



## Exploring fear of childbirth in Kenya through evaluation of the readability of Wijma Delivery Expectancy/Experience Questionnaire Version A (W-DEQ-A)

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### ABSTRACT

**Background:** Several tools measuring fear of childbirth (FOC) have been developed in the last three decades, however concerns about their readability have been raised.

**Aim:** To explore the fear of childbirth in a sample of women of reproductive age by evaluating the readability of Wijma Delivery Expectancy/Experience Questionnaire version A (W-DEQ-A).

**Methods:** The Flesch Reading Ease Formula, the Flesch-Kincaid Grade Level, the FOG Scale, the SMOG Index, the Coleman-Liau Index, the Automated Readability Index, and the Linsear Write Formula were used to evaluate the readability of the W-DEQ-A. Also, focus group discussions were held to validate the findings of the readability scales mentioned above.

**Findings:** The SMOG Index (score = 7.6), Coleman-Liau Index (score = 7.6), and the Linsear Write Formula (score = 9.4) were easily readable by women of reproductive age who had at least secondary school education (grade 12). Concerns were raised over some terms used such as *desolate* and *deserted*, which were rarely used in day to day English language conversations.

**Conclusions:** In this study, participants observed that W-DEQ- A was readable if administered to expectant women with a basic secondary school certificate; but there is a need to simplify some words. It was emphasized that societal dynamics play an important role in the fear of childbirth and therefore the questionnaire should address all aspects contributing to fear of childbirth and not merely the feelings and thoughts women may have at the prospect of labor and delivery.

### Introduction

Childbirth is a significant phase in the life of women of reproductive age which is always unpredictable and not well elucidated both theoretically and in the available literature [1–3]. The fears attributed to childbirth may alter the psychosocial well-being of both the expectant women and their infants [4]. As a result, expectant women are continuously diagnosed with mild to severe levels of childbirth fears with studies inferring that about 6–10% of all parturient suffer from a severe fear of childbirth [5–9]. Also, there are fears associated with labor pains and anticipated lacerations either to the expectant women, the infant or both and expectant women who develop severe childbirth fears may

have intensive and uncontrolled anxiety which may lead to complications during childbirth [10]. Existing literature has positively inter-connected childbirth fears with an increased inclination to pharmacological pain relief, increased proportions of inductions, expanded use of oxytocin to accelerate the progression of labor, and augmented preference to elective caesarean section [10–13].

Women who are giving birth for the first time in most instances are diagnosed with higher fear of childbirth (FOC) [1]. Diverse reasons have been underlined by different authors on the aspects prompting expectant women to FOC such as practically young maternal age, low levels of education, socio-economically crestfallen expectant women, fear of pain, psychosomatic distress before and during pregnancy, lack of

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familiarity with childbirth process, lack of psychosocial support, the obstetric outcome of previous childbirth, lived experience of sexual harassment, compromised self-esteem and vulnerability attributed to the societal backdrops of the expectant women [9,14–18].

Several tools measuring FOC have been developed in the last three decades, however concerns of their cogency have been raised since they have not been subjected to a comprehensive analysis of the theory and techniques used in measuring FOC [19]. Equally, the majority of the tools have been developed in specific countries [20] which might be having very exceptional and distinct socio-cultural facets making it challenging to assume their universal applicability. Research has indicated that when such tools are applied from one setting to another without justification, it is probable that the characteristics of interest envisioned to measure may be slanted thereby giving misrepresentative evidence of the real situation [21,22]. There is also a high prospect of not capturing the variables of interest intended since diverse cultures have distinctive ways of interpreting certain phenomena in the realm of reproductive health [23].

The Wijma Delivery Experience/Expectancy Questionnaire version A (W-DEQ-A) is a validated tool that has been used widely to measure childbirth fears and it is considered as a gold standard measure of FOC [24–27]. Many quantitative studies have been undertaken globally using this tool [13,18,20,28], but an assessment of its readability using the available validated readability scales has not been studied widely. To the best of our knowledge, only one qualitative study has been done in the United States of America [29] which employed only one readability test [30].

Readability has been defined as the ease with which an individual deciphers written materials [31]. Several scales have been developed by scholars with mathematical formulas that define the level of reading ability based on the length of words, sentence structure and the complexities of words used in each tool [32].

The objective of the current study was to evaluate the readability of the W-DEQ-A using seven validated readability scales. This was done by running the readability test of the W-DEQ-A in seven readability scales. Also, the study examined the readability and suitability of the tool within a sample of women of reproductive age in Kenya, a developing country where these studies have not been done expansively. The validated readability scales used included: The Flesch Reading Ease Formula [33], Flesch-Kincaid Grade Level [34], FOG Scale [35], SMOG Index [36], Coleman-Liau Index [37], Automated Readability Index [38], and Linsear Write Formula [39].

A detailed description of the used readability tests listed above has been highlighted in the methods section; including their scoring criteria, mathematical formulas and interpretation of the results.

## Methods

### Study design and recruitment and participants

A total of 26 women of reproductive age took part in the current study. The study was in the form of four focus group discussions (FGDs), with participants having relatively homogenous socio-demographic characteristics. The first and second FGDs had seven participants each, while the third and fourth FGDs had six participants respectively. The recruitment was done in four selected geographical locations/residency in Kenya, comprising both urban, peri-urban and rural settings. Information regarding the intended study was shared in various online professional groups of healthcare workers who were asked to identify women of reproductive age who were willing to participate voluntarily and had met the inclusion criteria.

Before participating in the FGDs, the identified women were briefed about the purpose of the study, and those who agreed to participate were given a specific date for the FGDs. This study took place during the COVID-19 pandemic [40] and therefore the meeting would only be held online through the WhatsApp mobile platform. The inclusion criteria for

the study participants were: at least 18 years and not older than 45 years, having at least one successful pregnancy in the last three years, able to read, write and speak in English, and possession of a smartphone with a working WhatsApp application. The first author provided airtime to each of the participants to enable them to purchase data bundles that were needed for the FGDs. Each participant received a recharge card of Kenya shillings 100 (an equivalent of about one US dollar).

The first virtual FGD was held in the morning of 6th of July 2020, the second meeting was done in the afternoon of the same day and the third and fourth FGDs were done in the morning and afternoon of 7th July 2020 respectively. Consent was ensured by accepting to join the online WhatsApp group for the study. We excluded women with a history of miscarriages, perinatal losses and those who had serious maternal medical conditions. Women of reproductive age who did not own a smartphone and those that would not read, speak and write in English were also excluded from the study.

### Data collection procedure and analysis

To evaluate the readability of the W-DEQ-A the authors converted the 33 items in the W-DEQ-A [24] into brief statements in prose form (Table 1). The brief statements were then entered into an online site [41] (<https://readabilityformulas.com/free-readability-formula-tests.php>), which gave a readability score for each of the seven scales that were used. The seven validated readability scales used in this analysis are briefly defined and explained below and Table 2 gives a summary of the

**Table 1**

W-DEQ-A converted into brief statements for readability testing.

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

**Table 2**  
The readability scales and their corresponding scoring matrix.

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

N/A\*\* Not applicable.

scoring matrix of all the seven scales.

- The Flesch Reading Ease Formula:** This has been cited as one of the oldest and most accurate readability formulae used to assess the difficulty of reading passages written in English. It uses the following formula:  $RE = 206.835 - (1.05 \times ASL) - (84.6 \times ASW)$ , where RE = readability ease, ASL = average sentence length and ASW = average number of syllables per word. In this formula, a score between 90 and 100 is considered easily understood by an average fifth-grader, 60 and 70 score is easily understood by eighth and ninth graders respectively; while scores between 0 and 30 are considered easily understood by college graduates [42].
- The Flesch-Kincaid Grade Level:** Different articles refer to this formula with different names such as; Flesch-Kincaid Index, Flesch-

Kincaid Grade Level Score, Flesch-Kincaid Scale, Flesch-Kincaid Score, Flesch-Kincaid Readability Score, Flesch-Kincaid Readability Statistics, Flesch-Kincaid Grade Level Index, Flesch-Kincaid Readability Index, and Flesch-Kincaid readability equation. It employs the following formula:  $FKRA = (0.39 \times ASL) + (11.8 \times ASW) - 15.59$ , where FKRA = Flesch-Kincaid reading age, ASL = average sentence length and ASW = average number of syllables per word. The higher score in this formula is an indication of a lower grade completed and vice versa, for example, a fourth-grader will score between 90 and 100 while a college graduate will score between 0 and 30 [42].

- The FOG Scale:** This formula is also known as the Gunning Fog Readability Formula and/or FOG index. In this scale the mathematical formula used is;  $GL = 0.4 (ASL + PHW)$ , where GL = grade level, ASL = average sentence length and PHW = percentage of hard words. In this formula, the authors concluded that short sentences written in plain English language achieve a robust score compared to long sentences written in complicated language. The ideal score should be either 7 or 8. The scores above 12 are said to be too hard for most people to read [42].
- The SMOG Index:** In this index, a sentence is defined as a string of words punctuated with a period, an exclamation mark, or a question mark. The following formula is used:  $SMOG\ grade = 3 + \text{Square root of polysyllabic count}$ . It is suggested that the more the total polysyllabic word count, the advanced grade level of the reader. A total polysyllabic word count of between 1 and 6 indicates that the text is understood by an average student in grade five and a total polysyllabic word count of 73–90 is suitable for grade 12 readers [42].
- The Coleman-Liau Index (CLI):** In this formula, instead of syllables per word and sentence length, it relies on characters and uses the computerized appraisal to comprehend characters more clearly and precisely. Coleman-Liau Index uses the following formula:  $CLI = 0.0588L - 0.296S - 15.8$ , where L = average length of letters per 100 words and S is the average number of sentences per 100 words. For example, the 10.6 index means that the text is appropriate for a 10–11th grade reader [42].
- Automated Readability Index (ARI):** Just like the Coleman-Liau Index, the ARI relies on a factor of characters per word, and not syllables per word and sentence length. The index is premised on the assumption that the number of characters is more readily and precisely counted by computer programs than syllables. The following formula is used in calculating the ARI:  $4.71 (\frac{\text{character}}{\text{words}}) + 0.5 (\frac{\text{words}}{\text{sentences}}) - 21.43$  where characters are the number of letters [42].
- Linsear Write Formula:** Like many other readability formulas, this was initially designed for the United States Air Force to guide them to compute the readability of their official manuals. The formula is used to calculate the grade level of a text sample based on the length and number of words used in a sentence where there are three or more syllables [42].

After undertaking the readability assessment highlighted above, a qualitative in-depth FGD followed. This was meant to complement and validate the readability assessment. It was envisioned that the study participants would respond to the questions and the findings would be compared with the results of the readability assessment of the W-DEQ-A.

A soft copy of W-DEQ-A in English was sent to the study participants before the start of the FGDs. The participants were required to read all the questions and note down any items/ questions or sentences that were not clearly understood, any difficult/confusing word/words, any statements that were deemed irrelevant and if the questionnaire was readable. They were also asked to make general observations, suggestions, or comments on their understanding of the W-DEQ-A.

**Ethical considerations**

The ethical approval was taken from Jaramogi Oginga Odinga Teaching and Referral Hospital (JOOTRH) Ethical Review Committee (ERC.IB/VOL.1/69).

## Results

### Socio-demographic characteristics of study participants

As indicated in Table 2, a total of 26 women of reproductive age participated in this study. About 38.5% (n = 10) were between the ages of 26–35 and 61.6% (n = 16) were from peri-urban areas. Those with college diploma were 19% (n = 5) while about 23.08% (n = 6) had given birth six months prior to the current study (see Table 3).

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

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

#### Flesch reading ease score

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

#### Gunning FOG Index

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

#### Flesch-Kincaid grade level score

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

#### The Coleman-Liau index

On this scale, the W-DEQ-A had a score of 9; an indication that the

**Table 3**  
Demographic characteristics of study participants.

	Socio-demographic characteristics	Total n (%)
1	<b>Age</b>	
	18–25	9 (34,6%)
	26–35	10 (38,5%)
	36–45	7 (26,9%)
2	<b>Geographical location/residency</b>	
	Rural	7 (26,92%)
	Peri-urban	16 (61,54%)
	Urban	3 (11,54%)
3	<b>Academic level of participants</b>	
	Primary school certificate	5 (19%)
	high school certificate	6 (24%)
	College certificate	5 (19%)
	College diploma	5 (19%)
	Degree graduates	5 (19%)
4	<b>Occupation of participants</b>	
	Causal worker	10 (38,46%)
	Business women	10 (38,46%)
	Permanent employee	6 (23,08%)
5	<b>Parity</b>	
	Given birth 6 months ago	6 (23,08%)
	Given birth 7–12 months ago	10 (38,46%)
	Given birth 13–36 months ago	10 (38,46%)

questionnaire would be read by a reader who has completed one year of secondary (form 1) education systems in Kenya (An equivalent of a ninth grade in the US education system). This scale uses a factor of characters per word and not syllables per word.

#### The SMOG Index

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

#### Automated Reliability Index

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

#### Linsear Write formula

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

#### Readability consensus

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

#### Validation of the W-DEQ-A readability scales through FGDS

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

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

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

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

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

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

Several issues were raised in regards to the general sentence construction, wording and comprehension of specific words. A list of

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

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

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

1. Fear attributed to giving birth after a previous negative birth experience.

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

2. Fears attributed to culturally diverse norms and settings

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

3. Fears attributed to trauma and maternal abuse

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

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

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

5. Fear of loss of life to expectant women

Study participants noted that although the W-DEQ-A mentions fantasies of the child being injured or dying during labor/ delivery, it fails to

ask the same question to pregnant women. Study participants raised concerns about adverse effects following childbirth such as episiotomy, postpartum lower and upper abdomen pains, and postpartum depression which leads to sleeping difficulties, alteration of appetite, disproportionate fatigue, and recurrent mood changes; none of which was investigated in the W-DEQ-A.

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

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

## Discussion

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

In this regard, there was a consensus that the W-DEQ-A was readable by readers who have at least one year of secondary education in Kenya (an equivalent of ninth grade in the US education system). This finding concurs with similar studies that have found most patient materials to be written at a higher grade although it is recommended that they should be aimed at an eighth-grade level or lower [43].

In the current study, the SMOG index produced a readability score of 9 which is an equivalent of readers in their second year of secondary education in Kenya (an equivalent of grade 12 in the US education system) while the Flesch-Kincaid Grade Level Score produced a readability score of 8, an equivalent of a class eight reader in the Kenya education system (grade eight in the US education grading). Similar findings of relatively higher-grade levels when SMOG index and Flesch-Kincaid Grade Level Score are used in a similar text [32].

In the current study, the geographical location of the study respondents did not have an impact on their ability to read and comprehend the items in the W-DEQ-A. This finding echoes studies undertaken in the past [44]. However, this should be interpreted cautiously as the selected study respondents were required to have the ability to read, write and speak in English. A comprehensive quantitative study for more study participants would be recommended.

The study participants identified several items that were missing in the W-DEQ-A that would have contributed to the versatility of the tool. From the FGDs, it was noted that women with a previous history of distressing childbirth experience were more likely to be fearful. This has been reported in similar studies [45,46]. It was also reported by the study participants that trauma and maternal abuse contributed significantly to FOC and in this regard, it would have been valuable to include a question on this thematic area since many studies agree with this finding [47].

Fear attributed to the inability of the body to give birth as a result of low maternal age and underlying health conditions was another valid construct that was reported missing in the W-DEQ-A. The FGDs noted that these fears may have a unique impact on the childbirth process

especially if the underlying health conditions are known. This finding is in agreement with similar studies suggesting that midwives should be able to undertake counselling to expectant women who have underlying health issues and those with young maternal age [46,48].

### Strengths and limitations

The qualitative nature of this research permitted the study team to collect rich data about the FOC experience in a meticulous way. However, it has been criticized that in qualitative research, collected data largely lack randomization and there is a likelihood of bias when providing elucidation. Also, there are limited studies on this subject, more specifically the readability of the W-DEQ-A using the seven listed scales and therefore it was not possible to undertake a comprehensive comparison. The only study that was done in the United States of America did not use the seven readability scales we used in this study and therefore we couldn't compare the current findings with it.

### Conclusion

Study participants from the FGDs noted that childbirth fear is not necessarily individual thoughts or feelings but a more comprehensive phenomenon having many socio-cultural arrays of causal factors. The W-DEQ-A should be enlarged to accommodate new emerging constructs of FOC. Also, there is a need to take into consideration the ability of the study respondents to comprehend the questionnaire since this will greatly contribute to the generation of true positive results. Where possible, the questionnaire should be translated into a language that can be understood by study respondents with ease.

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