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Women's fear of childbirth and depressive symptoms before and after birth

Studies on the magnitude, challenges, and coping strategies in Pwani region, Tanzania

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Abstract

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Most women experience fear of childbirth (FoB) and depressive symptoms (DS), which have been associated with adverse obstetric outcomes. Such adverse effects are rarely screened in clinical practice, and knowledge of magnitude, associated factors, challenges, and coping strategies is lacking in Tanzania. This thesis aimed to assess the magnitude, challenges, and coping strategies regarding women's fear of childbirth and depressive symptoms before and after childbirth.

A mixed-method study was carried out in the Pwani region, Tanzania. A longitudinal study was performed to establish psychometric properties of W-DEQ-A and W-DEQ-B (Paper I), prevalence and predictors of FoB and DS during pregnancy (Paper II), and patterns and predictors of FoB and DS from pregnancy and postpartum (Paper III). Six hundred ninety-four pregnant women were recruited, and 625 completed the study. Individual interviews with women (n = 13) and traditional birth attendants (n = 3) and focus group discussions with women (n = 5), men (n = 2), and nurse-midwives (n = 4) were conducted to explore barriers, support, and coping strategies for overcoming FoB (Paper IV).

Factor analysis for W-DEQ revealed seven factors with 29 items with acceptable indices. Both versions of W-DEQ had good internal consistency.

The prevalence rates of FoB decreased from 16.2% during pregnancy to 13.9% after childbirth, while DS reduced significantly from 18.2% to 8.5% ($p < 0.001$). Some women had persistent FoB (6.4%) or DS (4.3%). Pregnant women above 30 years old, with informal education, and/or nulliparous were more likely to have FoB and DS. Giving birth by cesarean section and spending more than 12 hours at a health facility from admission to birth were associated with postnatal FoB. Furthermore, giving birth to an ill or dead baby was a predictor for postpartum DS.

In coping with FoB, three themes were identified: (i) perceived barriers to overcoming FoB, (ii) individual strength, family, community, and friendly healthcare facilities as proposed sources of support, (iii) turning to a higher power, socializing, and preparation as strategies to cope with FoB.

The Kiswahili W-DEQ-A-Revised and W-DEQ-B-Revised are reliable for measuring FoB with a multifactorial structure, incorporating seven factors with 29 items. FoB and DS coexist and get reduced with time. Recognizing predictors of both conditions, barriers to overcoming FoB, support, and coping strategies will help in the early identification of women at risk and in planning for timely interventions. Standardized tools and routine screening for FoB and DS during the perinatal period are recommended.

Keywords: Fear of childbirth, depressive symptoms, W-DEQ, validity, reliability, predictors, prevalence

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To my parents, Fredrick Massae and Kusurie Mashao

&

My siblings, Ester and Damian

&

All mothers who have experienced psychological and emotional disturbances related to pregnancy and childbirth

List of Papers

This thesis is based on the following papers, which are referred to in the text by their Roman numerals.

I. Massae AF, Larsson M, Leshabari S, Mbekenga C, Pembe AB, Svanberg AS. Fear of childbirth: validation of the Kiswahili version of Wijma delivery expectancy/experience questionnaire versions A and B in Tanzania. BMC Pregnancy and Childbirth. 2022; 22(1): doi: 10.1186/s12884-022-05134-8

II. Massae AF, Larsson M, Leshabari S, Mbekenga C, Pembe AB, Svanberg AS. Predictors of fear of childbirth and depressive symptoms among pregnant women: a cross-sectional survey in Pwani region, Tanzania. BMC Pregnancy and Childbirth. 2021; 21(1): doi: 10.1186/s12884-021-04169-7

III. Massae AF, Larsson M, Pembe AB, Mbekenga C, Svanberg AS. Patterns and predictors of fear of childbirth and depressive symptoms over time in a cohort of women in the Pwani region, Tanzania. PLoS One. 2022; 17(11): e0277004. doi: 10.1371/journal.pone.0277004

IV. Massae AF, Larsson M, Pembe AB, Svanberg AS, Sirili N, Mwakawanga DL. Mbekenga C. *"Listen to our problems, give us the care we deserve":* perceived barriers, support and coping strategies to overcome fear of childbirth in Pwani region, Tanzania. *Submitted*

Contents

Abbreviations

ANC	Antenatal Care
CBT	Cognitive Behavioral Therapy
C/S	Cesarean Section
DSM	Diagnostic and Statistical Manual of Mental Disorders
EPDS	Edinburgh Postnatal Depressive Scale
DS	Depressive Symptoms
FGDs	Focus Group Discussions
FoB	Fear of Childbirth
HCP	Healthcare Provider
HF	Health Facility
IDI	In-depth Interview
RA	Research Assistant
RCT	Randomized Controlled Trial
RCH	Reproductive and Child Health
SPSS	Statistical Package of Social Sciences
VAS	Visual Analogue Scale
W-DEQ	Wijma Delivery Expectancy/Experience Questionnaire

Preface

Growing up in a family with a medical doctor and a nurse-midwife, I became interested in the medical field without knowing what it entails. I lived with my aunt during my advanced secondary studies in 2001–2003; she was a nurse-midwife who inspired me with her white uniforms and headgear. I eventually started my bachelor's degree in nursing in 2004. I became interested in maternal and child health during my clinical rotations. Even in my leisure time, the maternity unit was the finest place to be. Being able to help countless women give birth to children was a privilege. After completing my internship in 2010, I began working as a nurse tutor at a nursing school that offered an advanced program in mental health for middle-cadre nursing education. My attention shifted to mental health nursing. However, I had internal disputes about whether I preferred mental health or midwifery. After one year, I enrolled in the midwifery and women's health master's program. During my clinical rotation, I became aware of several psychological issues throughout pregnancy, labor, and the postpartum period.

I spoke with postpartum mothers who could not breastfeed, denying their babies milk because of despair or concern about their altered body image. In addition, I encountered women who were afraid of having an altered body image after giving birth vaginally or who feared the pain and discomfort of labor. Some women declared they would not have children again because of the problems and unpleasant events surrounding their birth. They believed that subsequent pregnancies and births would also lead to the same problems. At this juncture, I saw a gap. Women's psychological issues could only be addressed when they displayed symptoms or were previously recognized as having mental health issues. There was no formal screening or prevention method to find women who needed further help. I considered this to signal lacking guidelines, abilities and skills.

The university hired me in 2015 as an assistant lecturer and an expert in midwifery and women's health. Therefore, I was responsible for facilitating courses in midwifery, women's health, and reproductive health for undergraduate and postgraduate students.

When the chance to pursue a PhD came, I chose to blend midwifery with psychological concerns regarding pregnancy, childbirth, and postpartum effects. The general idea was perinatal mental health, but I narrowed it down to depression. Remembering my previous clinical practices and social

interactions with women, I decided to learn about contextual screening methods and the occurrence and magnitude of fear of childbirth and depressive symptoms. If there were inadequate data to indicate to decision makers that fear of childbirth and depressive symptoms exist in Tanzanian women and that routine prenatal and postnatal care should include mental health components, implementation would not be feasible. I hope this research will advance the understanding of perinatal mental health problems, informing policymakers about the magnitude, contributing factors, and barriers to coping with fear of childbirth and depressive symptoms. I hope to participate in future research projects and work on guidelines, screening instruments, and interventions to enhance perinatal mental health.

Introduction

Women's expectations and experiences of health facility childbirth

A childbirth experience has been described as an important event in most women's lives. It is well known that many women have preconceived, detailed expectations, which impact on their experience as birth approaches [1]. These expectations play an essential role in determining a woman's response to the childbirth experience and coping during the postpartum period. Both expectations and actual childbirth experiences are crucial in women's views of themselves, the birth process, and the services offered [1,2]. Expectations and beliefs about childbirth, which can be positive or negative, differ markedly from one woman to another, influenced by a woman's psychological state, social relationships, and cultural values and beliefs [3]. Women whose expectations have been met are more likely to have positive childbirth experiences [2,4]. Healthcare providers (HCPs) should be aware of women's wishes in order to meet their expectations where possible. A good relationship with the provider has been recommended to alleviate concerns and promote a positive childbirth experience. However, unavoidable circumstances leading to a cesarean section (C/S), for instance, may not meet a woman's expectation of normal vaginal birth [5].

Other factors proven to contribute significantly to women's positive birth expectations and experiences include being involved in making decisions, childbirth being an interactive process, and being given opportunities to be in charge, cope, and be in control of what is going on around them [6–9]. Perceiving and believing in birth as a natural life event and expecting the body to give birth successfully without pain relief, medical interventions, or any other interference [8] were other factors influencing a positive childbirth experience. Support from outside medical professionals, a partner, or a close female friend/family member, to help cope with the labor process [3,6,9] has been reported to contribute to a positive childbirth experience. Conversely, some women perceive childbirth as a potentially non-affirming event that immerses them in pain and fear [8,9]. Negative birth experiences can lead to anger, frustration, confusion, and lack of physical and emotional control, which can affect a woman's decision on future childbearing [9–12]. If the childbirth experience does not match the expectations, especially in women who are not well-

prepared psychologically, this can lead to the development of fear of childbirth [13–15], depression [16,17], and post-traumatic stress disorders [1,18], and may increase the risk of cesarean childbirth at a woman's request in the future [19–21].

Defining fear of childbirth, depression, and depressive symptoms

Pregnancy is a transition time to motherhood during which expectant mothers can experience psychological distress due to hormonal, emotional, and physical changes. As they approach birth, some women feel uncertain and anxious. Systematic reviews have revealed that women from low- and lower-middle-income countries are more likely to report psychological disorders during pregnancy and after childbirth due to the interaction of biological, social, and psychological etiological factors [22,23].

FoB and depression are among the common non-psychotic perinatal mental disorders. FoB is commonly categorized as a phenomenon under a specific phobia within anxiety-related disorders [22,24]. Fear is an emotional response to a known, external, definite, or nonconflictual threat. Though there is no clear definition of FoB, as it encompasses a wide range of emotions [25,26], the particular threat in our studies was pregnancy, labor, and childbirth. Thus, FoB refers to feeling fearful or worried about pregnancy and childbirth.

In contrast, depression is a mood disorder that affects an individual's ability to function and is characterized by overwhelming sadness and inability to experience pleasure [25,27,28]. Depressive symptoms (DS) are a range of emotions that include feeling sad or hopeless and can also cause difficulty with thinking, memory, eating, and sleeping. Symptoms and treatment of FoB and DS can overlap.

DS may occur in depressive and bipolar disorders. Depressive disorders include premenstrual dysphoric disorder, depressive disorder due to another medical condition, and major depressive disorder [27]. A major depressive episode is diagnosed if DS lasts for at least two weeks, and a major depressive episode persisting for at least two years is termed persistent depressive disorder. There is insufficient evidence to suggest that the presentation of a major depressive episode during antenatal or postnatal periods differs considerably from depressive episodes that occur in women at other times. Consequently, neither antenatal nor postnatal depression is classified as a distinct type of depression in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) [27]. An episode of major depressive disorder with onset during pregnancy or within four weeks after childbirth is termed as a major depressive disorder with peripartum onset. It has been commonly referred to as antenatal or postpartum depression. This thesis focused on screening

women for the presence of DS using a standardized questionnaire and not diagnosing a major depressive disorder or postpartum depression; therefore, the term DS will be used throughout.

The evidence suggests a link between FoB and DS during pregnancy and after birth; in some women, they coexist [16,29]. It has been well-documented that DS can be a consequence of long-term FoB. However, DS can be a risk factor for severe FoB during pregnancy. Some women develop a phobic fear that leads to total avoidance of childbirth due to prenatal DS [16,28,29]. Further, FoB during pregnancy might lead to fear after birth [5], similar to DS [30]. It is recommended that women be assessed for both these conditions at once [16].

Fear of childbirth

It is suggested that FoB is a common and complex feeling ranging from worries to extreme anxiety, which can impair women's daily functioning and well-being, resulting in a perceived inability to go through the labor process and give birth [24,31]. FoB can be primary, occurring before birth, or secondary, arising after experiences of traumatic or distressing childbirth. Studies by Wijma et al. and other researchers suggest that fear can be classified into four categories: (1) Low, where the woman does not see any or almost no problems and is not bothered about the upcoming birth; (2) Moderate, where the woman can imagine that problems may appear during childbirth with assumptions that they will be handled appropriately, as every woman experience risk during the process of childbirth, (3) Severe or clinical fear. The fear is so intense that it affects a woman's daily life, leading to dysfunctional social, personal, and work life and influencing their desire for future childbirth or leading to them doubt their ability to give birth; and (4) Phobia, a pathological fear, where the woman wants to avoid getting pregnant or an upcoming birth is viewed with intense fear [21,28].

Prevalence of fear of childbirth

According to literature from around the globe, the prevalence of FoB is between 5 and 30% during pregnancy [25,28,32,33] and between 5 and 20% after birth [10,34,35]. Researchers have reported higher FoB rates among women during pregnancy than postpartum [10,35]. A systematic review by Nilsson et al. [25] showed that the prevalence varied between countries depending on cut-off points used to define FoB, the measuring scales used, and the context where the data were collected. The review showed that FoB ranged between 5.5 and 26.2%. A cohort study in six European countries (Belgium, Denmark, Estonia, Iceland, Norway, and Sweden) indicated that 11% of pregnant women experienced FoB [36]. The same range was supported by studies

from Africa, which revealed that the prevalence rates of FoB among pregnant and postnatal women were: Malawi 20% [35], Kenya 22.1% [37], and Ethiopia between 24.5% and 28.9% [38,39]. However, there are some challenges in comparing prevalence due to the absence of a comprehensive definition of FoB, differing cut-off points, and the different instruments used.

Measuring fear of childbirth

Various methods have been employed to assess FoB since no international screening, or diagnostic standards exist. Worldwide, FoB is rarely screened in routine clinical practice. However, in some countries, FoB can be detected if a woman reports her fear to HCPs, if HCPs ask about it, or if a health facility (HF) has a screening tool for FoB [40–42]. The most frequently used tool is the Wijma Delivery Expectancy/Experience Questionnaires (W-DEQ), designed by Wijma in 1998 in Sweden [24]. It has two versions, W-DEQ-A and W-DEQ-B. The questionnaire aims to measure women's cognitive appraisal of childbirth for both primiparous and multiparous women, with 33 items on a 6-point Likert scale ranging from "extremely" to "not at all." In W-DEQ-A, pregnant women are assessed on expectations for the upcoming birth (e.g., "How do you think you will feel in general during the labor and delivery?" with different options indicating inverse extremes of the expectations, such as "Extremely tense" vs. "Not at all tense" or "Extremely relaxed" vs. "Not at all relaxed." W-DEQ-B is for experiences of fear during and following childbirth (e.g., "How did you feel in general during labor and delivery?") with the same response options as W-DEQ-A. The maximum total score is 165, whereas the lowest score is 0. Higher scores reflect a higher level of FoB.

However, ways of identifying and categorizing FoB using W-DEQ vary, with various cut-off points having been used to define and classify FoB, leading to different prevalence rates. Some studies have used a cut-off of ≥ 85 to identify the high-severe level of FoB [19,43,44], while others have used cut-off points of ≥ 66 [13,35,37,38,45] or > 100 [46,47]. Additionally, a study done in 2019 proposed a new W-DEQ cut-off point of 85 for detecting tokophobia (pathological fear) based on the DSM-5 diagnosis of specific phobia [48].

The questionnaires have been translated into several languages and cross-culturally validated, mainly in middle-and high-income countries [34,49–52] and recently in African countries like Malawi in 2020 [53] and Kenya in 2021 [54]. However, the questionnaires have received some critiques due to measuring constructs other than FoB. At its development, the questionnaire was hypothesized as unidimensional measuring various aspects of FoB with good psychometric properties [24]. However, evidence from studies that have tested the tool's psychometric properties using factor analysis suggests a multidimensional questionnaire [53,55–58]. Another critique is that the form is lengthy and has poor readability, with many items to screen for FoB. Other critiques

include difficulties in translating some items into other languages for cultural transferability, adaptability, and clinical applicability [16,42,59]. A qualitative study done in the United States assessing W-DEQ revealed that the items in the tool screening for FoB did not reflect how participants themselves would describe fear. Women described factors contributing to FoB that were not previously reflected in W-DEQ, such as fear regarding how the structure of maternity units and HCPs' approaches affected childbirth care services [60]. Thus, W-DEQ may not be an evenly valuable screening tool across all contexts and settings. Despite the critique and reported challenges in using W-DEQ, this thesis used the same tool to assess its psychometric properties in Tanzania and screen women for FoB, as W-DEQ has been used widely, including in African countries. Another tool for screening for FoB is a single visual analogue scale (VAS), where women are asked to indicate how afraid they are of childbirth on a scale from 0 to 10. Women have been categorized as having FoB with a VAS threshold of 5 and above [61].

The Fear of Birth Scale is another tool to measure FoB during pregnancy, developed by Haines et al. [62]. The scale has two components, worry, and fear, and was tested on pregnant women in Australia and Sweden. The participants are asked to respond to one question "How do you feel right now about the approaching birth?". They respond by placing marks on two 100 mm VAS, anchored with the words "calm vs. worry" and "no fear vs. strong fear." The two values are added up and averaged to yield a total score ranging from 0 to 100. The higher the score, the greater the FoB. Various cut-off points have been used to define and identify FoB, such as > 50 [62], ≥ 54 [42], and ≥ 60 [63–65].

Another tool to measure FoB includes a 10-item scale known as Childbirth Fear Prior to Pregnancy. It uses a 6-point Likert scale to capture the dimensions of FoB reported by young adults, like fear of bodily damage, labor pain, birth complications, and harm to the baby. The existing tools like W-DEQ were considered unsuitable for young adults, as some of the questions were considered frightening for young women, such as those related to the potential death of the baby and loss of control during labor [61].

Recently, another tool for screening for FoB was introduced, known as the Fear of Childbirth Questionnaire. Slade and colleagues developed the questionnaire to assess FoB in an English-speaking United Kingdom (UK) population [66]. The Fear of Childbirth Questionnaire has 20 items created based on ten elements of FoB reported by women in the UK, such as: fear of not knowing and not being able to plan for the unpredictable; fear of harm or stress to the baby; fear of inability to cope with the pain; fear of harm to self in labor and postnatally; fear of procedures being done to them; fear of not being heard during labor; fear of being abandoned and alone; fear regarding the body's ability to give birth; fear of internal loss of control; fear at being terrified of birth and not knowing why [67]. The questionnaire has shown good reliability

and content validity in measuring FoB [66]. However, more studies are needed to test its applicability to other contexts outside the UK.

Etiology and predisposing factors for fear of childbirth

FoB is a continuum from a reality-related fear to an irrational one that occupies the woman's mind all the time. Most women experience a reasonable fear of the unknown due to the unpredictability of childbirth outcomes [67,68]. FoB before and after birth has various etiologies and predisposing factors, depending on the setting. However, there are no distinct predisposing factors during pregnancy or after childbirth. Most are cross-cutting. It has become clear that FoB can be related not only to childbirth per se but also to sociocultural and structural factors, such as socio-demographics and other social circumstances, parity, pregnancy, and birth-related factors, mood-related factors, other indirect factors, and vicarious experiences.

As regards sociodemographic factors, studies have revealed that FoB is more common in younger women [36,69]. In contrast, other studies have reported that FoB is more prevalent in women with advanced maternal age [29], yet others have found no association between maternal age and FoB [70,71]. Furthermore, some studies have reported an association between unemployment [72] or low education level [36,69] and FoB. Contradictory findings show that FoB is more prevalent in employed women [13] and those with high education levels [73], irrespective of parity. In contrast, other studies have reported no association between FoB and education level, occupation, or income [64,74]. In addition, being single [32] and having limited social support from a male partner, family, friends, and HCPs are stated to be associated with increased FoB [67,75,76].

Concerning parity, some studies have indicated that FoB is more common among nulliparous women during pregnancy [32] and primiparous women after birth [10,43], while others have found it more often in multiparous women [29]. Contradictory results have also been found with no association between parity and FoB [43]. Having an unplanned pregnancy is associated with FoB [73]. This is in line with a study done in six European countries, which indicated women with planned pregnancy had less FoB [43].

Furthermore, pregnancy-related and birth-related factors such as previous obstetric complications [77], long duration of labor, mode of birth, and childbirth interventions like episiotomy, emergency C/S, and instrument-assisted vaginal birth, have been reported to be associated with FoB before and after birth [10,71]. Women with previous traumatic childbirth and other negative birth experiences are likely to experience FoB in subsequent pregnancy and childbirth [77,78]. FoB can also be due to women doubting their ability to bear labor pain, cope with labor and give birth, deal with lack of body control, fear for the baby's or woman's well-being, and fear of becoming a parent [67,79].

Moreover, FoB has been stated to be more prevalent in women with mood and other mental health problems like anxiety, post-traumatic stress disorders, stress, and psychosis [29,43,80]. A history of childhood abuse has been reported to be associated with FoB [81]. In addition, a vicarious experience like witnessing live childbirth can contribute to FoB [82]. Differing results showed that observing live birth can reduce FoB rather than enhance it [83]. Negative stories from family, friends, community, and media can cause someone to fear birth [84].

Consequences of fear of childbirth

FoB can affect women's health and well-being during pregnancy, labor, and postpartum. Commonly reported outcomes of FoB are avoidance of pregnancy and termination [85,86]. Furthermore, fearing labor pain can cause a woman to avoid vaginal birth and opt for a C/S birth [36,87]. Previous studies indicate that FoB can alter the childbirth process by contributing to increased obstetric interventions [72], poor emotional and psychological health for women [71,88], increased length of labor, and increased risk of labor dystocia [14]. Moreover, FoB can lead to increased use of pharmacologic pain relief, such as epidural analgesia [80], as well as post-traumatic stress disorder [85,89], maternal and fetal distress, decreased normal birth diagnosis [90], adverse birth experiences, and low satisfaction with care [10,72]. Women who have had a previous negative birth experience often fear a repeated unpleasant experience for an upcoming birth [91]. Furthermore, FoB can contribute to low Apgar scores at one minute and adverse neonatal outcomes [74,89]. FoB can also negatively affect mother-baby attachment and breastfeeding, as these mothers need longer to start breastfeeding [92].

Depressive symptoms

Psychological features like DS may affect a woman's attitude toward pregnancy and upcoming childbirth. DS also has high clinical significance as it can affect the health outcomes for both mother and the infant [93].

Prevalence of depressive symptoms

Maternal DS is a global health concern, with prevalence rates of 5–34% during pregnancy [94–98] and 4–25% after childbirth [99,100]. A multi-ethnic prospective cohort study revealed that the prevalence of DS was 8.6% in Western Europeans, 19.5% in Middle Easterners, 17.5% in South Asians, and 11.3% in other groups [101]. In China, a prevalence of antenatal DS of 28.5% has been reported [102]. In an African context, the prevalence has been reported

to be within the global range and varying from region to region: 24.5% in Nigeria, 11.5% in Tanzania [103], and 33.8%, also in Tanzania [104].

Screening for depressive symptoms

Various tools have been used to screen for DS. The Edinburgh Postnatal Depression Scale (EPDS) is often used during pregnancy and after childbirth. The EPDS is a 10-item self-reported questionnaire where pregnant and postnatal women are asked to rate themselves on how they have felt in the previous seven days. Items include "I have blamed myself unnecessarily when things went wrong; things have been getting on top of me; I have felt sad or miserable; the thought of harming myself has occurred to me." Responses are measured on a 4-point Likert scale ranging from 0–3, where the lowest total score is 0, and the maximum is 30. Higher scores indicate a greater likelihood of DS [105]. The cut-off points to identify women with DS vary from 9 to 15 points, accounting for variations in estimated prevalence rates [106]. In some studies, EPDS has been used as a diagnostic tool for antepartum and postpartum depression with more or less similar cut-off points for determining the presence of DS [107–109]. EPDS has been used to evaluate perinatal anxiety in multiple contexts [110]. However, the developers insisted that the scale cannot measure anxiety [105].

The developers of EPDS indicate that women with scores above 12/13 are likely to suffer from a depressive illness of varying severity. They have further suggested that a threshold of 9/10 might be appropriate if the questionnaire is used for routine screening by primary care workers [105]. Other cut-off points from further validation and non-validation studies of EPDS across the globe have been used: ≥ 9 [111,112], ≥ 10 [34,113,114], ≥ 12 [115,116], and ≥ 13 [117]. A systematic review by Gibson and colleagues revealed the cut-off points of 9/10 for possible postpartum depression, 12/13 for probable postpartum depression, and 14/15 for antepartum depression. They suggested that the cut-off points 9/10 and 12/13 could be markers of minor and major depression, respectively [118]. However, other researchers have suggested that scores ≥ 10 can make the best screen for both minor and major depression [119].

The Kiswahili version of EPDS has been validated in Kenya, where Kiswahili is a national language, like in Tanzania, and cut-off points for perinatal depression have been suggested at ≥ 13 [107]. Furthermore, studies have been conducted in Tanzania to screen for depression using EPDS with varying cut-off points. In the Kilimanjaro region, three studies have been carried out with cut-off points of ≥ 10 [120] and ≥ 13 [103] to assess antepartum depression and with cut-off points of ≥ 13 [108] to determine postpartum depression. Another study was done in the Mwanza region, assessing antenatal depression with a cut-off point of ≥ 13 [104].

Other tools have been suggested and used to screen for DS in pregnant and postnatal women, such as the Hopkins Symptom Check List [121,122], the Patient Health Questionnaire-9 [107,123], the Beck Depression Inventory [124,125], the Beck Depression Inventory-II [126], the Hospital Anxiety and Depression Scale [127], the Center for Epidemiological Studies Depression Scale [128], the Inventory of Depressive Symptomatology [129], the Postpartum Depression Predictors Inventory-Revised [130]. However, some of the tools screen for both DS and anxiety. There is no universally agreed gold standard tool to screen for DS and diagnose depression during pregnancy or after childbirth.

Etiology and predisposing factors for depressive symptoms

The causes of DS are unclear but assumed to be a mixture of emotional and physical influences, such as hormonal changes during pregnancy and the period following childbirth [131]. However, there are acknowledged predictors of prenatal and postnatal DS, such as being single, divorced, or separated, not having a formal education, unemployment, being younger, having a large family, having financial instabilities, having previous C/S, having an unplanned pregnancy, a history of miscarriage, lack of preparation for childbirth, being a victim of gender-based violence – mainly intimate partner violence, lack of social support, lack of parenting knowledge, and low self-efficacy [101–103,132–134]. In Tanzania, studies have explored the prevalence of mental ill-health, including DS. The prevalence differs with ethnic background.

Consequences of depressive symptoms

The health of fetuses, infants, and children is related to the well-being of their mothers. Thus, maternal DS affects the quality of the family environment as it interrupts women's daily activities, mother-infant bonding, and infant sleep patterns. Also, it can lead to maternal suicidal ideation, delays cognitive and language development in children, and contributes to the discontinuation of breastfeeding or early interruption of exclusive breastfeeding [108,109,135].

Coping strategies and support to overcome a fear of childbirth and depressive symptoms

Coping strategies and support can be both internal (individual women) and external. Expanding on previous studies by Ternström and Ahmad, feeling confident regarding pregnancy and childbirth was one of the personal strategies to reduce FoB. Self-confidence increased women's self-control during labor and their ability to cope with labor. Confidence could be enhanced by

having positive thinking, raising awareness of pregnancy and birth, getting adequate support, and being spiritually strong [65,136].

Antenatal classes enable women to prepare and understand what they need during labor [44,137]. Inviting women to tour the HF where they plan to give birth can help them cope with FoB [138]. Negative stories about childbirth can induce FoB, so avoiding stressful environments, events, and individuals with negative birth experiences can help women reduce FoB [86,89].

Being given a chance to choose a favorite HF and HCPs to attend during pregnancy and birth can aid in coping with FoB [139]. HCPs can provide psychological, physical, and informational support to reduce FoB. In addition, professional help, particularly midwifery care, entailed receptive, compassionate, empathetic, respectful, dignified care, attentive listening, and continuous availability for a woman and a family [28,139]. For instance, women who experienced negative childbirth needed personalized and ongoing professional and social support through reassurance, which enabled them to recover and gain trust in healthcare provision services [140]. In addition, emotional, psychological, and financial support from partners, family members, and friends was essential to creating comfort and assurance, ultimately reducing or eliminating FoB [141].

Support from a partner, parenting knowledge, and skills were among the coping strategies for women with DS [122].

The United Republic of Tanzania

According to the National Population and Housing Census of 2022, Tanzania has a population of 61.7 million (51.3% female) and an annual growth rate of 3.2%. Administratively, Tanzania is divided into 31 regions, 26 in the mainland and five in Zanzibar, covering a total area of 945,087 km^2 [142]. The regions are divided into districts, divisions, wards, and villages. Tanzania has approximately 130 ethnic groups (tribes), though Kiswahili is the national language and English is the second language [143].

The average life expectancy at birth is 67.3 years (69.3 years for females and 65.4 years for males). The fertility rate is 5.2 children, and 27% of women aged 15–19 years are either pregnant or have given birth [144]. In some parts of the country, polygamy is common, with 18% of married women having co-wives, while 9% of married men have more than one wife. The perinatal mortality rate is 39 deaths per 1,000 pregnancies, and the maternal mortality ratio is 556 per 100,000 live births. The neonatal mortality rate is 25 deaths per 1,000 live births, and the infant mortality rate is 43 deaths per 1,000 live births [145].

Health service provision in Tanzania

Health services in Tanzania are hierarchical and decentralized, comprising primary health care, including dispensaries, health centers and district hospitals. The second level is referral health facilities such as regional, zonal, and national referral hospitals [146]. Mainland Tanzania has 7,680 dispensaries, 1,430 health centers, and 662 hospitals [142], and at least 90% of inhabitants live within five kilometers of a primary healthcare facility [145].

The community level is the lowest level of primary health care delivery, with preventive, promotional, and other essential community-based health services being offered. Dispensaries and health centers are closest to the community and provide preventative and curative services, including maternal and child health services, mainly antenatal, normal childbirth, postnatal, and under-five care. In the case of patients unmanageable at the dispensary level, a referral is made to a health center, where emergency obstetric and newborn care is provided. The primary healthcare professionals at these levels are clinical officers, assistant clinical officers, enrolled nurse-midwives/enrolled nurses, and public health nurses.

District hospitals are served by medical officers, assistant medical officers, clinical officers, and enrolled and registered nurse-midwives. Women with complications during pregnancy, labor, birth, or after birth are referred to regional hospitals.

The consultant hospitals, including zonal and national referral hospitals are the highest referral level with specialized services. The Ministry of Health is the authority charged with managing the health sector in the country. Figure 1 gives an overview of health service provision in Tanzania.

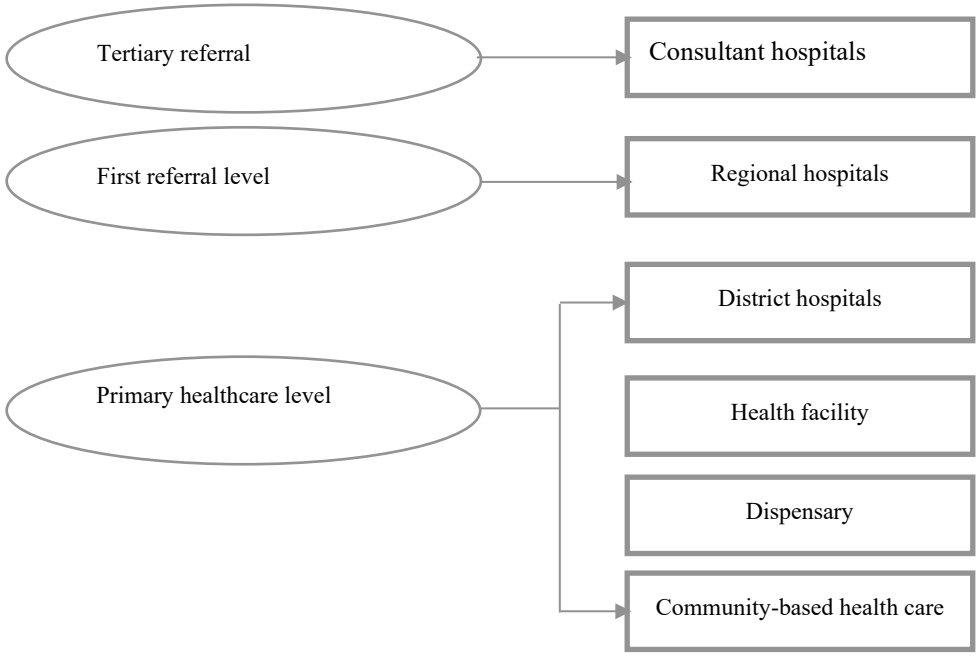

Figure 1: Organization of health services provided in Mainland Tanzania.

Antepartum, intrapartum and postpartum care in Tanzania

Antenatal care (ANC) is the entry point into the healthcare system for many women. ANC services in Tanzania are free of charge and provided at reproductive and child health (RCH) clinics accessible at all levels of HFs. In 2019, the Tanzania Ministry of Health, Community Development, Gender, Elderly, and Children adapted and endorsed the new WHO guidelines from 2016 [147], which recommend a minimum of eight antenatal contacts comprising nutritional interventions, maternal and fetal assessments, interventions for common physiological conditions of pregnancy, and preventive measures [148].

Through collective efforts, the country has made substantial progress in improving the continuum and accessibility of care during the perinatal period. Different policies, guidelines, strategies, and interventions have been implanted in Tanzania. These include strengthening the health system, ensuring the availability of adequate skilled HCPs, provision of comprehensive ANC, reproductive health and family planning services, male involvement in reproductive health issues, accessibility of emergency obstetric and newborn services, availability of safe blood, provision of comprehensive abortion services, implementation of Maternal and Perinatal Death Surveillance and

Response guidelines, and public-private HFs partnership [149–151]. Despite the various efforts undertaken in the country, some challenges persist, such as inadequate skilled HCPs and accessibility to maternal health care services [150,152]. Available reports show that about 98% of women attend antenatal clinics at least once, while 63% of childbirths occur in HFs, and a skilled health provider assists 64% of these [145]. In case of no complications, women are discharged within 24 hours of childbirth, and their babies are given the recommended first dose of vaccines. Furthermore, inadequate infrastructure, transport, and communication between HFs, disrespectful attitudes of HCPs, and shortage of resources such as medical equipment, drugs, and facilities are among the challenges in providing adequate and quality perinatal care [152–154].

The national postnatal guidelines recommend four postnatal visits/care within 24 hours, 7, 28, and 42 days post-childbirth [155]. However, early postpartum visits are underutilized, and most women bring their baby to an HF at 4–6 weeks for immunization, growth monitoring, and other routine checkups [156].

One of the components missing in the antenatal and postnatal guidelines is perinatal mental health care. Despite evidence of prevalent mental health concerns during these periods, perinatal mental health services are not routinely offered at RCH clinics in Tanzania; instead, if a woman shows signs of mental health concerns, she is referred to a psychiatric unit or psychologist. There are no standalone national guidelines addressing perinatal mental health problems. In basic training for nursing and midwifery, i.e., a bachelor's degree and below, the focus is on general mental health rather than perinatal mental health. Though mental health is taught at nursing colleges and universities, no standardized tools exist for screening women for perinatal mental health symptoms.

Furthermore, companion has been emphasized as one of the physical and psychological supports needed during pregnancy, labor, and after childbirth. The partner escort policy is intended to encourage couples to seek antenatal and childbirth services and has been advocated in Tanzania [157,158] and across the globe [159–162]. However, strong sociocultural and family-focused norms, gender roles, occupational demands, and HF environments hinder its implementation [163–166]. A study in Kilimanjaro, Tanzania, revealed that partner attendance impaired the timing of starting ANC. Women whose partners failed to accompany them delayed initiation of ANC due to fear of being questioned discriminated against, or prohibited care because of the absence of their partners [167].

Strategies undertaken to improve partner involvement in some health facilities in Tanzania include sending invitation letters to men to attend ANC, coaching pregnant women on how to invite their partners to ANC, giving priority to couples in receiving services, and providing education and community sensitization [168]. Despite the strategies implemented and the proven

importance of partner involvement for improved utilization of RCH services, the proportion of males accompanying female partners to ANC in Tanzania remains low.

Midwifery practices in Tanzania

Nurse-midwives are the key implementers of RCH service provision in Tanzania and the backbone of primary health care services. Nurse-midwives cooperate with women and their partners to provide appropriate and individualized midwifery care. For complicated pregnancies, birth, or puerperium, midwives report and work in cooperation with clinical officers at lower-level HFs, medical officers, and specialists in obstetrics and gynecology at higher-level HFs. Nurse-midwives training is structured into different levels, such as certificate, diploma, bachelor, master, and doctorate degrees [169].

Midwifery services in Tanzania follow the midwifery model of care, upholding the belief that pregnancy and childbirth are normal physiological processes. One of the midwives' roles is to ensure pregnancy, childbirth, and the postnatal period are managed based on available evidence, reducing unnecessary medical interventions. However, the shortage of nurse-midwives continues to be challenging, with approximately one nurse-midwife per 1,400 citizens [170]. This can interfere with the midwife-pregnant woman's relationship, affecting the birth experience. The birth experience has been reported to contribute to FoB and DS either positively or negatively [77,78]. Investing in midwives and increasing access to competent midwives is vital to promote positive childbirth, preventing maternal and newborn death, and improving maternal mental health status [171].

Although much focus on midwifery care in Tanzania has been on facility settings, midwives are supposed to promote and provide midwifery care services in the community as well.

The rationale for the thesis

The effects of FoB and DS are well-known worldwide. Addressing these conditions during pregnancy can benefit not only a woman's mental health but also her infant's physical health and development. In Tanzania, common perinatal mental disorders such as anxiety, post-traumatic stress disorders, and depression have been explored [120,172,173]. Still, there is limited information on FoB and its association with other psychological concerns like DS during pregnancy and after childbirth. Studies on FoB and DS in low- and middle-income countries are needed to give insights into the magnitude of these problems, influencing factors, and appropriate tools for assessment and support required by women to overcome FoB. FoB and its association with DS appear not to have been reported previously in Tanzania. Policymakers may use novel research findings and implementers like nurse-midwives, other clinicians, and non-governmental organizations to improve the care provided to women in Tanzania and beyond by integrating mental health components in routine perinatal care.

Aim

Overall aim

This thesis aimed to assess the magnitude, challenges, and coping strategies regarding women's fear of childbirth and depressive symptoms before and after birth in selected HFs and communities in the Mkuranga and Kisarawe Municipal Councils, Tanzania.

Specific aims

The studies' aims are described below, and their interrelationships can be seen in Figure 2.

1. To translate W-DEQ-A and W-DEQ-B from English into Kiswahili and assess the reliability, validity, and factorial structure of the Kiswahili versions for a Tanzanian population (Paper I).

2. To investigate the prevalence of FoB and DS among pregnant women, how they are associated, and their predictors, focusing on sociodemographic and obstetric characteristics (Paper II).

3. To assess the prevalence rates of FoB and DS after birth, including patterns of FoB and DS from pregnancy to postpartum, as well as predictors for the development and persistence of FoB and DS in women after childbirth (Paper III).

4. To examine the perceived barriers, sources of support, and coping strategies to overcoming FoB among postpartum mothers, nurse-midwives, and the community in the Pwani region, Tanzania (Paper IV).

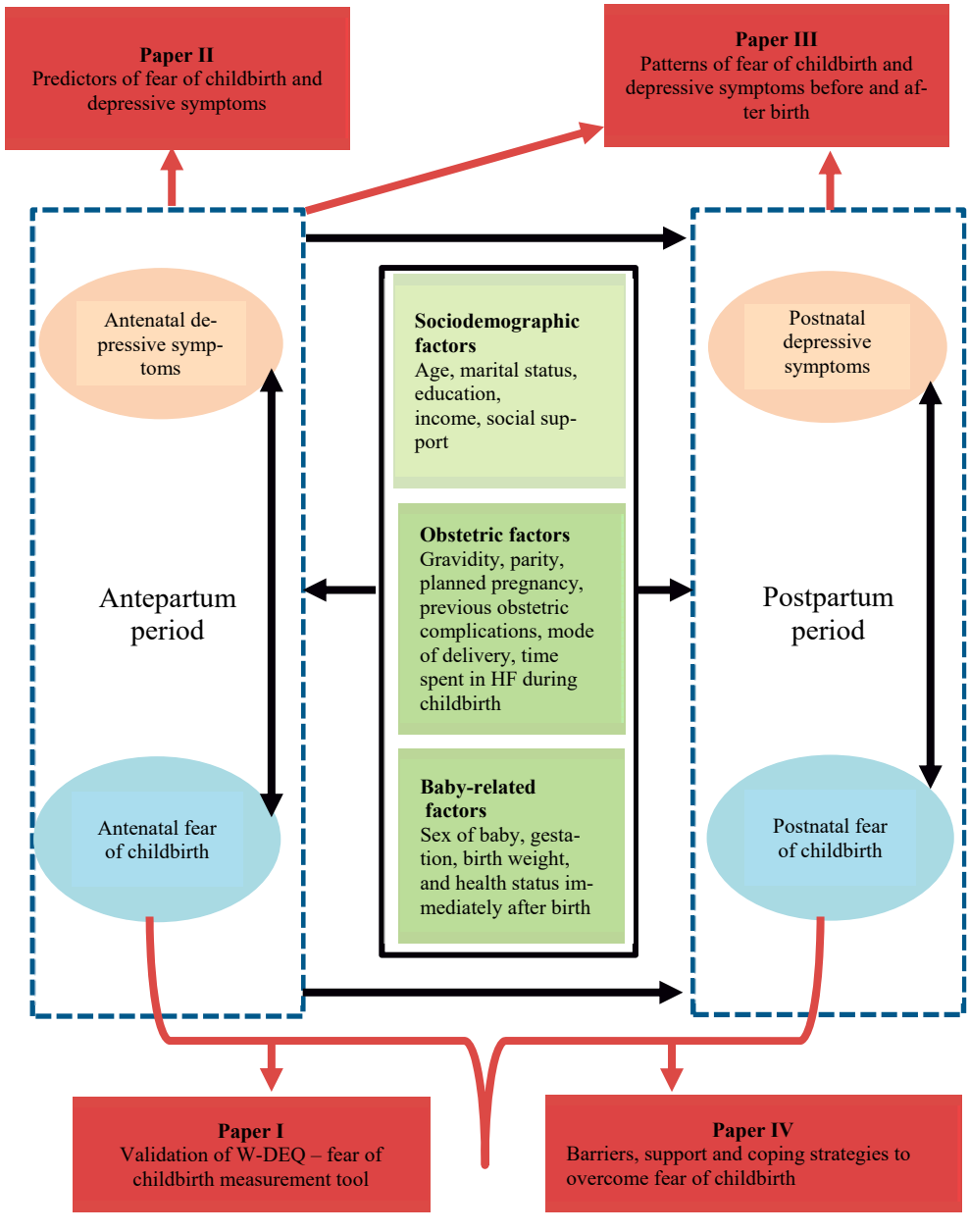

Figure 2. Conceptual framework on the relationships between independent and dependent variables, depressive symptoms and fear of childbirth, barriers, coping strategies for fear of childbirth, and studies included in this thesis.

Note: HF, Health facility; W-DEQ, Wijma delivery expectancy/experience questionnaire.

Methods

Study design

This was a longitudinal study using a mixed-method approach. The quantitative method was applied to the first three papers, and the qualitative method to the fourth. The studies were both HF- and community-based. The process is outlined in Figure 3.

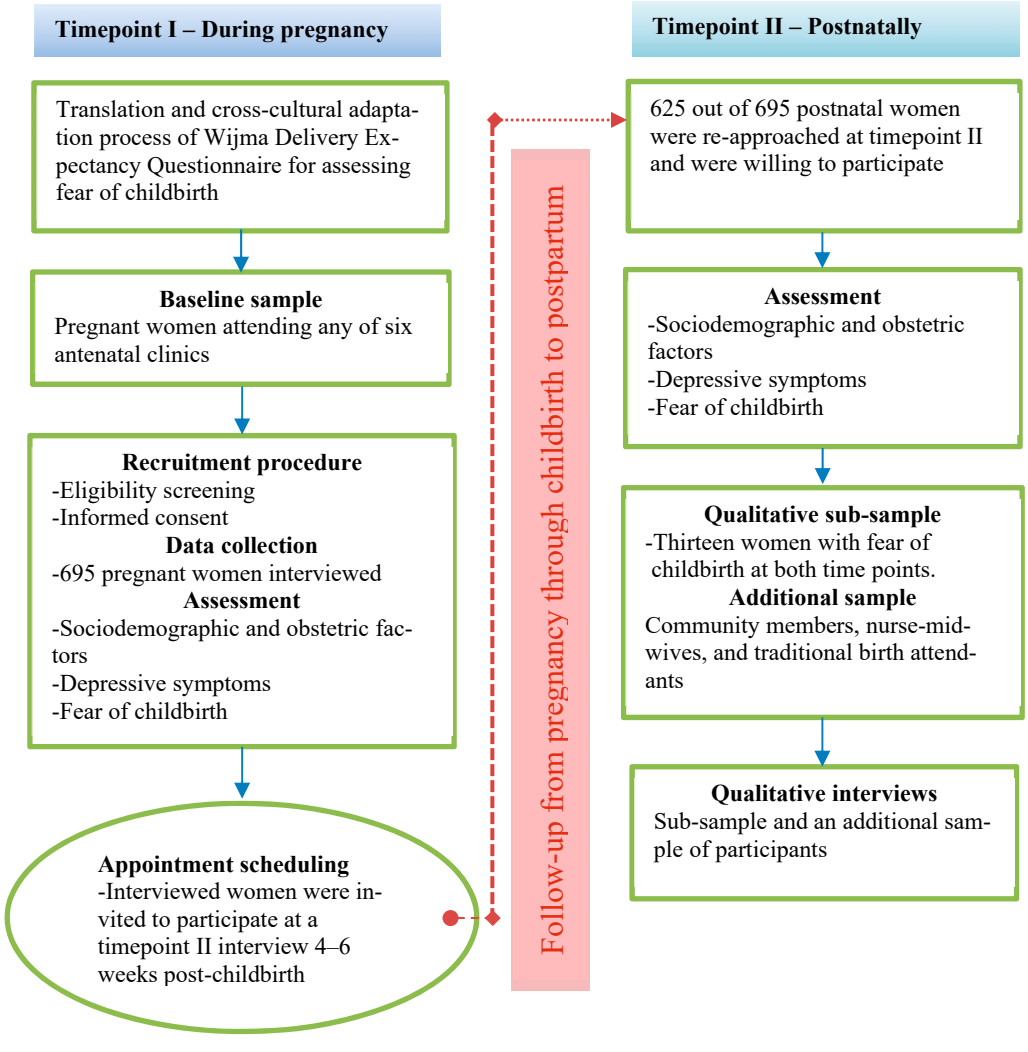

Figure 3. Overview of research design.

Study setting

This thesis is based on studies conducted in the Mkuranga and Kisarawe districts in the Pwani region, Tanzania. The region has an area of 32,547 km² and a total population of around 2 million (50.7% female) [142]. The region borders the Tanga Region to the north, Lindi Region to the south, Morogoro Region to the west, and the Dar es Salaam region to the east. It encompasses seven districts: Mkuranga, Kisarawe, Rufiji, Kibiti, Kibaha, and Bagamoyo [174].

Mkuranga is located in the east of the Pwani region with a population of just over 250,000 (51.4% female). The district is divided into four divisions, with 25 wards, 125 villages, and 477 hamlets [175]. The district comprises 57 HFs, one district hospital, six health centers (two governmental and four privately owned), and 50 dispensaries (37 government and 13 privately owned) [176].

Kisarawe is another district in the Pwani region with a population of around 115,000 (50.0% female). Administratively, it has four divisions, 17 wards, 66 villages, and 235 hamlets [177]. The district has 40 HFs, one district hospital, three government health centers, and 36 dispensaries, of which 32 are government and four are private [176]. The major economic activities in these districts are agriculture, livestock keeping, and business.

In this thesis, the HF-based studies were conducted in six government-owned HFs in the Mkuranga and Kisarawe districts; one district hospital and two health centers per district. In the Mkuranga district, the HFs were the Mkuranga district hospital and the Mkamba and Kisiju health centers, whereas the HFs in the Kisarawe district were the Kisarawe district hospital and the Masaki and Maneromango health centers. Data were collected at their RCH clinics and labor wards. The community-based study was performed in the community surrounding the study sites' HFs, such as Mkuranga urban and Mkamba and Kisuju villages in the Mkuranga district and Kisarawe urban and Masaki and Maneromango villages in Kisarawe (Figure 4).

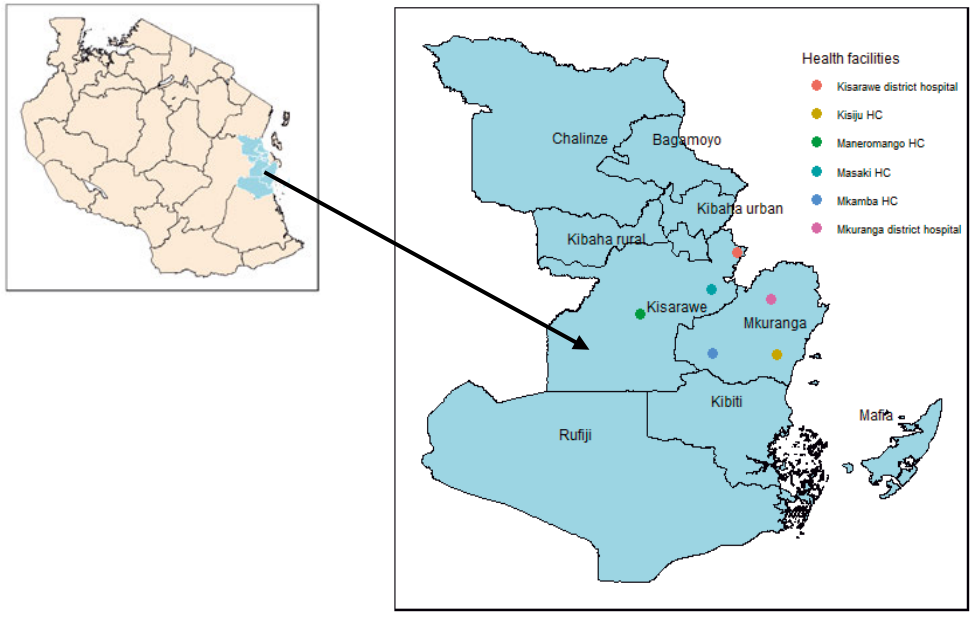

Figure 4. Map showing regions in Tanzania, including study sites in the Pwani region

Study participants, recruitment, and sampling procedures

For **Papers, I, II, and III**, pregnant women attending antenatal clinics were invited to participate. Recruitment was performed from April 2018 to July 2019. The participants were recruited from selected HFs. The inclusion criteria were at least 32 weeks of gestation, anticipating vaginal birth, no previous C/S birth, living in the study area and planning to attend the same HF for antenatal care, birth, and postnatal care, and being able to speak Kiswahili. We used consecutive sampling to screen 1,130 pregnant women for eligibility criteria. We invited 702 women, but eight declined to participate in the study. A sample of 694 pregnant women between 32 and 42 gestational weeks was interviewed and followed up after birth, and 625 completed the interview at 4–6 weeks postnatally. A total of 69 women were lost to follow-up due to various reasons like traveling outside the study sites, unwillingness to continue with the study, losing their babies, and lack of communication.

For **Paper IV**, a diverse study population sample was purposively recruited to have different perspectives and opinions on FoB. The first group was women classified in Papers II and III as having FoB. The other groups were women and men who did not participate in the earlier studies but lived in the study

communities with at least one child. Village executive officers invited them to participate in this study. Furthermore, nurse-midwives working at RCH-clinics, labor wards, and postnatal or antenatal wards at selected HFs were involved in the study. The criteria were at least two years of professional work experience and willingness to participate. The last group to participate in this study was traditional birth attendants. The recruitment and data collection took place between June and August of 2021.
More information on methods is given in Table 1.

Table 1. Summary of methods and participants

Paper	Study	Design and sample	Data collection technique and tools	Analysis
I	Validation of the Kiswahili version of Wijma Delivery Expectancy/Experience Questionnaire versions A and B in Tanzania	Longitudinal study -16 experts reviewed the tools -694 pregnant women interviewed	Self-administered and interviewer-administered questionnaires -Wijma Delivery Expectancy/Experience Questionnaire versions A & B with 33 items each	-Exploratory and confirmatory factor analysis -Internal consistency test -Convergent and discriminant validity test
II	Predictors of fear of childbirth and depressive symptoms among pregnant women in Pwani region, Tanzania	Cross-sectional study -694 pregnant women	Face-to-face interviews using administered questionnaires -Wijma Delivery Expectancy/Experience Questionnaire versions A & B -Edinburgh Postnatal Depression Scale with 10 items	-Bivariate analysis using chi-squared (X^2) test -Multivariable logistic regression
III	Patterns and predictors of fear of childbirth and depressive symptoms over time in a cohort of women in the Pwani region, Tanzania	Longitudinal study -694 pregnant women, of whom 625 were followed up postnatally	Face-to-face interviews using administered questionnaires -Wijma Delivery Expectancy/Experience Questionnaire versions A & B -Edinburgh Postnatal Depression Scale	-Chi-squared and Fisher's exact tests -McNemar's test -Multivariable logistic regression
IV	Perceived barriers, support, and coping strategies to overcome fear of childbirth in Pwani region, Tanzania	Qualitative study -13 postnatal women -3 traditional birth attendants -27 nurse-midwives -49 women from community -24 men from community	In-depth interviews (IDIs) and focus group discussions (FGDs) -13 IDIs among postnatal women -3 IDS among traditional birth attendants -4 FGDs among nurse-midwives -5 FGDs among women in community -2 FGDs among men in community Semi-structured interview guides for IDIs and FGDs	Qualitative content analysis

Data collection tools, translation, cultural adaptation process, and data collection procedure

For **Paper I,** several groups of people participated in validating the W-DEQ-A and W-DQ-B. The primary group was pregnant and postnatal women who participated during pilot testing and actual data collection when they were interviewed about their expectations and experiences of childbirth using the W-DEQ. W-DEQ-A and W-DEQ-B have the same items but were worded differently. Version A (for pregnant women) is about their expectations for the forthcoming childbirth, and version B, for postnatal women, is about the recent childbirth experience. The W-DEQ was developed over 20 years ago and has been translated and validated in multiple contexts. Since the tool has yet to be validated in Tanzania, a validation process was done sequentially.

The W-DEQ-A and W-DEQ-B were translated into Kiswahili following the translation and cultural adaptation process described by Beaton et al. [178]. First, the principal investigator (AFM) translated the English versions of the scale into Kiswahili. The translations were then reviewed and discussed with six native Kiswahili speakers and specialists in reproductive health, midwifery, obstetrics, and gynecology to check for clarity, understandability, and wording for the Tanzanian context. The forward translation was a back-and-forth process, as the experts recommended revisions in the wording of some items. After addressing all the comments, two independent bilingual experts back-translated the new questionnaires into English. The researchers compared the forward- and back-translated versions for similarities and differences to determine the clarity of the content of the different language versions of the tools.

The W-DEQ-A and B, together with a 3-point Likert scale, were sent to 16 Tanzanian Kiswahili native speakers and experts in midwifery, obstetrics, and gynecology, mental health and psychiatry, psychology, and behavioral science with more than five years of experience in their area of expertise. The 3-point Likert scale enabled experts to rate each item of W-DEQ for its necessity from 1–3 (1, “not necessary”; 2, “useful but not essential”; 3, “essential”). Also, the experts were required to provide written comments on clarity and understandability for each item and questionnaire. The content validity ratio was computed for each item. The research team convened a meeting with the team of experts to discuss unclear items and those with a content validity ratio below 0.48. The team members renamed and altered one item that was unclear to most panelists. Other comments were discussed, and all ambiguities were rectified. The modified tools were subsequently sent back to three experts who participated from the beginning of the validation process for cross-checking and approval before piloting the tools.

The tools were pre-tested on 31 pregnant and 40 postnatal women seeking RCH services at Bagamoyo HFs. The tools were designed to be self-reported. However, in this study, we interviewed women since most were unfamiliar

with the Likert scale. During data collection, six research assistants (RAs; unemployed nurse-midwives) were trained on the contents of the questionnaires, ethical principles, and data collection procedures. The RAs interviewed women using the Kiswahili W-DEQ-A &B and noted the responses in the questionnaires. Getting participants to respond on the 6-point Likert scale could be challenging as the tools have narratives only at the two extremes (0: "not at all"; 5: "extremely").

To address the challenge, a visual scale with narratives for points 1–4 on the scale was developed to aid the women. The RAs were trained to use a visual scale to help women rate their expectations. The research team also revised unclear items. The questionnaires were re-tested on five pregnant and postnatal women together with the newly developed visual scale. During this round, most of the questions appeared straightforward. Ambiguous questions were corrected, and questionnaires were refined and organized for data collection.

The Kiswahili W-DEQ-Revised versions with the visual scale and a questionnaire with sociodemographic and obstetric questions were used for data collection. The same team of trained 6 RAs was used for data collection. Data collection was done at two timepoints: women were interviewed first at between 32 and 40 gestational weeks and then again at 4–6 weeks post-childbirth.

For **Papers II and III,** the EPDS was administered along with the W-DEQ to assess DS and FoB among pregnant and postnatal women. Both tools measure maternal mental aspects toward childbirth. Antenatal and postnatal FoB was screened using the Kiswahili W-DEQ-A and W-DEQ-B, respectively, while antenatal and postnatal DS were measured using EPDS. We adapted the Kiswahili version of EPDS, validated in Kenya [107], for data collection in Tanzania. Independent variables were divided into demographic variables, obstetric characteristics of index pregnancy, and the most recent previous pregnancy and childbirth. The outline of independent variables is presented in the conceptual framework shown in Figure 2. The dependent variables were FoB and DS. The variables were dichotomized to determine the prevalence rates and predictors of FoB and DS. FoB was categorized into low FoB for scores ≤ 65 and high FoB for scores ≥ 66. In this study, low FoB was referred to as no fear, and high FoB as FoB. DS was grouped into high DS for scores < 10 and low DS for scores ≥ 10. In this study, low DS was referred to as no DS and high DS as DS.

For **Paper IV,** interview guides for individual in-depth interviews (IDIs) and focus group discussions (FGDs) were used to facilitate data collection. The guides were developed in English and then translated into Kiswahili. The two data collection approaches supplemented each other. At the beginning of each IDI and FGD, verbal and written informed consent was sought for

participation and audio recording. The participants were assured that all information would be treated confidentially within the research team and groups. All participants filled out their sociodemographic information in a form before the interviews. All interviews were carried out by healthcare professionals with experience in conducting IDIs and FGDs. The principal investigator oriented them on the aim of the study and data collection guides.

A total of 16 IDIs were conducted, 13 with women with high FoB and three with traditional birth attendants. The saturation principle described by Glaser and Strauss guided the number of interviews [179]. Interviews were conducted in private and quiet rooms at HFs and residential premises, depending on the participant's availability and convenience. Only the interviewer and interviewee were present. Each interview lasted between 30 and 70 minutes.

Eleven FGDs were conducted, four with nurse-midwives from each of the chosen HFs, five with women, and two with men from the community study sites. The group size ranged from 6 to 12 participants. Confidentiality within the groups was emphasized, and whatever was discussed within a group was considered as shared perspectives and experiences and not supposed to be communicated outside the group. Identification numbers were assigned to each participant to facilitate the discussion. Each FGD had a moderator and a co-moderator. The main task of the moderator was to introduce the aim of the study, inform about the participants' right to withdraw at any time, anonymity, confidentiality, there being no right or wrong responses, and lead the group discussion. The co-moderator was responsible for taking notes, observing verbal and non-verbal cues from participants, and summarizing the discussion after each session.

Depending on the study participants' availability and preferences, the FGDs were conducted in a comfortable and calm environment, usually at the hospitals, residential premises, or village executive officers' offices. No third party was allowed to observe the discussions. The FGDs lasted between 58 and 120 minutes. Table 2 shows the characteristics of participants and the number of interviews per category.

Table 2. Characteristics of the study participants (Paper IV)

Participants	**Age range (years)**	**Number of participants**	**Number of interviews**	**Gender**
Postnatal women	26-49	13	13 IDIs	
Traditional birth attendants	69-80	3	3 IDS	W
Community-women	19-70	49	5 FGDs	
Men	24-73	24	2 FGDs	
Nurse-midwives	25-53	27	4 FGDs	23W; 4M
Total		116	27	

Note: FGD, focus group discussion; IDI, in-depth interview; M, man; W, woman.

Data analysis

For **Paper I,** the Statistical Package of Social Sciences (SPSS) computer software version 26 and SPSS Amos were used for analysis. First, the content validity ratio was calculated by seeking opinions from a team of experts in nursing and midwifery, obstetrics, mental health and psychiatry, psychology, and behavioral science. The experts reviewed the tools several times to contextualize the contents and promote clarity. Before data collection, the research team used the experts' feedback to improve the tool. After data collection, the sample size adequacy, multicollinearity, and normality tests were done to check for items fit for further analysis. Confirmatory factor analysis was conducted to confirm which items explained the maximum variance and were valid for the Tanzanian context. Cronbach's alpha and the intra-class correlation coefficient were also computed to assess the internal reliability of the tools and inter-rater reliability. Lastly, the tools were tested to determine if they measured the same or different constructs of FoB, with discriminant and convergent validity computed.

For **Paper II**, cross-sectional data for pregnant women were used to assess the prevalence and predictors of FoB and DS during pregnancy. SPSS version 26 was used for statistical data analysis. We did a descriptive analysis to define women's demographic and obstetric characteristics and prevalence rates of both FoB and DS. A non-parametric chi-squared test was used to elicit the association between FoB and DS and the association of demographic and obstetrics characteristics and FoB and DS. Multivariable analysis was carried out to determine the strengths of the associations and to control for confounders.

For **Paper III,** longitudinal data were used to assess the patterns of FoB and DS from pregnancy through childbirth to the postnatal period and their predictors. The main focus was on postnatal time, where predictors were grouped into three groups: predictors of postnatal FoB and DS, predictors of developing FoB and DS after childbirth, and predictors of persistent FoB and DS. Descriptive statistics were used to describe study participants' demographic and obstetric characteristics and FoB and DS prevalence rates at both time points. McNemar's test was used to determine the proportions and patterns of FoB and DS at all time points. Multivariable logistic regression was done to determine the predictors of FoB and DS in the three groups.

For **Paper IV,** an iterative data analysis approach was applied, where data collection and analysis were performed concurrently. Interview guides were revised during data collection to include necessary information mentioned in the initial interviews. Kiswahili audio recordings were transcribed verbatim, and codes were developed in English. A deductive-inductive, team-based coding was used for codebook development and coding processes [180].

Qualitative content analysis was guided by the procedure outlined by Graneheim and Lundman [181]. A team of four coders performed the coding in pairs to ensure inter-rater reliability. The team started with the first two interview transcripts, which they coded independently. In case of disagreements and inconsistencies during the coding process, the whole team discussed and resolved them. The coding was compared, and the team discussed and addressed all the differences. The team agreed on the final codebook version, which was imported to NVivo version 12 for further coding. After coding, the codes were organized based on similarities and differences to form subcategories, which were further grouped to create categories. Categories with similar messages were abstracted into more significant themes. Team debriefing was used to review the categories and themes until an agreement was reached.

Ethical considerations

The permission to use and validate the W-DEQ was given by Wijma, the tool developer. The studies were approved by the Senate Research and Publication Committee of the Muhimbili University of Health and Allied Sciences with reference number 2018-03-09/AEC/Vol.XII/91. Regional administrations permitted all studies in HFs and communities down to study sites and villages through the respective district authorities.

Before interviews, participants were given information about the study objectives, procedures, reasons for voluntary participation, their right to withdraw at any time, and the importance of informed consent. Data were collected after participants signed the informed consent form in two copies, one for the researcher and one for the participants.

Privacy and confidentiality were ensured throughout the research, and rooms at the HFs, which would provide a quiet environment for uninterrupted interviews and discussion, were used. Ensuring confidentiality for FGDs is challenging, but the researcher underlined the importance of keeping the conversations confidential and that whatever was shared should remain within the group. Postnatal women whose interviews were carried out at the HFs were assured that the information provided would not jeopardize future healthcare provision. Also, HCPs were assured that the information provided would not be shared with their managers. The principal investigator kept all audio records, and transcripts were made anonymous by coding them to conceal the identities of the study participants before they were shared with the entire research team.

Results

The results of this thesis are from the validation process of W-DEQ, describing the prevalence and patterns of FoB and DS before and after childbirth, with predictors focusing on sociodemographic and obstetric factors. In addition, barriers encountered, support, and coping strategies for women to overcome FoB are presented. The key findings are summarized in Figure 5.

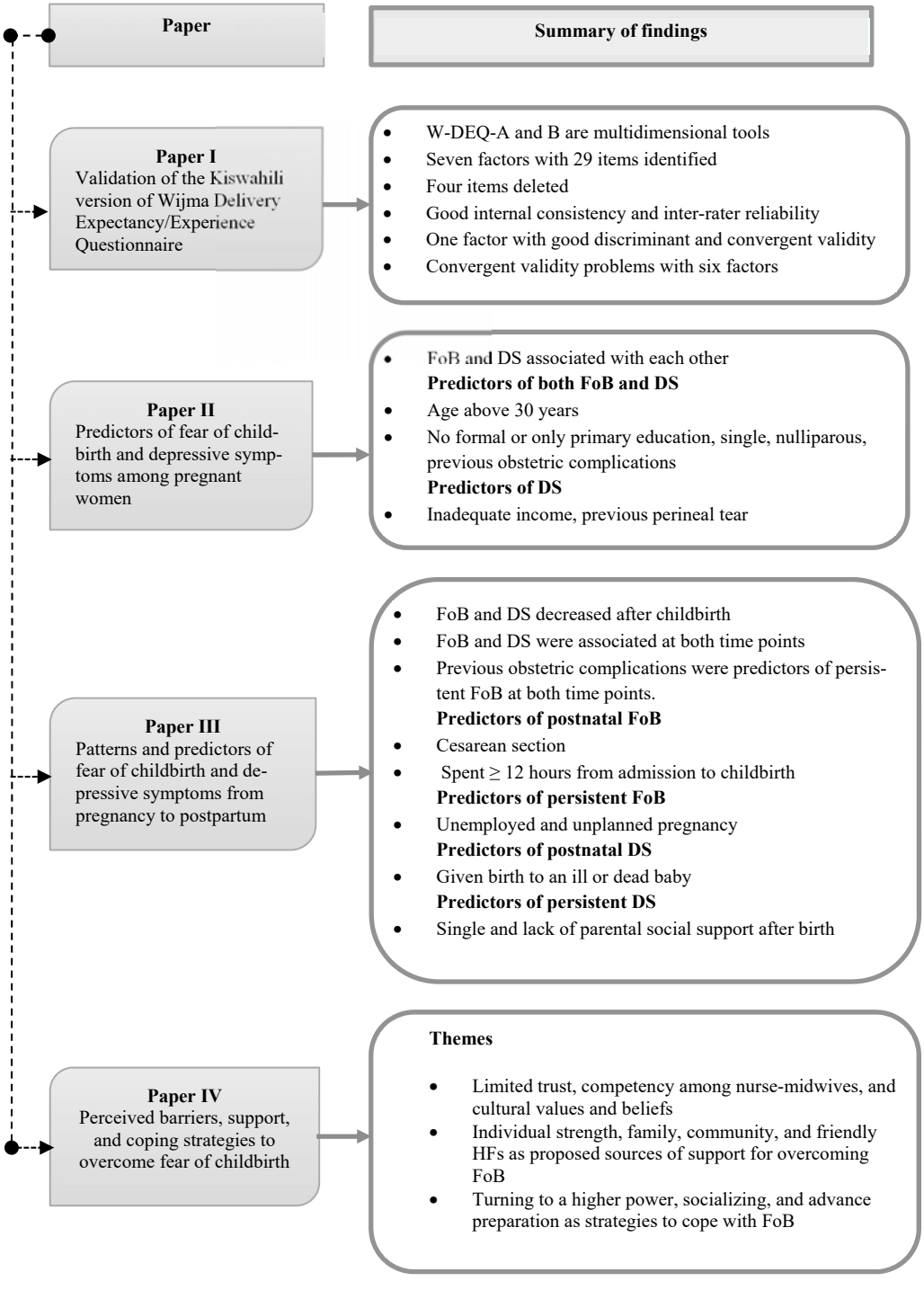

Figure 5. Papers and main findings in this thesis.

A brief description of study participants for Papers I–III is given in Table 3 below.

Table 3. Demographic profile of the study participants.

Profile	Papers I and II (n = 694) n (%)	Paper III (n = 625) n (%)
Median age (IQR), years	26 (11)	26 (24)
Education level		
No formal	137 (19.7)	124 (19.4)
Primary	429 (61.8)	384 (61.4)
Secondary education or higher	128 (18.4)	117 (18.7)
Occupation		
Employed	490 (70.6)	445 (71.2)
Unemployed	204 (29.4)	180 (28.8)
Marital status		
Married	508 (73.2)	450 (72.0)
Not married	186 (26.8)	175 (28.0)
Income		
Adequate	304 (43.8)	268 (42.9)
Inadequate	390 (56.2)	357 (57.1)

Translation, cross-cultural adaptation process, and psychometric properties of W-DEQ (Paper I)

The content validity ratios were within acceptable ranges during the experts' review process. No item was deleted prior to actual data collection. In the Tanzanian context, the items *fantastic (mzuri), funny (kufurahisha),* and *surrender control of the body (kushindwa kudhibiti mwili)* related to labor and childbirth were not comprehensible to most women. The items were revised to get the appropriate Kiswahili phrase. According to the item analysis, women were most fearful about *labor pain* and most *longed for a child*. Labor and childbirth being *funny* scored low. Most likely, the women did not understand the concept, or it was challenging to contextualize the meaning of it. Thirty-three items were subjected to factor analysis, and seven factors were generated. These were fear, lack of self-efficacy, positive anticipation, isolation, concern for the baby/riskiness, negative emotions, and lack of positive behaviors. Four items, *funny (kufurahisha), self-evident (kama ilivyotarajiwa), longing for a child (hamu ya kumpata mtoto),* and *surrender control of the body (kushindwa kudhibiti mwili)*, did not load to any factor, which led to deletion. Confirmatory factor analysis was done to confirm how many items fit in a Tanzanian context. All 29 items were shown to fit the model within the acceptable indices. Both W-DEQ-A and W-DEQ-B, with 33 items, had an internal consistency of 0.83 and 0.85, respectively. The internal consistency

of W-DEQ-A and W-DEQ-B with 29 items was somewhat improved. Both versions showed good discriminant validity. However, convergent validity was only observed in one factor, "Concerns for the baby," indicating problems with convergent validity.

Prevalence and predictors of FoB and DS during pregnancy (Paper II)

The prevalence rates of FoB and DS were 15.1% and 17.7%, respectively. FoB was strongly associated with DS. The predictors of FoB in combination with DS were: age above 30 years, having a lower educational level, being single, being nulliparous, and having experienced obstetric complications. When analyzing predictors for FoB, a low level of education, lack of social support from a male partner in previous childbirth, and having experienced obstetric complications previously were predictors of FoB. Predictors of DS were: lacking formal education, having an inadequate income, being single, and having experienced a perineal tear before the index pregnancy.

Patterns of FoB and DS from pregnancy to postpartum and predictors of developing persistent FoB and DS in women after childbirth (Paper III)

Of 694 pregnant women interviewed, 625 completed the study, and 69 (9.9%) participants were lost to follow-up. Prevalence rates of antenatal FoB and DS were 16% and 18.2%, respectively, while postnatal rates were 13.9% and 8.5%. Both FoB ($p = 0.246$) and DS ($p < 0.001$) decreased after childbirth. The proportion of participants with persistent FoB during pregnancy and postpartum was 6.4%, while 7.5% developed a fear after birth. The proportion with persistent DS was 4.3%, whereas 4.2% developed DS after childbirth.

FoB and DS were associated with each other at both time points. Having experienced obstetric complications was a predictor of both postnatal and persistent FoB. Predictors of postnatal FoB were having given birth by C/S and having spent more at the HF than 12 hours between admission and childbirth. Furthermore, being unemployed and having an unplanned pregnancy were associated with having persistent FoB during pregnancy and after birth.

Participants who gave birth to ill or dead babies were 4.8 times more likely to have postnatal DS. The odds for persistent DS were 2.6 times higher for single women. Additionally, lack of parental social support was a cross-cutting predictor of postnatal and persistent DS.

Perceived barriers, support, and coping strategies to overcome fear of childbirth (Paper IV)

Three themes emerged from the analysis. See Table 4.

Table 4. Themes and categories on barriers, support, and coping strategies to overcoming fear of childbirth.

1. Perceived barriers to overcoming FoB
• Perceived incompetence among nurse-midwives in identifying and managing women with FoB
• Limited trust when sharing information
• Cultural values and beliefs related to pregnancy and childbirth
2. Individual strength, family, community, and friendly HFs as proposed sources of support for overcoming FoB
• Individual women strengths
• Adequate healthcare provision as a source of support for overcoming FoB
• Sufficient social support in overcoming FoB
3. Turning to a higher power, socializing, and advance preparation as strategies to cope with FoB
• Placing hope in a higher power
• Socializing with others
• Advance preparation for birth

Perceived barriers to overcoming FoB

Participants described various circumstances that could prevent women from overcoming FoB. Nurse-midwives stated that they felt they might have missed women with FoB. They said this might have been due to a lack of skills in identifying them during antenatal clinic visits, labor and childbirth, and even postnatal clinic visits. The skills may be in terms of identifying signs shown by fearful women or having knowledge on eliciting historical factors grounded in society or their family. This was attributed to the lack of clear guidelines on identifying women with FoB.

Participants stated that sharing information regarding a woman's fearful situation was only meaningful if they got the right advice and help. In the worst case, information could be shared with a third party without the client's consent. Participants also underlined that some cultural norms prevented women from sharing personal information about pregnancy and childbirth.

Individual strength, family, community, and friendly HFs as proposed sources of support for overcoming FoB

Women's self-confidence was one of the inner supports needed to reduce FoB. Self-confidence relates to a woman's readiness for childbirth and belief in their ability to cope with FoB. Social support from partners, family, and community was essential to overcome FoB. Further support that could help alleviate FoB was provided with good customer care from HCPs, information about birth, including FoB, and a friendly healthcare environment for childbirth with adequate childbirth facilities, privacy, and companions.

Turning to a higher power, socializing, and advance preparation as strategies to cope with FoB

Participants who had experienced FoB described their strategies to cope with it. One was praying and trusting in a higher power. Other participants stated that when they were most afraid, they engaged in community social activities, like women's social gatherings or family activities like farming, as a distractor to avoid thinking about the upcoming childbirth. Preparation for birth was also among the coping strategies for FoB.

Discussion

The studies included in this thesis aimed to assess the magnitude, challenges, and coping strategies to overcome FoB among women during pregnancy and after childbirth. The main findings indicate that the Kiswahili W-DEQ-A-Revised and W-DEQ-B-Revised are reliable multidimensional tools to screen for FoB during pregnancy and after birth in the Tanzanian context. FoB and DS are interrelated, and their prevalence rates decrease from late pregnancy to after childbirth. Women experienced FoB and DS at different time points, some during pregnancy but not after birth, others after childbirth but not during pregnancy, and some at both time points. Women had different strategies to cope with FoB but needed further support from HFs, family, and community. However, they encountered barriers in sharing their concerns regarding FoB, like sociocultural norms surrounding pregnancy and childbirth and HCPs incompetent in dealing with fearful women.

The multidimensional screening for fear of childbirth

Given the 16% and 13.9% prevalence rates of FoB during pregnancy and after childbirth identified in this thesis, there is a need to discuss whether standardized instruments and routine screening for FoB should be considered during the perinatal period. In Tanzania, a clinical practice rarely includes a full evaluation of FoB. The psychometric evaluation of the Kiswahili W-DEQ-A and W-DEQ-B undertaken in this thesis indicates that all versions of the questionnaires are multidimensional. The findings were in line with an increasing number of previous studies highlighting the lack of unidimensionality of the WDEQ-A and W-DEQ-B [51,52,55]. Four items, “longing for a child,” “labor being funny,” “self-evident” and “surrender control of the body,” were eliminated, leaving the final model with 29 items with seven specific dimensions that are hypothetically distinct. This suggests that some items were inappropriate for use to gauge FoB in the research sample. Other studies have also deleted some items, like “funny,” “self-evident,” and “surrender control of the body” [52,182], whereas others have retained all items due to their being correlated [49,57]. The reason could be the translation process from one language to another or the contextualization of what childbirth entails. The seven

subscales in this study were comparable to those in earlier psychometric assessment studies of the W-DEQ, though not identical [52,183].

The seven subscales identified (fear, lack of self-efficacy, lack of positive anticipation, isolation, concern for the baby/riskiness, negative emotions, and lack of positive behaviors) showed good internal consistency, similar to that in other studies [50,56,58]. The low correlations between the Kiswahili WDEQ-A and W-DEQ-B subscales suggest that the subscales measure different aspects of FoB, except only the fear factor (5 items), which had a high correlation with the total scores on the W-DEQ. The findings were consistent with a study in Australia indicating that W-DEQ subscales had differing correlations [49]. The researchers argued that since each subscale was independent, measuring different aspects of the underlying concept of FoB, no total score should be computed to estimate the magnitude of FoB. Combining subscales with low intercorrelations to calculate a total score is pointless, as such a calculation would require that the items in the scale all assess the same underlying construct [49]. However, many researchers have continued calculating total scores for WDEQ-A and W-DEQ-B and using cut-off points based on this score to estimate the presence of FoB [37,43,47].

The "concern for the baby" factor had adequate convergent validity in this thesis. The remaining six factors showed unsatisfactory support for convergent validity, implying that items loading to different factors did not correlate with each other within their latent parent factor. In addition, the findings suggested a good discriminant validity with all factors signifying that elements in the scales shared more variance with their latent variables than with other constructs outside their parent factor [184]. Contrary findings were seen in a study by Takegata and colleagues that revealed good convergent validity of the Japanese W-DEQ with other tools [183]. The discrepancy would be contextually related to how women perceive childbearing. Also, inconsistency in responding between one item and another could have contributed to the difference.

Screening of women during the perinatal period is of paramount importance. However, having a reliable and valid tool would facilitate identifying women with FoB for further help. Globally, the W-DEQ has been questioned concerning its utility in research and clinical practice. Its length and multidimensionality have been of great concern [16,42,65]. The removal of four poorly performing items resulted in a shorter version with 29 items, though its clinical applicability needs to be tested elsewhere in Tanzania. Despite the critiques, the tool has been used to estimate the prevalence rates of FoB and associated factors in many contexts [19,35,38,44].

The continuum of fear of childbirth and depressive symptoms from antepartum to postpartum

Like other studies, those in this thesis revealed that FoB and DS are strongly associated during pregnancy and after birth [10,30,94]. The identified prevalence rates of FoB and DS at both times were fairly similar to global prevalence ranges [135,185,186]. However, they were unstable over time, decreasing after childbirth (Paper II and Paper III). Childbirth being unpredictable could be one of the reasons, as some women might fear the unknown during pregnancy – a fear that might resolve after birth. Contradictory studies have shown that FoB and DS decreased over time [185,187], while others have found that women had more FoB postnatally than antenatally [59]. In some women, FoB and DS did not resolve completely, while others developed FoB and DS after childbirth. These findings highlight the importance of HCPs, particularly nurse-midwives, screening women both during pregnancy and after birth, as FoB and DS can rise at any point during the perinatal period. Clinic-friendly tools and competent HCPs will facilitate identifying and managing women with FoB and DS.

FoB and DS have also been associated with various sociodemographic, obstetric, and birth-related factors. Some factors were distinct to pregnancy or the postnatal period, while others were cross-cutting. As previously seen, being over 30 years old, not having a formal education, and being nulliparous were predictors of FoB combined with DS during pregnancy [13,186,188,189]. For older women, the reason could be that they had been more exposed to the childbirth process, which could have contributed to fear. However, previous studies have shown that both younger and older women [190] and highly educated women [73] are more likely to have FoB and DS. The discrepancies could be due to, e.g., personal resources, cultural, or contextual factors. Inadequate income and previous perineal tearing or episiotomy were found to be more likely to be associated with DS during pregnancy, like in previous studies [104,189].

Moreover, giving birth through C/S and having more than twelve hours pass from admission at HF to childbirth were factors contributing to FoB postnatally. Previous studies support these findings [34,86]. However, some studies have reported FoB as a predictor of C/S childbirth by request [19,21]. Contrarily, previous results have indicated that FoB is associated with a prolonged duration of labor [14,59]. This suggests that FoB can lead to cesarean birth or long labor duration and, conversely, that C/S and length of labor can lead to FoB.

Furthermore, giving birth to an ill or dead baby was a significant predictor of postnatal DS. This could be due to the majority of women longing for healthy babies. These findings highlight the importance of HCPs monitoring labor duration, providing assurance to women, and assisting women and families in meeting their childbirth expectations.

Persistent FoB was more common among unemployed women and those with unplanned pregnancies. Previous studies report that unplanned pregnancies and unemployment contribute to FoB [37,72] or do not do so [64,74]. Lack of parental support was associated with persistent DS. This is supported by previous studies showing that insufficient social support is associated with DS [133,189]. If a pregnancy was not planned, being financially insecure and lacking family support could lead to either FoB or DS from pregnancy through childbirth and after birth if not resolved during pregnancy.

Previous obstetric complications were cross-cutting predictors of both FoB and DS at both time points. Related findings have been shown in previous studies: previous negative birth experience was associated with increased levels of FoB and DS [9,12]. If childbirth expectations and experiences differ markedly and positive expectations are not met, this might contribute to FoB [14,15]. Previous studies indicate primiparous women are less likely to fear childbirth as they have no own birth experiences [32], while multiparous women can refer to positive or negative experiences [29]. Taking a proper history of previous childbirth and screening for FoB is crucial for identifying negative childbirth experiences. Being single was another cross-cutting predictor of both FoB and DS during pregnancy and postnatal DS. Other studies support this finding [37,189].

Coping with fear of childbirth is not without obstacles

Women encountered several barriers to overcoming FoB. One was reported to be incompetent nurse-midwives and lacked formal guidelines to address FoB during the perinatal period. Nurse-midwives declared that they felt a gap in assessing, identifying, and managing fearful women seeking RCH services. A previous study revealed midwives lacked confidence, knowledge, and training to provide mental health support [191]. Another study reported that training midwives to deal with fearful women contributed to decreased FoB [117].

Furthermore, the lack of confidentiality among HCPs, family, and community was another barrier for women to disclose their fears. Women declared that because FoB was uncommon, it was sometimes difficult for them to get the right advice for overcoming the situation. The findings were in line with previous studies indicating that breach of confidential information was among the reasons women did not disclose fears [192]. This highlights the importance of protecting clients' personal information to build trust, so they share their health-related concerns with HCPs and trust others in the community.

Sociocultural beliefs and taboos have roles in dealing with FoB. Some women could not open up to others about what they feared because of norms that pregnancy-related issues were not supposed to be shared with a third party, even if they could get support from that person. Others had superstitions about pregnancy, believing sharing their concerns could endanger their lives.

This shows that FoB is grounded in pregnancy, childbirth, and many other dimensions, including sociocultural norms. Thus, FoB is multifaceted and should be assessed and addressed from multiple perspectives. Similar findings reported that sociocultural beliefs like witchcraft could cause FoB and fear of sharing concerns [193].

As FoB is grounded in multiple dimensions, several sources of support are needed to overcome it. Other studies have also shown that women trusting their capacity for childbirth, having informative support regarding pregnancy from HCPs, having a supportive environment for birth at HFs, and support from their peer group, partner, and family were essential to overcome FoB [65,136,194]. The findings suggest the need for HCPs to empower women with pregnancy-related and childbirth-related information and provide friendly healthcare and facilities for childbirth. This also indicates a need to teach the community, including partners, to provide adequate support to women during the perinatal period.

Women with FoB used various mechanisms to cope with the fearful situation, such as believing in a higher power, undertaking social activities to overcome their fears, and being prepared for childbirth. It has been reported elsewhere that pregnant women with FoB use various avoidance mechanisms to overcome their fears [65,195,196]. Other findings show that women believe childbirth is mainly a biological process that does not require special preparation [194]. This suggests that the perception of childbirth is contextual, and the predisposing factors, the support needed, and coping approaches will likely differ based on the level of fear, economic status, faith and religion, sociocultural aspects, and many other factors. Thus, screening and managing women with FoB should consider different dimensions that might contribute to it.

Interventions to counter fear of childbirth and depressive symptoms

Based on the prevalence, predictors, barriers, and coping strategies for women with FoB and DS described in this thesis, wide-ranging interventions are needed to help women, HCPs, and the community. The management of severe FoB, tokophobia and DS involves a combination of different therapies, medication, social support, lifestyle changes, and adaptations. There have been few well-designed studies to test the feasibility and effectiveness of interventions for women with FoB and DS. Interventions have included psychoeducation, counseling, hypnotherapy, stress reduction, and cognitive behavioral therapy (CBT).

Most interventions have been reported to reduce or eliminate FoB and DS. However, most studies have been done in high-income countries. Among

them was a randomized control trial (RCT) done in Australia to address FoB during pregnancy using a midwife-led psychoeducation intervention on FoB known as BELIEF (Birth Emotions and Looking to Improve Expectant Fear). Trained midwives delivered the package over the phone at 24 and 34 gestational weeks. The telephone counseling sessions reduced the FoB scores for the intervention group [197].

Furthermore, the intervention improved midwives' confidence, knowledge, and skills in counseling women with FoB [198]. Other RCTs have been done in Finland, involving a psycho-educative group therapy developed by Saito et al. [199] and Rouhe et al. [200]. Women were also screened for anxiety and postpartum depression. FoB and birth-related anxiety and concerns decreased in the intensive therapy group [199], and postnatal DS and maternal adjustments improved [200].

Another intervention was performed in Sweden to assess the feasibility of internet-based CBT to treat severe FoB in nulliparous women. The internet-based CBT package encompassed cognitive restructuring, psychoeducation, breathing exercises, imaginary exposure, and relapse prevention. The pre-post results indicated a decrease in FoB, and the intervention helped women during birth. The intervention should be confirmed in RCTs [70].

In Tanzania, an RCT was performed between 2017 and 2019 to evaluate the effect of community health workers on delivering home visit services and conditional cash transfers to address maternal DS. The Hopkins Symptom Checklist-25 was used to screen for DS. Results revealed that the community health worker intervention slightly reduced Hopkins Symptom Checklist-25 scores, with no difference when conditional cash transfers were used [122]. Another cluster RCT in Tanzania was conducted to assess whether prenatal group sessions of problem-solving therapy plus CBT could improve mental health outcomes postpartum for people infected with the human immunodeficiency virus. DS was evaluated using the Patient Health Questionnaire-9 at nine months and six weeks post-childbirth. In the intervention group, there was no significant reduction of DS at nine months but a significant decrease at six weeks postpartum [201].

FoB and DS management require different approaches based on the underlying factors, context, and severity. The greatest challenge is that most interventions have been done in multiple contexts, including Tanzania, using various screening tools, cut-off points, and sometimes involving other medical conditions, making them challenging to implement in different contexts. Still, some of the interventions can be adapted with validated and standardized tools to screen for FoB and DS. It is evident that support is needed for women to overcome FoB.

Methodological considerations

This thesis comprises both quantitative and qualitative data. It has both methodological strengths and limitations, described below.

Quantitative studies

Validity and reliability are the quality measures used in quantitative studies [202].

Internal validity

This concept refers to the extent to which research demonstrates whether the outcome is truly caused by the independent variables. Involvement of Tanzanian experts to provide comments on the translated versions of W-DEQ-A and W-DEQ-B tools was used to ensure that the tools measured the intended construct of FoB in the Tanzanian context. The W-DEQ was translated into Kiswahili since there was no available Kiswahili version when the study plan was established. The translation involved a back-and-forth process between the researchers, experts in the study area, and bilingual experts. The validation of Kiswahili W-DEQ can facilitate its use in future studies. Screening women for prenatal and postnatal DS using the validated Kiswahili EPDS version from Kenya enhanced the internal validity of the studies. However, slight modifications were made to the wording to make the EPDS more suited to Tanzanian Kiswahili.

It was interesting to study and follow the natural course of FoB and DS among pregnant to postnatal women without any intervention to establish its patterns in Tanzanian women. The same tools were used to gather data throughout pregnancy and after birth to increase internal validity. However, the findings might have been affected, and the content of those questions was altered by translating the W-DEQ from English into Kiswahili and changing a few words in the EPDS from Kenyan to Tanzanian Kiswahili.

External validity

This concept concerns the generalizability of the findings to other contexts or relevant settings. Data were collected at six different HFs in two districts to increase the sample's representativeness. The sample size was large enough, with a power of 80%, to ascertain the prevalence rates and predictors of FoB and DS. In addition, rigorous follow-up of study participants resulted in a limited loss to follow-up (9.9%), which contributed to the strength of the studies. Given the nature of HFs and how RCH clinics operated, random sampling was impossible. Instead, participants were recruited through consecutive sampling. Using a non-random sample might limit the generalizability of the findings to other contexts. In addition, not including women with previous or anticipated C/S could also have limited the generalizability of the findings and underestimated prevalence rates. However, the study was conducted in rural areas where the population was homogenous in sociodemographic characteristics like education levels, religion, and economic status. Thus, the findings can be considered for generalizability to other rural areas.

Reliability

This concept refers to if the research methods and tools can produce consistent results multiple times under the same circumstances in the attributes they are intended to measure. Six RAs – nurse-midwives by profession and native Kiswahili speakers – were trained to ensure consistency of data collection. The training focused on the contents of the data collection tools, the use of a visual scale, recruitment of study participants, ethics in data collection, and data collection procedures. Furthermore, developing and using a visual scale was an added advantage to ensure clarity and consistency and avoid differences in explanations. To further enhance reliability, data collection methods and tools were piloted for practicability and applicability in capturing the construct of interest.

Moreover, continuous quality checking of the collected data was done to ensure consistency in filling out the responses, which also helped minimize missing data. The W-DEQ and EPDS are self-reported tools, but in these studies, a face-to-face interview approach was used for data collection. This improved the consistency by eliminating the efforts for participants to fill out responses. On the other hand, this would have resulted in social desirability bias if women adjusted their responses to satisfy the interviewer. This could have led to a slight underestimation of the prevalence rates of FoB and DS.

Ethical challenge

We could not offer further support to women identified as having high FoB and DS in the study. This was because data were analyzed and interpreted

weeks after collection. Another reason was that the instruments employed in this research were primarily for screening and could not be utilized for clinical diagnosis.

A qualitative study

In qualitative research, criteria have been established to judge trustworthiness, such as credibility, transferability, dependability, and confirmability [203].

Credibility refers to confidence in how well data and analysis processes address the intended objective. Several methods were used to capture the multiple realities in the studies. The use of purposive sampling facilitated the selection of rich informants, which enhanced the credibility of the information gathered. To further strengthen credibility, semi-structured interviews were considered the appropriate method to increase participants' descriptions and focus on the research aim. Triangulation of data collection methods, data collection sites, and study participants also increased credibility, as this captured individual and group perspectives from several different contexts. A team coding and systematic data analysis improved credibility by ensuring that interpretation of findings was grounded in the data. Furthermore, peer debriefing and repeated reflections and reviews of data, emerging subcategories, categories, and themes by co-researchers enhanced the credibility of the findings.

Transferability concerns the applicability of findings to other settings. Detailed descriptions of the study settings, participants, and data collection and analysis process will help the readers judge whether the findings and conclusions are transferable to other contexts.

Dependability describes the consistency and stability of the findings over time. Using interview guides for IDIs and FGDs allowed for consistency throughout the data collection process. Also, the same team of HCPs conducted the IDIs and FGDs, to minimize the threats of dependability. Further, the open discussion within the research team to scrutinize the data collection and analysis process promoted consistency in the findings.

Confirmability explains the neutrality of the findings. Using Kiswahili during data collection ensured good interactions between researchers and participants, allowing the participants to describe their perspectives freely. Having researchers from Tanzania and Sweden with regular constructive dialogues strengthened the study. Furthermore, providing examples of the analysis process and describing findings supported with quotes were done to show that the results were grounded in data. Memos and field notes written during data collection, transcription, and coding were used to support the coding and category formation.

Reflexivity

This refers to reflecting on the role of the researchers and their relationships to study participants and how these can influence the outcome of the research process [204]. The author being a nurse-midwife and clinical supervisor of nursing and midwifery students at the HFs, has contributed to the conceptualization of this research. Also, having contextual knowledge was an advantage. On the other hand, this could have negatively affected the research process due to preconceived notions. However, bracketing the researcher's preunderstanding of the research topic during the data collection provided more room for learning from participants. Throughout the process, the author has had an open mind to learn more and understand the participants' points of view.

Conclusions and clinical implications

In this thesis, FoB and DS were found to be prevalent among pregnant and postnatal women in Pwani, Tanzania. Using standardized and validated instruments is essential to identify and assist fearful women needing support. The findings from this thesis indicate that the WDEQ-A and W-DEQ-B are multidimensional. The seven subscales found might provide researchers with a more comprehensive, psychometrically sound instrument to investigate the concept of FoB and the numerous components included in the WDEQ-A-Revised and W-DEQ-B-Revised. Also, the tools showed good reliability and discriminant validity.

Given the prevalence of FoB and DS during pregnancy and after childbirth and that FoB and DS can coexist and occur before or after birth or at both time points, routine screening would benefit women during the peripartum period. FoB and DS were associated with various factors such as previous obstetric complications, perineal tears, C/S childbirth, inadequate social support, being single, having a lower education level, having an insufficient income, and giving birth to an ill or dead baby. In addition, women encountered various barriers like sociocultural norms that prohibited them from sharing pregnancy-related matters outside the family. A lack of both guidelines and midwives' competencies in addressing women with FoB was also among the barriers identified. Adequate healthcare provision and social support were identified as necessary sources of support. Faith in a higher power and advanced preparation for childbirth were individual coping strategies to overcome FoB. Screening would not only benefit those with high levels of FoB and DS but could also be used in personalized care and help HCPs provide the support required by each woman during perinatal care. Integrating mental health components into routine antenatal and postnatal care in Tanzania may be paramount for restoring women's mental health and psychological well-being.

Addressing FoB and DS involves multiple approaches. Screening and identifying women suffering from FoB and DS is vital.

Recommendations for future research

The studies were conducted in a cohort of Tanzanian women using a Kiswahili version of the WDEQ-A and W-DEQ-B. Given the extensive use of the tools, more testing is required in various settings to determine their applicability. Therefore, the author recommends that research into the appropriate cut-off points for clinical judgment based on the revised 29-item, 7-subscale versions (WDEQ-A-Revised and W-DEQ-B-Revised) be performed in multiple clinical settings to enable screening of patients potentially experiencing FoB and detect those at risk. More research into the revised versions is also suggested to fully comprehend how each subscale may contribute to a better understanding of the mental health of women preparing for childbirth.

These studies fall short of exploring the convergent validity of the tools. Additional studies are recommended to determine the association of the revised W-D-DEQ versions with other tools measuring related constructs.

Future research is required to explore factors associated with FoB and DS among women with previous cesarean birth to compare the magnitude of their problems with those of women undergoing spontaneous vaginal childbirth.

The data for this study were collected in the third trimester. Studies including pregnant women in all trimesters are recommended.

Further research is needed on suitable interventions depending on FoB or DS severity and contributing factors. Designing and implementing evidence-based, culturally sensitive interventions and approaches for women with FoB and DS during peripartum care would improve holistic care for all pregnant and postnatal women in Tanzania.

Summary in English

Childbirth experiences are multidimensional and unique for each woman. It is normal to have some apprehension related to upcoming childbirth. However, some women have a severe fear of childbirth (FoB) and depressive symptoms (DS) in response to birth. FoB and DS are associated with an increased rate of elective cesarean section, pharmacological pain relief, obstetric interventions, longer labor duration, low maternal satisfaction with care, and poor mother-newborn bonding. Very little information is available on FoB and its consequences among Tanzanian women. Previous studies have assessed the occurrence of DS, anxiety, and post-traumatic stress disorders in Tanzania, as well as associated factors. Rates differ from region to region. Literature has shown that FoB and DS can be present in the same woman. Limited information has been available about FoB and its association with DS. This thesis, therefore, aimed to assess magnitude, challenges, and coping strategies to overcome FoB before and after childbirth.

The thesis had a mixed-method design. Data were collected before and after childbirth at six health facilities in Mkuranga, Kisarawe, and surrounding communities. For Paper I, a longitudinal study was done following a sequential procedure of translating W-DEQ from English into Kiswahili, with experts providing opinions on the translated version's understandability, relevancy, and ability to capture the elements of FoB. Data were collected from pregnant and postnatal women. Paper II assessed the prevalence rates and predictors of FoB and DS among pregnant women. Paper III determined prevalence rates and patterns of FoB and DS and their predictors from pregnancy to postpartum. Six hundred ninety-four pregnant women were recruited and followed up, and 625 completed the study after childbirth. W-DEQ-A and W-DEQ-B were used to assess FoB during pregnancy and after birth. The Edinburgh Postnatal Depressive Scale was used to screen for DS before and after childbirth. Paper IV used a qualitative approach, including in-depth interviews with postnatal women and traditional birth attendants and focus group discussions with women, men, and nurse-midwives.

These studies showed that W-DEQ was a reliable tool with seven factors and 29 items. Four items were deleted as they did not load to any factor. The prevalence rates for FoB and DS during pregnancy were 16% and 18.2%, respectively, and those after birth were 13.9% and 8.5%. The rates decreased over time from pregnancy to postpartum. Some women developed FoB (7.5%)

or DS (4.2%) after childbirth, while others had persistent FoB (6.4%) or DS (4.3%). FoB and DS were associated with each other. Several factors were associated with FoB and DS at different time points. Having experienced obstetric complications and being single were cross-cutting predictors of both FoB and DS before and after childbirth. Being over 30 years, lacking a formal education, and being nulliparous were predictors of both FoB and DS.

Furthermore, giving birth by cesarean section and spending more than 12 hours from admission to childbirth at a health facility were associated with postnatal FoB, while giving birth to an ill or dead baby was associated with postnatal DS. Women encountered barriers to overcoming fear, such as feeling limited trust about sharing FoB information and having specific cultural values and beliefs related to pregnancy and childbirth. Multiple sources of support were needed to overcome FoB, including adequate healthcare provision and sufficient social support. Women with FoB had strategies to deal with it, such as placing trust in a higher power, socializing with others, and preparing for childbirth.

In conclusion, the studies highlight the multidimensionality of W-DEQ in measuring FoB, FoB, and DS coexist, and several factors are associated with FoB and DS. There is a need for standardized tools for assessing FoB and DS and initiating integrated mental health services during perinatal care. Addressing barriers to overcoming FoB, providing adequate support, and developing culturally sensitive interventions to address FoB and DS during perinatal care are highly recommended.

Summary in Kiswahili

Uzoefu wa uzazi unaambatana na mambo mbalimbali na wa kipekee kwa kila mwanamke. Ni kawaida kuwa na wasiwasi kuhusiana na uzazi ujao. Hata hivyo, baadhi ya wanawake wanapatwa na woga mkali na kuwa na dalili za sonona zihusianazo na uzazi. Woga na dalili za sonona kwa ajili ya uzazi zinahusishwa na kasi ya kuongezeka kwa kujifungua kwa njia upasuaji kwa wanawake kuchagua njia hiyo, kupewa dawa za maumivu wakati wa uchungu na kujifungua, afua za uzazi, muda wa uchungu na kujifungua, kutorizika na huduma ya uzazi na uhusiano hafifu kati ya mama na mtoto mchanga. Licha ya matokeo yatokanayo na woga wa uzazi na dalili za sonona, taarifa chache sana zihusuyo woga wa uzazi na matokeo yake miongoni mwa wanawake wa kitanzania. Tafiti nyingine zilizofanyika Tanzania, walitathimini ukubwa na sababu zinazohusiana na kuwa na dalili za sonona, wasiwasi, na madhara yatokanayo na mtu kupitia uzazi mgumu/wenye changamoto kwa kipindi kilichopita. Bado ukubwa wa tatizo unatofautiana kutoka mkoa hadi mkoa. Tafiti zinaonyesha kuwa woga wa uzazi na dalili za sonona zinaweza kuwepo kwa pamoja kwa wakati mmoja kwa mwanamke mmoja. Kuna taarifa chache za uhusiano kati ya woga wa uzazi na kuwa na dalili za sonona. Kwa hivyo, tafiti hii na chapisho hili lililenga kuangalia ukubwa wa tatizo la woga wa uzazi na kuwa na dalili za sonona na kubainisha vikwazo, na mikakati ya kukabiliana na woga wa uzazi kabla na baada ya kujifungua.

Wakati wa utafiti na andiko hili njia mbalimbali zilitumika kukusanya takwimu. Takwimu zilikusanywa kabla na baada ya kujifungua katika vituo sita vya afya vya wilaya ya Mkuranga, Kisarawe na jamii zinazozunguka maeneo hayo. Utafiti wa I, ulifanyika kwa hatua. Ilianza kwa kutafsiri dodoso la W-DEQ lililokuwa kwa lugha ya kingereza kuja Kiswahil, tukaalika wataalamu kupitia dodoso hilo la Kiswahili kuona kama linaeleweka, linafaaa kupima woga wa uzazi na maswali yakoje na umuhimu wake. Takwimu zilikusanywa kutoka kwa wanawake wajawazito na baada ya kujifungua. Tafiti ya II ilitathmini ukubwa na mambo yanayohusiana/yanayoletelezea wanawake wajawazito kuwa na woga wa uzazi na dalili za sonona. Utafiti wa III ni kubainisha ukubwa wa woga wa uzazi na dalili za sonona, mabdiliko ya viwango vya tatizo na mambo yanayohosiana na woga wa uzazi na dalili za sonona kuanzia wakati wa ujauzito hadi baada ya kujifungua. Wanawake wajawazito 694 walisajiliwa katika tafiti hizi na kufuatiliwa, na 625 walikamilisha utafiti baada ya kujifungua. W-DEQ-A na W-DEQ-B

zilitumika kutathmini woga wa uzazi wakati wa ujauzito na baada ya kujifungua. Dodoso la Edinburgh la kupima dalili za sonona baada ya kujifungua ilitumiwa kuchunguza dalili za sonona kabla na baada ya kujifungua. Tafiti ya IV ilitumia ukusanyaji wa taarifa ya maneno "*qualitative study*" ikijumuisha mahojiano ya mtu mmoja mmoja kwa wanawake baada ya kujufungua na wakunga wa jadi. Pia ilitumia mahojiano katika makundi mbalimbali ikiwemo wanawake kutoka katika jamii, wanaume na wauguzi-wakunga.

Matokeo ya tafiti hizi yalibaini kuwa W-DEQ ni dodoso linaloweza aminika lakini lina vipengele saba mbalimbali na maswali 29 ya kupima woga wa uzazi kabla na baada ya kujifungua. Dodoso la awali lilikua na mawali 33 lakini baada ya uchakataji wa takwimu, maswali manne yaliondolewa kwa sababu yalionekana hayapimi vizuri woga wa uzazi kwa akina mama wa kitanzania. Viwango vya woga wa uzazi na dalili za sonona wakati wa ujauzito vilikuwa kwa asilimia 16 na 18.2, kwa mtiririko huo, na baada ya kujufungua, 13.9% na 8.5%. Viwango hivyo vilipungua kutoka wakati wa ujauzito hadi kipindi cha baada ya kujifungua. Baadhi walikua na woga wa uzazi baada ya kujifungua (7.5% na dalili za sonona (4.2%), huku wengine wakiendelea kuwa na woga wa uzazi (6.4%) na dalili za sonona (4.3%) kwa kipindi chote cha ujauzito na baada ya kujifungua. Woga wa uzazi na dalili za sonona zilihusiana kwa pamoja. Sababu kadhaa zilihusishwa na woga wa uzazi na dalili za sonona kwa nyakati tofauti; hata hivyo, hapakuwa na sababu za kipekee kwa wanawake kuwa na woga wa uzazi na dalili za sonona, lakini baadhi ya sababu zilikua tu kwa wakati wa ujauzito na wengine baada ya kujifungua. Kupitia matatizo ya uzazi kwa uzazi uliotangulia ilikua na uhusiano mkubwa kwa wanawake kuwa na woga wa uzazi na dalili za sonona wakati wa ujauzito na baada ya kujifungua. Kuwa na umri zaidi ya miaka 30, ukosefu wa elimu rasmi, na kutokuwahi kuzaa mtoto vilionyesha uhusiano wa mama kupatwa na woga wa uzazi na dalili za sonona wakati wa ujauzito

Zaidi, kuzaa kwa njia ya upasuaji, na kutumia zaidi ya massa 12 kutoka kulazwa katika vituo vya kutolea huduma ya afya hadi kujifungua kulihusishwa na wanawake kuwa na woga wa uzazi baada ya kujufungua. Kujifungua mtoto mgonjwa au aliyefariki kulihusishwa na kupatwa na dalili za sonona baada ya kujifungua. Wanawake walikumbana na vikwazo mbalimbali katika kukabiliana na woga wa uzazi, kama vile kukosekana kwa uaminifu wa kuwashirikisha watu wengine jambo lao lihusianalo na woga wa uzazi. Pia maadili ya kitamaduni na imani zihusianazo na ujauzito na uzazi ilikua kikwazo pia kwa wanawake kushirikisha watu woga wa uzazi waliokua nao. Misaada mbalimbali ilibanishwa kuhitajika ili wanawake waweze kukabiliana na woga wa uzazi kama vile utoaji wa huduma bora za afya wa kutosha na kupata ushirikiano na misaada ya kutosha kutoka kwa watu mbalimbali. Wanawake walio na woga wa uzazi walikuwa na mikakati yao ya kukabiliana na woga huo, kama vile kuweka matumaini yao kwa aliye juu, kushirikiana na wengine katika jamii na kufanya maandalizi ya uzazi mapema.

Kwa kuhitimisha, tafiti hizi zimeonyesha kuwa dodoso la W-DEQ lina vipengele mbalimbali katika kupima woga wa uzazi kwa akina mama. Woga wa uzazi na dalili za sonona zinaweza kuwa kwa pamoja kwa mwanamke mmoja. Pamoja na mambo kadhaa yanayohusishwa na mwanamke kuwa na woga wa uzazi na dalili za sonona, kujua ukubwa na visababishi vya woga wa uzazi na sonona inaonyesha uhitaji wa kuwa na dodoso lilihakikiwa la kupima akina mama kuangalia uwepo wa woga wa uzazi au dalili za sonona. Pia inaonyesha umuhimu wa kujumuisha huduma ya afya ya akili wakati wa ujauzito, kujifungua na baada ya kujifungua katika huduma zetu za kliniki na mama na mtoto. Tunapendekeza kushughulikia vikwazo wanavyokumbana navyo wanawake katika kupambana na woga wa uzazi, kutoa msaada wa kutosha na kutengeneza mikakati inayoendana na tamaduni za kitanzania ya uboreshaji na kushughulikia matatizo haya kwa akina mama.

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