sciences of the University of Pécs on doktoriiskola@etk.pte.hu

Participant's Statement

The above information regarding my participation in the study is clear to me. I have been given a chance to ask questions and my questions have been answered to my satisfaction. My participation in this study is entirely voluntary. I understand that my records will be kept private and that I can leave the study at any time.

Name of Participant…….

_____ _____

Signature or Thumbprint Date

Investigator's statement

I, the undersigned, have explained to the volunteer in a language she understands, the procedures to be followed in the study and the risks and benefits involved.

Name of Interviewer…….

_____ _____

Interviewer signature Date

Appendix 2: Informed Consent for the intervention group

My name is DAVID ONCHONGA, a PhD student at the University of Pécs. I am conducting a study on "ANTENATAL DEPRESSION AND FEAR OF CHILDBIRTH IN KENYA: IMPROVING THE CONTINUUM THROUGH INTEGRATED ANTENATAL EDUCATION". This study will help the Ministry of Health and other stakeholders to put measures to reduce the burden of antenatal depression and fear of childbirth in Kenya and beyond.

Procedures to be followed

Participation in this study will require that I ask you some questions and I will record the information from you in a questionnaire. You will be required to undergo an intensive integrated antenatal education for 8 hours (four sessions during antenatal clinics each lasting for two hours). You have the right to refuse participation in this study. Please remember that participation in the study is voluntary. You may ask questions related to the study at any time. You may refuse to respond to any questions and you may stop an interview at any time. You may also stop being in the study at any time without any consequences.

Discomforts and risks

Some of the questions you will be asked may be embarrassing or make you uncomfortable. If this happens, you may refuse to answer these questions if you so choose. You may also stop the interview at any time.

Benefits

If you participate in this study, you will learn how to deal with antenatal depression and fear of childbirth. You will also have the opportunity to learn and get acquainted with the necessary

procedures and steps during labour and delivery. Your participation will help us to learn how to provide effective services that can improve the health of antenatal women and reduce the effects of antenatal depression and fear of childbirth.

Reward

There will be no reward given for participating in this survey.

Confidentiality

The interviews and examinations will be conducted in a private setting. Your name will not be recorded on the questionnaire. The questionnaires will be kept safely and everything will be kept private.

Contact information

If you have any questions you may contact, Dr. Ákos Várnagy Supervisor 1. On +3672536001 or Professor Keraka Supervisor 2. On +2548710901 or the Doctoral School of Health Sciences of the University of Pécs on doktoriiskola@etk.pte.hu

Participant's Statement

The above information regarding my participation in the study is clear to me. I have been given a chance to ask questions and my questions have been answered to my satisfaction. My participation in this study is entirely voluntary. I understand that my records will be kept private and that I can leave the study at any time.

Name of Participant…….

_____ _____

Signature or Thumbprint Date

Investigator's statement

I, the undersigned, have explained to the volunteer in a language she understands, the procedures to be followed in the study and the risks and benefits involved.

Name of Interviewer…….

_____ _____

Interviewer signature Date

Appendix 3: self-administered questionnaire.

Questionnaire number

1. How old are you (Age in years)?
    1. 18-24 ()
    2. 25-29 ()
    3. 30-34 ()
    4. 35-39 ()
    5. Above 40 ()
2. What is your level of education?
    1. None ()
    2. Primary ()
    3. Secondary ()
    4. Tertiary ()
    5. University ()
3. Marital status
    1. Single ()
    2. Married ()
    3. Divorced ()
4. Where do you live?
    1. Rural ()
    2. Peri-urban ()
    3. Urban ()
5. Employed
    1. Yes ()
    2. No ()
6. If yes, what kind of job do you do?
    1. Casual ()
    2. Permanent ()
7. If yes in 7 above, how much is your income in Ksh?
    1. Less than 10,000 ()
    2. 11,000-20,000 ()
    3. 21,000- 30,000 ()
    4. Above 31,000 ()
8. What is your religion
    1. Christian ()
    2. Muslim ()
    3. Hindu ()
    4. No religion ()
    5. Traditional ()
9. Have you had a pregnancy before the one you have now?
    1. Yes ()
    2. No ()
10. What was your age at first pregnancy?

1. Below 15 years ()
2. Between 16-19 years ()
3. Between 20-24 years ()
4. Between 25-29 years ()
5. Between 20-34 years ()
6. Between 35-39 years ()
7. Above 40 years ()

11. Was it a live birth you had?
    1. Yes ()
    2. No ()
12. How did you deliver your previous pregnancy?
    1. Normal ()
    2. With complication ()
    3. Caesarean section ()
    4. Miscarriage ()
13. What do you remember from your previous pregnancy that will influence how you think and feel during this delivery?
    1.
14. Gestation week of your current pregnancy
    1. 22 ()
    2. 23 ()
    3. 24 ()
    4. 25 ()
15. Have you been checking this pregnancy regularly?
    1. Yes ()
    2. No ()
16. If yes above, how many times?
    1. Once ()
    2. Twice ()
    3. Three times ()
    4. More than three times ()
17. If no in 15 above, why?
    1. Long distance to health facility ()
    2. I was not aware of the pregnancy ()
    3. I fear the attitude of nurses ()
    4. I don't see the importance ()
18. Are you engaged in any physical activity?
    1. Yes ()
    2. No ()
19. Have you attended any childbirth preparation class?
    1. Yes ()
    2. No ()
20. If yes, where?
    1. Health centre/Hospital ()
    2. From elders ()
    3. Traditional birth attendant ()

21. Do you have any knowledge about birth delivery choices?
    1. Yes ()
    2. No ()
22. If yes above, can you list any that you know.
    1. Vaginal delivery ()
    2. Scheduled caesarean ()
    3. Unplanned caesarean ()
    4. Scheduled induction ()
23. If you had uncomplicated pregnancy and had the choice to schedule for a caesarean section or to wait for spontaneous vaginal delivery, which one would you choose?
    1. Vaginal birth ()
    2. Caesarean section ()
    3. Undecided/I don't know ()
24. Why will you choose the mode of delivery you mentioned above?
    1. It is the normal ()
    2. It is safe for both of us ()
    3. Its less painful ()
    4. Fear of childbirth ()
    5. It's cheap ()
    6. Spouse preference ()
25. Was your pregnancy planned?
    1. Yes ()
    2. No ()

Appendix 4: Permission to use W-DEQ-A

Dear David Onchonga,

NOTICE: In case of the W-DEQ, proceed from the English version in the attachment, NOT the version from 1998!

Here comes the permission:

“Herewith I offer you permission to use the following questionnaire(s):

W-DEQ vers. A: Wijma Delivery Expectancy-Experience Questionnaire, measuring Fear of Childbirth before delivery

W-DEQ vers. B: Wijma Delivery Expectancy-Experience Questionnaire, measuring Fear of Childbirth after delivery

TES vers. A: Traumatic Event Scale, measuring trauma anxiety before delivery

TES vers. B: Traumatic Event Scale, measuring trauma anxiety after delivery

DFS: Delivery Fear Scale, measuring fear of childbirth during delivery

in your project as described in this E-mail letter below.

Conditions are (1) that you refer to the scale(s) in your publications whenever you mention data based on it(them), (2) that you send me copies of such publications, (3) that, in case of a

translation, you send me a copy of the translation of the questionnaire(s) both as a Word-file and as a pdf-file.

W-DEQ, DFS and SFOC measure “fear of childbirth” and its measurement **SHOULD** be referred to as that and **NOT**, as some researchers, probably unfamiliar with psychometrics, have done as “childbirth experience”, “appraisal” etc. Terms like “childbirth experience”, “appraisal” etc. are psychometrically nonsense when you use these instruments, validated for the field of anxiety and fear. This is described in detail e.g. in Wijma et al. (1998). Psychometric aspects of the W-DEQ: a new questionnaire for the measurement of fear of childbirth. Journal of Psychosomatic Obstetrics and Gynecology, 19, 84-97.

NOTICE that the permission of these questionnaires regards the use in a separate format and NOT imbedded in a booklet with other texts. In case of a translation, you should follow the lay-out of the original English or Swedish version.

NOTICE that the copyright remains by me even in case of a translation and validation by others.

The W-DEQ references are:

Wijma, K., Wijma, B. & Zar, M. (1998). Psychometric aspects of the W-DEQ: a new questionnaire for the measurement of fear of childbirth. Journal of Psychosomatic Obstetrics and Gynecology, 19, 84-97.

The TES references is:

Wijma, K., Söderquist, J., Wijma, B. (1997). Posttraumatic stress disorder after childbirth. A cross sectional study. Journal of Anxiety Disorders, 11, 587-597.

The DFS reference is:

Wijma, K., Alehagen, S., Wijma, B. (2002). The development of the Delivery Fear Questionnaire. Journal of Psychosomatic Obstetrics and Gynecology, 23, 97-108.

”

It would be interesting to keep up with information about the progress of your research.

Please don’t hesitate to contact me in case of any questions.

Kind regards,

Klaas Wijma, PhD, Senior Professor

Unit of Medical Psychology

Department of Clinical and Experimental Medicine

House 511

Faculty of Medicine and Health Science

Linköping University

S-58183 Linköping, Sweden

Tel. +46 13 28 46 67

Mob. +46 732 713067

E-mail klaas.wijma@liu.se

Web site https://liu.se/medfak/ike/forskning/forskare-vid-ike/wijma-klaas?l=sv

Board of Fellows ISPOG (http://www.ispog.org/)

Want to know about the state of the art for Childbirth and Anxiety?

See:

Wijma K, Wijma B. A woman afraid to deliver - how to manage

childbirth anxiety. Chapter 1 In: Paarlberg KM, Van de Wiel HBM, editors.

Bio-psycho-social Obstetrics and Gynaecology. A Competence-oriented Approach.

Berlin: Springer; 2017

Appendix 5: Wijma Delivery Expectancy/Experience Questionnaire (W-DEQ) version A.

INSTRUCTION

This questionnaire is about feelings and thoughts women may have at the prospect of labour and delivery. The answers to each question appear as a scale from 0 to 5. The outermost answers (0 and 5 respectively) correspond to the opposite extremes of a certain feeling or thought. Please complete each question by drawing a circle around the number belonging to the answer which most closely corresponds to **how you imagine** your labour and delivery will be.

Please answer **how you imagine** your labour and delivery will be - *not the way you hope it will be.*

I How do you think your labour and delivery will turn out as a whole?

1 0 1 2 3 4 5
Extremely fantastic — Not at all fantastic

2 0 1 2 3 4 5
Extremely frightful — Not at all frightful

II How do you think you will feel in general during the labour and delivery?

3 0 1 2 3 4 5
Extremely lonely — Not at all lonely

4 0 1 2 3 4 5
Extremely strong — Not at all strong

5 0 1 2 3 4 5
Extremely confident — Not at all confident

6 0 1 2 3 4 5
Extremely afraid — Not at all afraid

7 0 1 2 3 4 5
Extremely deserted. — Not at all deserted

II How do you think you will feel in general during the labour and delivery?

8 0 1 2 3 4 5
Extremely weak — Not at all weak

9 0 1 2 3 4 5

Extremely safe — Not at all safe

10 0 1 2 3 4 5

Extremely independent. — Not at all independent

11 0 1 2 3 4 5

Extremely desolate — Not at all desolate

12 0 1 2 3 4 5

Extremely tense — Not at all tense

13 0 1 2 3 4 5

Extremely glad — Not at all glad

14 0 1 2 3 4 5

Extremely proud — Not at all proud

15 0 1 2 3 4 5

Extremely abandoned — Not at all abandoned

16 0 1 2 3 4 5

Totally composed — Not at all composed

17 0 1 2 3 4 5

Extremely relaxed — Not at all relaxed

18 0 1 2 3 4 5

Extremely happy — Not at all happy

III What do you think you will feel during the labour and delivery?

19 0 1 2 3 4 5

Extreme panic — No panic at all

20 0 1 2 3 4 5

Extreme hopelessness — No hopelessness at all

21 0 1 2 3 4 5

Extreme longing longing for the child — No longing for the for the child at all

22 0 1 2 3 4 5

Extreme self- confidence — No self- self-confidence at all

23 0 1 2 3 4 5

Extreme trust — No trust trust at all

24 0 1 2 3 4 5

Extreme pain — No pain at all

IV What do you think will happen when labour is most intense?

25 0 1 2 3 4 5

I will behave extremely badly — I will not behave badly at all

26 0 1 2 3 4 5

I will allow my body take total control — I will not allow my body to take total at all

27 0 1 2 3 4 5

I will totally lose control of of myself — I will not lose control of myself at all

V How do you imagine it will feel the very moment you deliver the baby?

28 0 1 2 3 4 5

Extremely enjoyable — Not at all enjoyable

29 0 1 2 3 4 5

Extremely natural — Not at all natural

30 0 1 2 3 4 5

Totally as it should be — Not at all as it should be

31 0 1 2 3 4 5

Extremely dangerous — Not at all dangerous

VI Have you, during the last month, had fantasies about the labour and delivery, for example.....

32 ... fantasies that your child will die during labour/delivery?

0 1 2 3 4 5

Never — Very often

33 ... fantasies that your child will be injured during labour/delivery?

0 1 2 3 4 5

Never — Very often

Would you please now check that you have not forgotten to answer any questions?

Appendix 6: EDINBURGH POSTNATAL DEPRESSION SCALE (EPDS)

The EPDS consists of 10 questions. The test can usually be completed in less than 5 minutes. Responses are scored 0, 1, 2, or 3 according to increased severity of the symptom. Items marked with an asterisk (*) are reverse scored (i.e., 3, 2, 1, and 0). The total score is determined by adding together the scores for each of the 10 items.

Referral Cut-Off Scores

The cut-off score for women is 9. Any score above 9 should receive a referral.

The cut-off score for men is 10. Any score above 10 should receive a referral.

Any person who scores 1 or higher on question #10 should be referred immediately.

Instructions for Users

1. The caregiver is asked to underline 1 of 4 possible responses that comes the closest to how s/he has been feeling the previous 7 days.
2. All 10 items must be completed.
3. Care should be taken to avoid the possibility of the caregiver discussing her/his answers with others.
4. The caregiver should complete the scale her/himself, unless s/he has limited English or has difficulty with reading.

Name:
Date:

We would like to know how you are feeling. Please UNDERLINE the answer which comes closest to how you have felt IN THE PAST 7 DAYS, not just how you feel today.

Here is an example, already completed.

I have felt happy:

Yes, all the time
Yes, most of the time
No, not very often
No, not at all

This would mean: "I have felt happy most of the time" during the past week. Please complete the other questions in the same way.

In the past 7 days:

1. I have been able to laugh and see the funny side of things
   - As much as I always could Not quite so much now Definitely not so much now Not at all

2. I have looked forward with enjoyment to things
   As much as I ever did
   Rather less than I used to
   Definitely less than I used to
   Hardly at all

*3 .I have blamed myself unnecessarily when things went wrong
   Yes, most of the time
   Yes, some of the time
   Not very often
   No, never

4. I have been anxious or worried for no good reason
   No, not at all
   Hardly ever
   Yes, sometimes
   Yes, very often

*5. I have felt scared or panicky for no very good reason
   Yes, quite a lot
   Yes, sometimes
   No, not much
   No, not at all

*6. Things have been getting on top of me
   Yes, most of the time I haven't been able to cope at all
   Yes, sometimes I haven't been coping as well as usual
   No, most of the time I have coped quite well
   No, have been coping as well as ever

*7. I have been so unhappy that I have had difficulty sleeping
   Yes, most of the time
   Yes, sometimes
   Not very often
   No, not at all

*8. I have felt sad or miserable
   Yes, most of the time
   Yes, quite often
   Not very often
   No, not at all

*9 I have been so unhappy that I have been crying
   Yes, most of the time
   Yes, quite often
   Only occasionally
   No, never

*10.The thought of harming myself has occurred to me
   Yes, quite often
   Sometimes
   Hardly ever
   Never

Appendix 7: Beck Anxiety Inventory (BAI)

Beck Anxiety Inventory

Below is a list of common symptoms of anxiety. Please carefully read each item in the list. Indicate how much you have been bothered by that symptom during the past month, including today, by circling the number in the corresponding space in the column next to each symptom.

	Not At All	Mildly but it didn't bother me much.	Moderately - it wasn't pleasant at times	Severely – it bothered me a lot
Numbness or tingling	0	1	2	3
Feeling hot	0	1	2	3
Wobbliness in legs	0	1	2	3
Unable to relax	0	1	2	3
Fear of worst happening	0	1	2	3
Dizzy or lightheaded	0	1	2	3
Heart pounding/racing	0	1	2	3
Unsteady	0	1	2	3
Terrified or afraid	0	1	2	3
Nervous	0	1	2	3
Feeling of choking	0	1	2	3
Hands trembling	0	1	2	3
Shaky / unsteady	0	1	2	3
Fear of losing control	0	1	2	3
Difficulty in breathing	0	1	2	3
Fear of dying	0	1	2	3
Scared	0	1	2	3
Indigestion	0	1	2	3
Faint / lightheaded	0	1	2	3
Face flushed	0	1	2	3
Hot/cold sweats	0	1	2	3
Column Sum				

Scoring - Sum each column. Then sum the column totals to achieve a grand score. Write that score here _____ .

Interpretation

A grand sum between **0 – 21** indicates very low anxiety. That is usually a good thing. However, it is possible that you might be unrealistic in either your assessment which would be denial or that you have learned to "mask" the symptoms commonly associated with anxiety. Too little "anxiety" could indicate that you are detached from yourself, others, or your environment.

A grand sum between **22 – 35** indicates moderate anxiety. Your body is trying to tell you something. Look for patterns as to when and why you experience the symptoms described above. For example, if it occurs prior to public speaking and your job requires a lot of presentations you may want to find ways to calm yourself before speaking or let others do some of the presentations. You may have some conflict issues that need to be resolved. Clearly, it is not "panic" time but you want to find ways to manage the stress you feel.

A grand sum that **exceeds 36** is a potential cause for concern. Again, look for patterns or times when you tend to feel the symptoms you have circled. Persistent and high anxiety is not a sign of personal weakness or failure. It is, however, something that needs to be proactively treated or there could be significant impacts to you mentally and physically. You may want to consult a counselor if the feelings persist.

Appendix 8: Map of study area

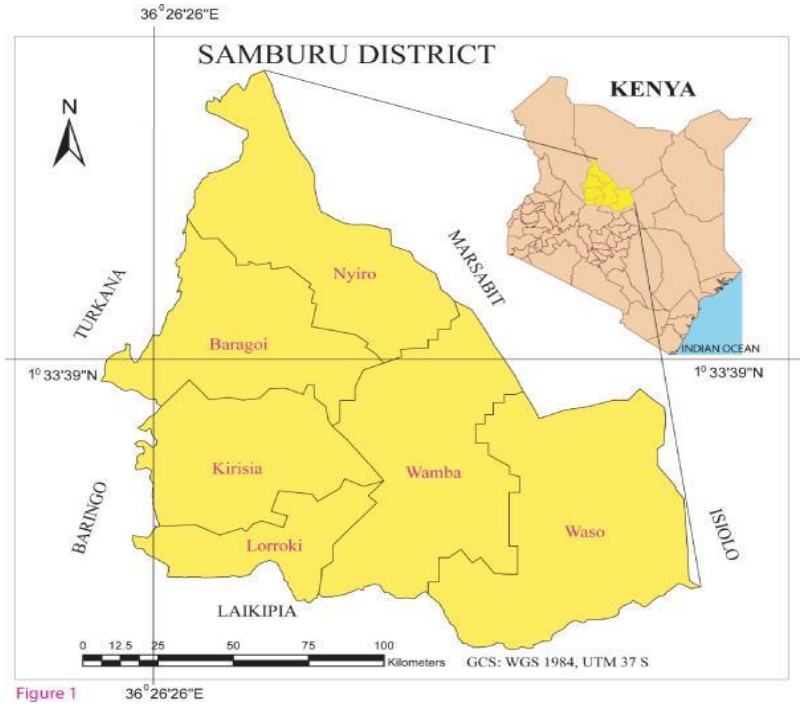


Figure 1

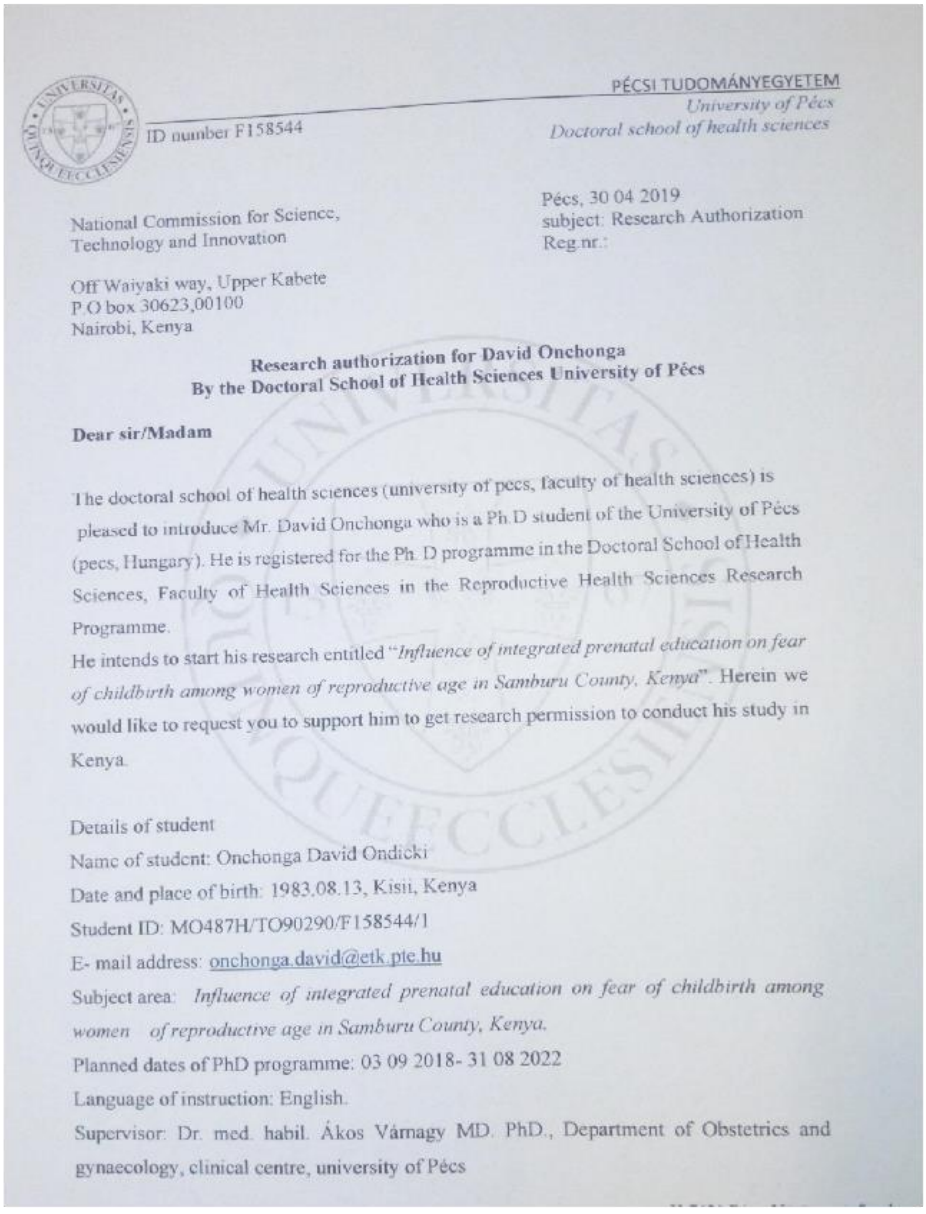
Appendix 9: workplan

Activity	2018-2019				2019-2020				2020-2021			2021-2022		
	Sep - Dec	Jan-Mar	Apr-June	July-Aug.	Sep-Dec	Jan-Feb	Mar-May	June-Aug	Sept-Dec	Jan-Mar	April - Aug	Sep - Dec	Jan-Apr	May-Aug.
Drafting concept note	X													
Proposal development		X												
Formalization of ethical review and research permit			X											
Enrolment of research participants				X										
pre-test and initial data collection for both groups				X	X									
Integrated antenatal health education to intervention group					X									
Data collection at 36th week						X								
Data cleaning and editing							X							
Data entry and analysis							X	X						
Thesis writing									X					
Manuscript development & sending to editors										X				
Final thesis writing										X	X			
Public Defence& final procedure for graduation												X	X	X

Appendix 10: Proposed Budget

Budget				
Item	Description	Quantity	Cost	Total
Tool Development	Questionnaires printing and photocopying	3900	10	39,000
Research Assistants	Recruitment and training	10	40000	400,000
Training Module	development	10	10000	30,000
Thesis Development	Printing and binding of final thesis	10	5000	50,000
Travel Costs	Air ticket for the principal researcher	3	80000	240,000
Total				759,000

Appendix 11: Research authorization



PÉCSI TUDOMÁNYEGYETEM
University of Pécs
Doctoral school of health sciences

ID number F158544

Pécs, 30 04 2019
subject: Research Authorization
Reg.nr.:

National Commission for Science,
Technology and Innovation

Off Waiyaki way, Upper Kabete
P O box 30623,00100
Nairobi, Kenya

Research authorization for David Onchonga
By the Doctoral School of Health Sciences University of Pécs

Dear sir/Madam

The doctoral school of health sciences (university of pecs, faculty of health sciences) is pleased to introduce Mr. David Onchonga who is a Ph.D student of the University of Pécs (pecs, Hungary). He is registered for the Ph. D programme in the Doctoral School of Health Sciences, Faculty of Health Sciences in the Reproductive Health Sciences Research Programme.
He intends to start his research entitled "*Influence of integrated prenatal education on fear of childbirth among women of reproductive age in Samburu County, Kenya*". Herein we would like to request you to support him to get research permission to conduct his study in Kenya.

Details of student
Name of student: Onchonga David Ondicki
Date and place of birth: 1983.08.13, Kisii, Kenya
Student ID: MO487H/TO90290/F158544/1
E- mail address: onchonga.david@etk.pte.hu
Subject area: *Influence of integrated prenatal education on fear of childbirth among women of reproductive age in Samburu County, Kenya.*
Planned dates of PhD programme: 03 09 2018- 31 08 2022
Language of instruction: English.
Supervisor: Dr. med. habil. Ákos Várnagy MD. PhD., Department of Obstetrics and gynaecology, clinical centre, university of Pécs

PÉCSI TUDOMÁNYEGYETEM
University of Pécs
Doctoral School of Health Sciences

ID number FI 58544

Co-Supervisor: Prof. Dr. Margaret Keraka - School of Public Health, Kenyatta University

Details of the host institution

University of Pécs

Faculty of Health Sciences

Doctoral School of Health Sciences

Hungary - 7621 Pécs, Vörösmarty u. 4.

Phone +36 (72) 513-678

E-mail: doktoriiskola@etk.pte.hu

Web site: http://doktoriiskola.etk.pte.hu/

Degree: PhD

Duration of training: 4 years

Language of instruction: Hungarian and English

Program director: **Prof. Dr. József BÓDIS MD, PhD, DSc,** university professor

Doctor of the Hungarian Academy of Sciences

Head of the office/Contact person: **Prof. Dr. Endre SULYOK MD., PhD, DSc**

professor emeritus, Doctor of the Hungarian Academy of Sciences

Any assistance given will be highly appreciated.

With kind regards,

Prof. Dr. József BÓDIS MD, PhD, DSc
university professor
Head of Doctoral School of Health Sciences

Prof. Dr. Endre SULYOK MD., PhD, DSc
professor emeritus
University of Pécs
Doctoral School of Health Sciences

Appendix 12: Research Permit

Telegrams: "MEDICAL", Kisumu
Telephone: 057-2020801/2020803/2020321
Fax: 057-2024337
E-mail: ercjootrh@gmail.com
When replying please quote

JARAMOGI OGINGA ODINGA TEACHING & REFERRAL HOSPITAL
P.O. BOX 849
KISUMU

Ref: ERC.IB/VOL.1/69

Date: 28th JUNE, 2019

UNIVERSITY OF PECS,

Dear David Onchonga,
LEVEL:PhD

RE: FORMAL APPROVAL OF THE PROTOCOL STUDY ENTITILED:-
"INFLUENCE OF INTEGRATED PRENATAL EDUCATION ON FEAR OF CHILDBIRTH AMONG WOMEN OF REPRODUCTIVE AGE IN SAMBURU COUNTY-KENYA."

The JOOTRH ERC reviewed your protocol and found it ethically satisfactory. You are therefore permitted to commence your study immediately. Note that this approval is granted for a period of one year (w.e.f. 28th JUNE, 2019 to 28th JUNE, 2020). If it is necessary to proceed with this research beyond approved period, you will be required to apply for further extension to the committee.

Also note that you will be required to notify the committee of any protocol amendment(s), serious or unexpected outcomes related to the conduct of the study or termination for any reason.

In case the study site is JOOTRH, kindly report to the Chief Executive Officer before commencement of data collection.

Finally, note that you will also be required to share the findings of the study in both hard and soft copies upon completion.

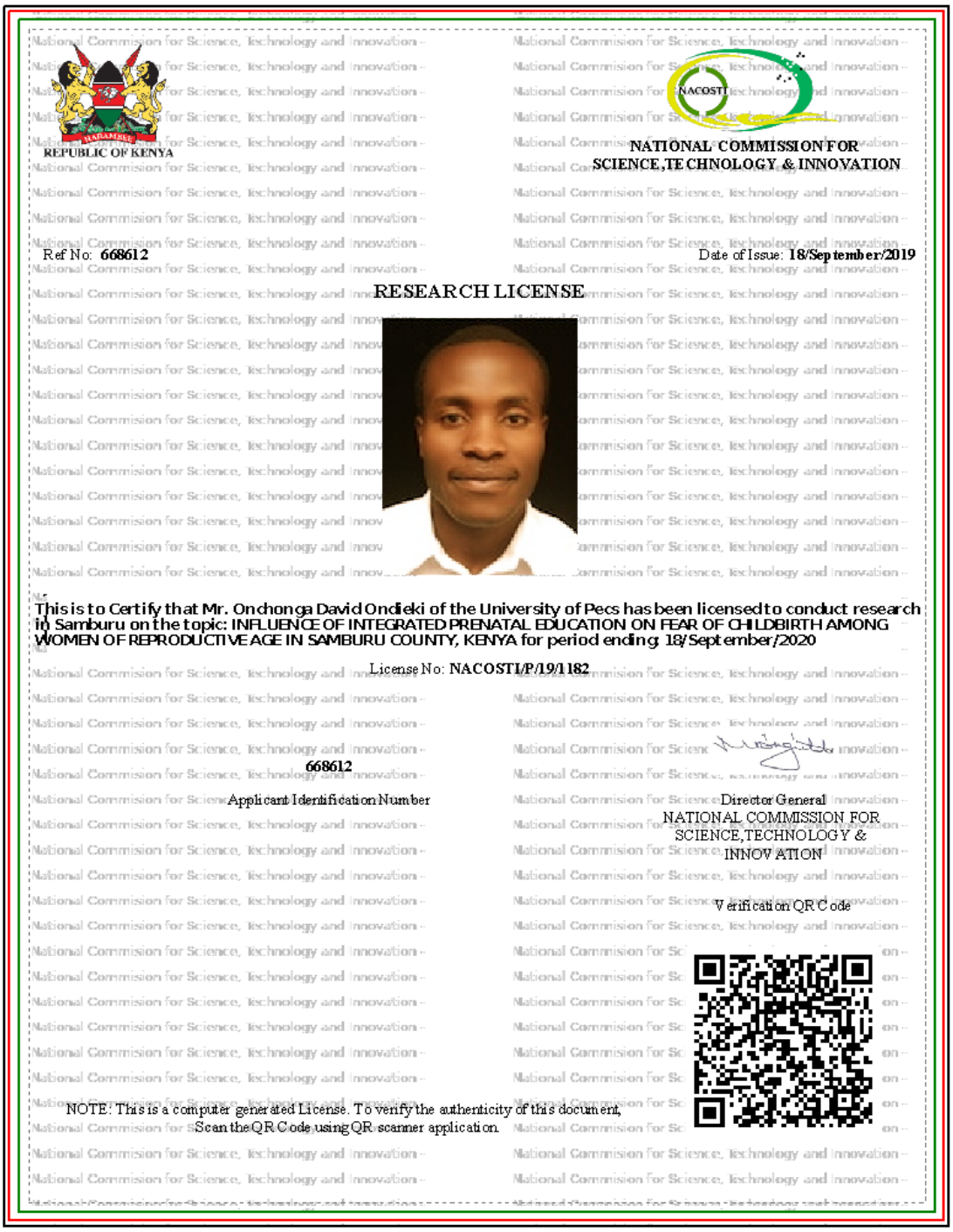
The JOOTRH – IERC takes this opportunity to thank you for choosing the Institution and wishes you the best in your future endeavours.

Yours sincerely,

JOOTRH ETHICS & RESEARCH COMMITTEE
P. O. Box 849 - 40100
KISUMU

WILBRODA N. MAKUNDA
SECRETARY- IERC
JOOTRH - KISUMU

Appendix 13: Research License



REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **668612**

Date of Issue: **18/September/2019**

RESEARCH LICENSE

This is to Certify that Mr. Onchonga David Ondieki of the University of Pecs has been licensed to conduct research in Samburu on the topic: INFLUENCE OF INTEGRATED PRENATAL EDUCATION ON FEAR OF CHILDBIRTH AMONG WOMEN OF REPRODUCTIVE AGE IN SAMBURU COUNTY, KENYA for period ending: 18/September/2020

License No: **NACOSTI/P/19/1182**

668612

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

Appendix 14: Swahili version of W-DEQ-A

DODOSO LA KUPIMA MATARAJIO YA WANAWAKE WAJAWAZITO WAKATI WA KUJIFUNGUA (W-DEQ) TOLEO A

Namba ya mshiriki.....

MAELEKEZO

Dodoso hili linahusiana na hisia na mawazo wanayoweza kuwa nayo wanawake wakati wanapotarajia kupata uchungu na kujifungua. Majibu ya kila swali yanaonekana katika mfumo wa kiwango kutoka 1 mpaka 6. Majibu yaliyo juu kabisa ni 1 na 6 ni kinyume chake kabisa cha hisia namawazo hayo

Tafadhali toa jibu ambalo unalodhani linalingana zaidi na unavyofikiria uchungu na wakati wakujifungua itakavyokua. Tafadhali jibu jinsi unavyofikiri na kuhusu uchungu na kujifungua utakavyokuwa na SI jinsi unavyotarajia

I. Je unafikiri wakati wa uchungu na kujifungua utakuwaje kwa ujumla?

1. Kwa ujumla, unadhani wakati wa uchungu na kujifungua utakuwa mzuri kwa kiasi gani?

0	1	2	3	4	5
Mzuri ajabu					Hautakuwa mzuri kabisa

2. Kwa ujumla, unadhani wakati wa uchungu na kujifungua utakuwa wa kutisha kwa kiasi gani?

0	1	2	3	4	5
Kutisha sana					Sio wa kutisha kabisa

II. Je unadhani utajisikiaje kwa ujumla wakati wa uchungu na kujifungua?

3. Kwa ujumla, unadhani ni kwa kiasi gani utakuwa mpweke wakati wa uchungu na kujifungua?

0 1 2 3 4 5

Mpweke sana Asiye mpweke kabisa

4. Kwa ujumla, unadhani ni kiasi gani utakuwa mwenye nguvu wakati wa uchungu na kujifungua?

0 1 2 3 4 5

Mwenye nguvu sana Asiye na nguvu kabisa

5. Kwa ujumla, unadhani ni kwa kiasi gani utajiamini wakati wa uchungu na kujifungua?

0 1 2 3 4 5

Mwenye kujiamini sana Asiye jiamini kabisa

6. Kwa ujumla, unadhani ni kwa kiasi gani utaogopa wakati wa uchungu na kujifungua?

0 1 2 3 4 5

Mwenye woga sana Asiye na woga kabisa

7. Kwa ujumla, unadhani ni kwa kiasi gani utaachwa peke yako bila msaada wakati wa uchungu na kujifungua?

0 1 2 3 4 5

Uliye achwa peke yako Asiyeachwa peke yako

bila msaada wowote kabisa bila msaada wowote kabisa

8. Kwa ujumla, unadhani ni kwa kiasi gani utakuwa dhaifu wakati wa uchungu na kujifungua?

0 1 2 3 4 5

Dhaifu sana Asiye dhaifu kabisa

9. Kwa ujumla, unadhani ni kwa kiasi gani utakuwa salama wakati wa uchungu na kujifungua?

0 1 2 3 4 5

Aliye salama sana Asiye salama kabisa

10. Kwa ujumla, unadhani ni kwa kiasi gani utakuwa huru wakati wa uchungu na kujifungua?

0 1 2 3 4 5

Aliye huru sana Asiye huru kabisa

11. Kwa ujumla, unadhani ni kwa kiasi gani utakata tamaa wakati wa uchungu na kujifungua?

0 1 2 3 4 5

Aliyekata tamaa kabisa Asiyekata tamaa kabisa

12. kwa ujumla, unadhani utakuwa a wasiwasi kwa kiasi gani wakati wa uchungu na kujifungua?

0 1 2 3 4 5

Mwenye wasiwasi sana Asiye na wasiwasi kabisa

13. Kwa ujumla, unadhani utajiskiaje wakati wa uchungu na kujifungua?

0 1 2 3 4 5

Mwenye kujisikia vizuri sana Asiyejisikia vizuri kabisa

14. Kwa ujumla, unadhani kwa kiasi gani utajisikia fahari wakati wa uchungu na kujifungua?

0 1 2 3 4 5

Mwenye kujisikia fahari sana Asiyejisikia fahari kabisa

15. Kwa ujumla, unadhani ni kwa kiasi gani utahisi kutelekezwa wakai wa uchungu na kujifungua?

0 1 2 3 4 5

Aliyetelekezwa kabisa Asiye telekezwa kabisa

16. Kwa ujumla, unadhani ni kwa kiasi gani utakuwa na amani wakati wa uchungu na kujifungua?

0 1 2 3 4 5

Aliye na amani sana Asiye na amani kabisa

17. Kwa ujumla, unadhani ni kwa kiasi gani utakuwa na utulivu wakati wa uchungu na kujifungua?

0 1 2 3 4 5

Aliye mtulivu sana Asiye mtulivu kabisa

18. Kwa ujumla, unadhani kwa kiasi gani utakuwa na furaha wakati wa uchungu na kujifungua?

0 1 2 3 4 5

Mwenye furaha sana Asiye na furaha kabisa

III. **Je unadhani utajisikiaje wakati wa uchungu na kujifungua?**

19. Unadhani ni kwa kiasi gani utakuwa na hofu wakati wa uchungu na kujifungua?

0 1 2 3 4 5

Mwenye hofu kali Asiye na hofu kabisa

20. Unadhani ni kwa kiasi gani utakuwa na matumaini wakati wa uchungu na kujifungua?

0 1 2 3 4 5

Asiye na matumaini kabisa Mwenye matumaini sana

21. Unadhani ni kwa kiasi gani utakuwa na hamu ya kumpata mtoto wakati wa uchungu na kujifungua?

0 1 2 3 4 5

Mwenye hamu ya mtoto sana Asiye na hamu ya mtoto kabisa

22. Unadhani ni kwa kiasi gani utaweza kujiamini kuwa unaweza kujifungua wakati wa uchungu na kujifungua?

0 1 2 3 4 5

Mwenye kujiamini sana Asiye jiamini kabisa

23. Unadhani ni kwa kiasi gani utakuwa na imani wakati wa uchungu na kujifungua?

0 1 2 3 4 5

Mwenye imani sana Asiye na imani kabisa

24. Unahisi ni kwa kiasi gani utakuwa na maumivu wakati wa uchungu na kujifungua?

0 1 2 3 4 5

Mwenye maumivu Asiye na maumivu

makali sana hata kidogo

IV. Je unafikiri ni nini kitatokea wakati uchungu utakavyokuwa mkali zaidi?

25. Unadhani ni kwa kiasi gani utasumbua wakati uchungu utakavyokuwa mkali zaidi?

0 1 2 3 4 5

Nitasumbua sana Sitasumbua kabisa

26. Unadhani ni kwa kiasi gani utaweza kudhibiti mwili wako wakati uchungu utakavyokuwa mkali zaidi?

0 1 2 3 4 5

Nitathubutu kufanya kile ambacho mwili unataka

Sitathubutu kufanya kile ambacho mwili unataka

27. Unadhani ni kwa kiasi gani utaweza jidhibiti wewe mwenyewe wakati uchungu utakavyokuwa zaidi?

0 1 2 3 4 5

Nitapoteza udhibiti wangu mwenyewe kabisa

Sitapoteza udhibiti wangu mwenyewe kabisa

V. Je unafikiri itakuaje wakati ule mtoto anazaliwa?

28. Unadhani ni kwa kiasi gani utafurahi wakati ule mtoto anazaliwa?

0 1 2 3 4 5

Nitafurahi sana Sitafurahia kabisa

29. Unadhani itakuwaje wakati mtoto anazaliwa?

0 1 2 3 4 5

Kawaida sana Si kawaida kabisa

30. Unadhani itakuwaje wakati ule mtoto anazaliwa?

0 1 2 3 4 5

Itakuwa kama Haitakuwa kama

nilivyotarajia matarajio yangu kabisa

31. Unadhani itakuaje wakati ule mtoto anazaliwa?

0 1 2 3 4 5

Itakuwa hatari sana Haitakuwa hatari kabisa

VI. Kwa mwezi uliopita, umewahi kuwaza kuhusu uchungu na kujifungua? kwa mfano

32. Kuwaza kua mtoto wako atafariki dunia wakati wa uchungu au kujifungua?

0 1 2 3 4 5

Hapana kamwe Mara kwa mara

33. Kuwaza kwamba mtoto wako ataumia wakati wa uchungu au kujifungua?

0 1 2 3 4 5

Hapana kamwe Mara kwa mara

Naomba uangalie kama hujasahau kujaza swali lolote

SHUKRANI SANA KWA KUKUBALI KUTUMIA MUDA WAKO KUJIBU DODOSO HILI

Appendix 15: Swahili version of W-DEQ-B

DODOSO LA KUPIMA MATARAJIO YA WANAWAKE WAJAWAZITO WAKATI WA KUJIFUNGUA (W-DEQ) TOLEO B

Namba ya mshiriki.....

MAELEKEZO

Dodoso hili linahusiana na hisia na mawazo wanayoweza kuwa nayo wanawake baada ya kujifungua. Majibu ya kila swali yanaonekana katika mfumo wa kiwango kutoka 1 mpaka 6. Majibu yaliyo juu kabisa ni 1 na 6 ni kinyume chake kabisa cha hisia namawazo hayo

Tafadhali toa jibu ambalo unalodhani linalingana zaidi na unavyofikiria sasa uchungu na kujifungua ilikuwaje. Tafadhali jibu jinsi unavyofikiria sasa kuhusiana na wakati alivyojifungua ilikuwaje wala SI jinsi ulivyotarajia iwe

I. Ulipata uzoefu gani wakati wa uchungu na kujifungua kwa jumla?

1. Kwa ujumla, wakati wa uchungu na kujifungua ulikuwa mzuri kwa kiasi gani?

0 1 2 3 4 5

Mzuri ajabu Haukua mzuri kamwe

2. Kwa ujumla, wakati wa uchungu na kujifungua ulikuwa wa kutisha kwa kiasi gani?

0 1 2 3 4 5

Kutisha sana Sio wa kutisha kamwe

II. Je ulijisikiaje kwa ujumla wakati wa uchungu na kujifungua?

3. Kwa ujumla, unadhani ni kwa kiasi gani ulikuwa mpweke wakati wa uchungu na kujifungua?

0 1 2 3 4 5

Mpweke sana Asiye mpweke kabisa

4. Kwa ujumla, unadhani ni kiasi gani ulikuwa mwenye nguvu wakati wa uchungu na kujifungua?

0 1 2 3 4 5

Mwenye nguvu sana Asiye na nguvu kabisa

5. Kwa ujumla, unadhani ni kwa kiasi gani ulijiamini wakati wa uchungu na kujifungua?

0 1 2 3 4 5

Mwenye kujiamini sana Asiye jiamini kabisa

6. Kwa ujumla, unadhani ni kwa kiasi gani uliogopa wakati wa uchungu na kujifungua?

0 1 2 3 4 5

Mwenye woga sana Asiye na woga kabisa

7. Kwa ujumla, unadhani ni kwa kiasi gani uliachwa peke yako bila msaada wakati wa uchungu na kujifungua?

0 1 2 3 4 5

Aliye achwa peke yako Asiyeachwa peke yako

bila msaada wowote kabisa bila msaada wowote kabisa

8. Kwa ujumla, unadhani ni kwa kiasi gani ulikuwa dhaifu wakati wa uchungu na kujifungua?

0 1 2 3 4 5

Dhaifu sana Asiye dhaifu kabisa

9. Kwa ujumla, unadhani ni kwa kiasi gani ulikuwa salama wakati wa uchungu na kujifungua?

0 1 2 3 4 5

Aliye salama sana Asiye salama kabisa

10. Kwa ujumla, unadhani ni kwa kiasi gani ulikuwa huru wakati wa uchungu na kujifungua?

0 1 2 3 4 5

Aliye huru sana Asiye huru kabisa

11. Kwa ujumla, unadhani ni kwa kiasi gani ulikata tamaa wakati wa uchungu na kujifungua?

0 1 2 3 4 5

Niliyekata tamaa kabisa Asiyekata tamaa kabisa

12. kwa ujumla, unadhani ulikuwa a wasiwasi kwa kiasi gani wakati wa uchungu na kujifungua?

0 1 2 3 4 5

Mwenye wasiwasi sana Asiye na wasiwasi kabisa

13. Kwa ujumla, unadhani ulijiskiaje wakati wa uchungu na kujifungua?

0 1 2 3 4 5

Nilijisikia vizuri sana sikujisikia vizuri kabisa

14. Kwa ujumla, unadhani kwa kiasi gani ulijisikia fahari wakati wa uchungu na kujifungua?

0 1 2 3 4 5

Mwenye kujisikia fahari sana Asiyejisikia fahari kabisa

15. Kwa ujumla, unadhani ni kwa kiasi gani ulihisi kutelekezwa wakai wa uchungu na kujifungua?

0 1 2 3 4 5

Aliyetelekezwa kabisa Asiye telekezwa kabisa

16. Kwa ujumla, unadhani ni kwa kiasi gani ulikuwa na amani wakati wa uchungu na kujifungua?

0 1 2 3 4 5

Aliye na amani sana Asiye na amani kabisa

17. Kwa ujumla, unadhani ni kwa kiasi gani ulikuwa na utulivu wakati wa uchungu na kujifungua?

0 1 2 3 4 5

Aliye mtulivu sana Asiye mtulivu kabisa

18. Kwa ujumla, unadhani kwa kiasi gani ulikuwa na furaha wakati wa uchungu na kujifungua?

0 1 2 3 4 5

Mwenye furaha sana Asiye na furaha kabisa

III. **Je unadhani ulijisikiaje wakati wa uchungu na kujifungua?**

19. Unadhani ni kwa kiasi gani ulikuwa na hofu wakati wa uchungu na kujifungua?

0 1 2 3 4 5

Mwenye hofu kali Asiye na hofu kabisa

20. Unadhani ni kwa kiasi gani ulikuwa na matumaini wakati wa uchungu na kujifungua?

0 1 2 3 4 5

Asiye na matumaini kabisa Mwenye matumaini sana

21. Unadhani ni kwa kiasi gani ulikuwa na hamu ya kumpata mtoto wakati wa uchungu na kujifungua?

0 1 2 3 4 5

Mwenye hamu ya mtoto sana Asiye na hamu ya mtoto kabisa

22. Unadhani ni kwa kiasi gani uliweza kujiamini kuwa unaweza kujifungua wakati wa uchungu na kujifungua?

0 1 2 3 4 5

Mwenye kujiamini sana Asiye jiamini kabisa

23. Unadhani ni kwa kiasi gani ulikuwa na imani wakati wa uchungu na kujifungua?

0 1 2 3 4 5

Mwenye imani sana Asiye na imani kabisa

24. Unahisi ni kwa kiasi gani ulikuwa na maumivu wakati wa uchungu na kujifungua?

0 1 2 3 4 5

Mwenye maumivu makali sana Asiye na maumivu hata kidogo

IV. Je unafikiri ni nini kilitokea wakati uchungu utakavyokuwa mkali zaidi?

25. Unadhani ni kwa kiasi gani ulisumbua wakati uchungu utakavyokuwa mkali zaidi?

0 1 2 3 4 5

Nilisumbua sana Sikusumbua kabisa

26. Unadhani ni kwa kiasi gani uliweza kudhibiti mwili wako wakati uchungu ulivyokuwa mkali zaidi?

0	1	2	3	4	5
Nilithubutu sana kufanya kile ambacho mwili ulitaka					Sikuthubutu kufanya kile ambacho mwili ulitaka

27. Unadhani ni kwa kiasi gani uliweza jidhibiti wewe mwenyewe wakati uchungu ulivyokuwa zaidi?

0	1	2	3	4	5
Nilipoteza kabisa udhibiti wangu mwenyewe					Sitapoteza kabisa udhibiti wangu mwenyewe

V. Je unafikiri ilikuaje wakati ule mtoto anazaliwa?

28. Unadhani ni kwa kiasi gani ulifurahi wakati ule mtoto anazaliwa?

0	1	2	3	4	5
Nilifurahi sana				Sikufurahia kamwe	

29. Unadhani ilikuwaje wakati mtoto anazaliwa?

0	1	2	3	4	5
Kawaida sana					Si kawaida kamwe

30. Unadhani ilikuwaje wakati ule mtoto anazaliwa?

0	1	2	3	4	5
Ilikuwa kama nilivyotarajia					Haikuwa kama matarajio yangu kamwe

31. Unadhani ilikuaje wakati ule mtoto anazaliwa?

0	1	2	3	4	5
Ilikuwa hatari sana					Haikuwa hatari kabisa

VI. Je, wakati wa uchungu na kujifungua, uliwahi kuwaza:

32. Kwamba mtoto wako anaweza kufariki dunia wakati wa uchungu au kujifungua?

0 1 2 3 4 5

Hapana kamwe Mara kwa mara

33. Kwamba mtoto wako ataumia wakati wa uchungu au kujifungua?

0 1 2 3 4 5

Hapana kamwe Mara kwa mara

Naomba uangalie kama hujasahau kujaza swali lolote

SHUKRANI SANA KWA KUKUBALI KUTUMIA MUDA WAKO KUJIBU DODOSO HILI

Appendix 16: Declaration of the Originality of the Dissertation

Submission of the doctoral dissertation and declaration of the originality of the dissertation

The undersigned,
Name: **ONCHONGA**
Maiden name: **DAVID ONDIEKI**
Mother's maiden name: **AGNES NYABOKE**
Place and time of birth: **KISII-13.08.1983**

on this day submitted my doctoral dissertation entitled:

INFLUENCE OF INTEGRATED PRENATAL EDUCATION ON FEAR OF CHILDBIRTH AMONG WOMEN OF REPRODUCTIVE AGE IN KENYA

to the
PR-1. **Reproductive Health Sciences Programme** of the Doctoral School of Health Sciences, Faculty of Health Sciences, University of Pécs.

Names of the supervisor(s): **DR AKOS VARNAGY**

At the same time, I declare that:
- I have not submitted my doctoral dissertation to any other Doctoral School (neither in this country nor abroad),
- my application for degree earning has not been rejected in the past two years,
- in the past two years I have not had unsuccessful doctoral procedures,
- my doctoral degree has not been withdrawn in the past five years,
- my dissertation is independent work, I have not presented others' intellectual work as mine, the references are definite and full, on preparation of the dissertation I have not used false or falsified data.

Dated: 18. 05. 2022.

signed by candidate