

Identifying women who are afraid of giving birth: A Comparison of the Fear of Birth Scale with the WDEQ-A in a large Australian cohort

Author

Haines, HM, Pallant, JF, Fenwick, J, Gamble, J, Creedy, DK, Toohill, J, Hildingsson, I

Published

2015

Journal Title

Sexual & Reproductive Health Care

Version

Accepted Manuscript (AM)

DOI

[10.1016/j.srhc.2015.05.002](https://doi.org/10.1016/j.srhc.2015.05.002)

Rights statement

© 2015 Elsevier. Licensed under the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International (<http://creativecommons.org/licenses/by-nc-nd/4.0/>) which permits unrestricted, non-commercial use, distribution and reproduction in any medium, providing that the work is properly cited.

Downloaded from

<http://hdl.handle.net/10072/106169>

Griffith Research Online

<https://research-repository.griffith.edu.au>

Identifying women who are afraid of giving birth: A Comparison of the Fear of Birth Scale with the WDEQ-A in a large Australian cohort

Haines HM ^{1,2,3}

Pallant JF ²

Fenwick J ^{4,5}

Gamble J ⁴

Creedy DK ⁴

Toohill J ⁴

Hildingsson I ¹

¹ Karolinska Institute

Department of Women's and Children's Health

Stockholm, Sweden.

² The University of Melbourne

Rural Health Academic Centre

49 Graham St, Shepparton,

Victoria Australia

³ Northeast Health

Green St, Wangaratta

Victoria, Australia

⁴ Griffith Health Institute and School of Nursing and Midwifery

Griffith University,

Meadowbrook QLD, Australia

⁵ Gold Coast University Hospital

1 Hospital Boulevard, Southport

Queensland 4215, Australia

Highlights

The Fear of Birth Scale correlates strongly with the WDEQ-A and has high sensitivity and specificity in detecting high fear of birth.

A two item scale to measure fear of birth has greater clinical utility than a 33 item scale.

Introduction

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65

Fear of childbirth has long been the subject of research interest and clinical attention in the Scandinavian countries (1, 2). More recently it has been explored in other parts of the world with focused research now occurring in Australia (3-5). Fear of childbirth is important to understand and respond to as it has been associated with caesarean section on maternal request (6), post traumatic stress disorder (7), increased length of labour (8), negative birth experiences and low satisfaction with care (9).

Some level of apprehension in facing birth is considered normal and adaptive with a spectrum which places women from low levels of nervousness through to severe fear and tocophobia (10). For multiparous women who perceive their previous birth as a negative experience, the fear of a subsequent birth is the most common explanation for their fear and makes intuitive sense to clinicians and researchers alike (3, 11, 12). For nulliparous women, and indeed also for some multiparous women, there are social issues which are predictive of childbirth fear such as suboptimal living circumstances and limited family support (13). In addition, studies of young female university students in Canada who have never been pregnant have uncovered strongly held societal attitudes generated through media that produce a fear of future childbirth (14). Attitudes and beliefs consistent with a view that birth is a natural event have been shown to be protective of childbirth fear (14,15).

The research to date has highlighted that sensitive questioning early in the pregnancy from the midwife or doctor about the presence and the level of fear is extremely important in preparing for the forthcoming birth. Discussing previous experiences also has the potential to uncover deeper and longer term psychological problems that a woman has not previously been able to disclose. Importantly, fear of childbirth is associated with underlying anxiety and or depressive disorders (16, 17) and may therefore be an early clue to the midwife or doctor in uncovering previously undiagnosed mental illness in the antenatal period. Notably childbirth fear is more prevalent in women who have experienced sexual abuse (18, 19). For these women childbirth fear, which is recognized by the health professional and questioned further, may be the first time they have been able to reveal their abuse and seek help.

In clinical practice accurate identification of women who suffer from childbirth related fear is hampered by discrepancies in both definition and measurement. There are conceptual differences in definitions of fear between women and varying cultural perspectives of childbearing per se (20). Inconsistencies in the prevalence and the impact of fear result from heterogeneity in research design, including the measurement tools used and the populations studied. In the Nordic countries fear of birth is estimated to negatively affect 10- 20 % of pregnant women, with between 5-8% of these

1 women experiencing severe or disabling fear (2). Studies from Australia and the United Kingdom
2 indicate that the prevalence of problematic fear may be even higher than in the Nordic countries with
3 26% - 30 % of pregnant women reporting high fear (3, 4). Just what constitutes low fear, moderate
4 fear, high fear, severe fear is a further complication in understanding the prevalence and impact of
5 fear in a consistent, comparable way.
6
7

8
9
10 To date, the most frequently used instrument to identify and measure the construct of fear of
11 childbirth is the Wijma Delivery Expectancy Questionnaire (WDEQ-A) (21). This instrument was
12 developed in the late 1990s in Sweden and has been used in a variety of international research settings
13 (4, 22-25). Findings from studies which use the WDEQ-A vary however in the methodology used to
14 categorise specific levels of fear and consequently there are inconsistencies in identifying which
15 women qualify as being in the problematic group. Some studies for example report the mean score of
16 the WDEQ-A (22), while others report fear as the top quartile of the continuous measure (4, 23).
17 Some studies use scores above a cut-point of ≥ 85 to indicate problematic fear with descriptors
18 ranging from 'high' or 'intense' or 'severe' fear and scores above 100 denoting 'extreme fear' or
19 'very intense' fear (17,26).
20
21
22
23
24
25
26
27

28 It has been suggested that the length of the WDEQ-A may limit its acceptability outside of research
29 settings (16) and that cultural transferability of some items may be doubtful. In English speaking
30 contexts some issues have been shown with the wording of items 28 and 30 – 'funny' and 'self
31 evident' (4,22). The multidimensionality of the WDEQ-A has been explored in several studies with
32 differing factor solutions (4, 22,25). When the WDEQ-A was recently used across six European
33 countries exploratory factor analyses revealed significant differences between the countries in the
34 scores on the six factors extracted, but the total mean WDEQ-A score (with the exception of
35 nulliparous women in Belgium) was similar. The authors concluded the level of fear was comparable
36 but that the content of fear of childbirth may differ between countries (28). This could mean that some
37 women may score high in domains such as *Lack of self-efficacy or Social isolation* for example, with
38 lower scores on the items specific to the domain of *Fear of giving birth*, thus giving them an overall
39 high score which may be more aligned to broader psycho-social problems than a specific fear of
40 childbirth. It might also be argued that, given the multidimensionality of the WDEQ-A, it may not be
41 appropriate to combine each factor score to create a single total score for fear of birth.
42
43
44
45
46
47
48
49
50
51
52

53 In recognising these constraints of measurement and translation, a single visual analogue question was
54 tested by Rouhe et al., and showed good predictive capacity in identifying women with fear of birth
55 when compared to the 33 item WDEQ-A (26). Patient-rated visual analogue scales (VAS) are a
56 clinically useful tool in the measurement of mood and have been used for that purpose for many years
57 (30). The simplicity of these scales promotes high compliance, they are easily understood across
58
59
60
61
62
63
64
65

1 language groups, and they have been shown to be both reliable and valid (31). Rouhe et al's large (26)
2 Finnish cohort study of more than 1300 women demonstrated a good correlation between the single
3 item 10cm VAS and the WDEQ-A with a sensitivity of 97.8% in screening for fear of childbirth
4 (WDEQ-A 100) at the VAS cut point value of 5 with specificity of 65.7%. When the VAS cut-point
5 was increased to 6.0, sensitivity was 89.2% and specificity 76.3% (26). Further development of the
6 idea for a simpler scale led to the use of numeric rating scale (NRS) of childbirth fear in a Norwegian
7 cohort of 1642 women (16). The authors concluded that the use of NRS "may promote high
8 compliance in studies and may, for some purposes, replace the WDEQ-A" (16) p241.
9

10
11
12
13
14 Extending this research, a cross cultural study from Australia and Sweden explored the use of a two-
15 item VAS to measure fear of birth (3). In this study expectant mothers were asked to rate their
16 feelings about the approaching birth by placing a mark on two VAS-scales with the anchors (a) 'calm
17 and 'worried' and (b) 'no fear and strong fear'. The two scores were averaged to create the Fear of
18 Birth Scale (FOBS) with possible scores ranging from 0 to 100. Internal consistency was strong with a
19 Cronbach alpha of 0.91. The construct and known groups validity of the scale was well supported at a
20 cut-point of 50. The FOBS has also been used in a population of Swedish expectant fathers (32). It
21 has been argued that the FOBS is short, intuitive and easy to use clinically, providing a pragmatic tool
22 for midwives and doctors to open a discussion with women about fear of childbirth (3).
23
24
25
26
27
28
29

30 Although the 33-item WDEQ-A is currently the most widely used measure of childbirth fear in
31 pregnant women, there is increasing discussion in the literature that simpler, clinically practical and
32 more culturally transferrable tools may offer a better solution to identifying fearful women in clinical
33 practice. The aim of this study is to compare the two item Fear of Birth Scale (FOBS) (3) with the 33
34 item WDEQ-A (21) in a large sample of Australian pregnant women.
35
36
37
38
39
40

41 **Method**

42 *Design*

43
44
45
46 This study involves secondary analysis of data from a large Australian randomized control trial
47 designed to test the effectiveness of a midwife led psycho-education intervention to reduce childbirth
48 fear – The BELIEF STUDY (33). Pregnant women from antenatal clinics in Queensland Australia
49 were invited to participate in the study. A total of 2,311 women were approached and of these 61% (n
50 = 1,410) were recruited (5). Those who consented completed three self-report questionnaires during
51 their second trimester, 36 weeks of pregnancy, and 4–6 weeks after birth. The questionnaires
52 comprised a variety of screening instruments including the Wijma Delivery Expectancy Questionnaire
53 (WDEQ-A), (21) and the Fear of Birth Scale (FOBS) (3). For more details on the full questionnaire
54 please see Fenwick, Gamble et al (33). The data used for the current study is from time point one
55
56
57
58
59
60
61
62
63
64
65

1 administered to women in their second trimester. The results of the BELIEF study are reported
2 elsewhere (5).

3 4 *Instruments*

5
6 Women were asked to complete demographic data and general information and details regarding any
7 previous births. Self-report of moderate or severe anxiety and/ or depression during this pregnancy
8 was obtained by asking the participants to circle one of the following response options: I am not
9 anxious or depressed, I am moderately anxious or depressed, I am extremely anxious or depressed.
10 Partner support was measured by the following question: How supportive of this pregnancy is your
11 partner? The five response options were: not at all supportive, not very supportive, indifferent, fairly
12 supportive, and very supportive.
13
14
15
16
17

18
19 Childbirth fear was measured with two instruments:
20

- 21
22 1. The 33 item, 6-point Likert scale WDEQ-A questionnaire. Items refer to expectations before
23 birth. The items on the WDEQ-A are summed to give a total score ranging from a minimum
24 score of 0, through to a maximum score of 165. A cut-point of ≥ 85 was used in this study to
25 denote high fear. The wording of two items was modified in line with previous work by
26 Fenwick et al (4). The anchor words on items 28 and 30 relating to the question “*How do you*
27 *imagine it will feel the very moment you give birth to your baby*” were reworded from the
28 original ‘extremely funny/not at all funny’ to ‘extremely enjoyable/not at all enjoyable’ and
29 from ‘extremely self evident/not at all self evident’ to ‘totally as it should be/not at all as it
30 should be’
31
32
- 33
34 2. The two item FOBS (3) where respondents respond to the question: “*How do you feel right*
35 *now about the approaching birth?*” and then place a mark on each of two 100 mm VAS-
36 scales with anchors defined as (a) ‘calm’ and ‘worried’ and (b) ‘no fear’ and ‘strong fear’.
37
38 The two scores were averaged to create a score ranging from 0 to 100, with high scores
39 indicating higher levels of childbirth related fear (3).
40
41
42
43
44
45

46 *Analysis*

47
48 Spearman’s correlation coefficients were used to investigate the associations between scores on the
49 continuous measure of the FOBS and the WDEQ-A. A receiver operating characteristic (ROC) curve
50 was generated to assess the sensitivity and specificity of possible cut-points on the FOBS against the
51 WDEQ-A cut-point of ≥ 85 (high fear). The c-statistic (area under the ROC curve) and an optimal cut-
52 off value were calculated from the Youden index (the maximal sum of sensitivity and specificity)
53 (38). Standard error for the optimal cut-off value was assessed with the bootstrap method. We used
54
55
56
57
58
59
60
61
62
63
64
65

1000 boot strap samples with $p < 0.05$ regarded as statistically significant (36). The sensitivity, the specificity, and the positive and negative predictive values were determined.

Fearful and non fearful women as classified by WDEQ- A (≥ 85) score and the FOBS at the optimal cut-point were compared using Chi Square statistics and Fisher's exact test for differences in demographic, psycho-social and obstetric characteristics. Due to the skewed nature of the data for the self report of mental health and partner support these variables were dichotomized into 'anxiety or depression this pregnancy (moderate, and severe)' and 'no anxiety or depression this pregnancy', while partner support was dichotomized by combining the first three options as 'unsupportive' and the fourth and fifth options as 'supportive'. Data was analysed using SPSS Version 21, IBM©.

Ethics: Ethics approval was obtained from Griffith University and multi-site approval for the three participating Queensland Health hospitals (Gold Coast, Logan and Redlands Hospitals) was received from the Gold Coast Health Service District Human Research Ethics Department.

Results

Participant characteristics

Of the 1410 who responded to the questionnaire, 24 women did not complete the WDEQ-A, 3 did not complete the FOBS and were therefore excluded from the analyses. Table one shows the study population which included nulliparous women ($n = 609$, 43%) and multiparous women ($n = 801$, 57%). Of the most recent previous birth for the multiparous women, 522 (65.4 %) had experienced a normal vaginal birth, had experienced an operative vaginal delivery, 131 (16.3%), 78 (9.7%) had experienced an emergency caesarean and 63 (7.8%) had experienced an elective caesarean. There were no exclusions on the basis of psycho-social, medical or obstetric reasons and participants were representative of Australian birthing women. Detailed characteristics for the 1410 women recruited to the study have been reported elsewhere (5).

Distribution and internal consistency

Scores on the WDEQ-A were normally distributed, ranging from 0 to 128, with a mean score of 49 (SD=22). Scores on the FOBS were positively skewed, with a median of 28, ranging from 0 to 100 with a mean of 33 (SD=25). The internal consistency of both the WDEQ-A and the FOBS in this population was strong with a Cronbach Alpha of 0.94 and 0.91 respectively.

Correlation

The FOBS and the WDEQ-A were strongly correlated with a Spearman correlation co-efficient of 0.66 ($p < 0.001$).

Sensitivity and specificity, positive and negative predictability.

A ROC curve (Figure 1) was calculated to determine the capacity of the FOBS to discriminate women who were or were not classified as being fearful according to WDEQ-A score ≥ 85 . The area under the curve was 0.89 indicating very high sensitivity.

Further analysis of the sensitivity and specificity using a Youden index with bootstrapping (1000 times) was undertaken to determine the optimal FOBS cut-point when compared with the WDEQ-A ≥ 85 . At FOBS cut-point of 54 there was a sensitivity of 89 %, specificity of 79 % and a Youden index of 0.68. The FOBS at cut point ≥ 54 , correctly identified 58 of the 68 women who scored ≥ 85 on the WDEQ-A, giving it a positive predictive value of 85%. The FOBS correctly identified 1040 women of the 1301 women who scored less than 85 on the WDEQ-A giving it a negative predictive value of 79%. This finding is further illustrated by a box plot (Figure 2).

Comparison of the characteristics of women classified as fearful using both instruments

Having established a cut point for the FOBS at ≥ 54 , the characteristics of the women grouped as fearful and non fearful were compared using the two instruments. Nulliparous women were more likely to be fearful than parous women using both the WDEQ-A and the FOBS ($p=0.02$ and $p=0.005$ respectively, Table 2). For the multiparous fearful women, those whose most recent previous birth was an emergency caesarean were the only group associated with being fearful when classified by both the WDEQ and the FOBS ($p=0.02$, $p=0.03$). Being fearful of birth as classified by the FOBS was associated with a preference for a caesarean birth this pregnancy however this was not seen with women identified as fearful using the WDEQ-A (Table 2).

Self reported moderate or severe anxiety or depression this pregnancy was associated with fear when assessed with both the FOBS and the WDEQ-A ($p < 0.001$, $p < 0.001$) (Table 2).

Discussion

The aim of this study was to compare the two item Fear of Birth Scale (3) with the 33 item WDEQ-A (21) in a population of pregnant Australian women. The findings demonstrate firstly that the FOBS and the WDEQ-A are strongly related with a Spearman Correlation Coefficient of 0.66 (39). Secondly, the FOBS at a score of ≥ 54 , has very good sensitivity and specificity in identifying women who were classified as highly fearful using the WDEQ- A. Finally, previously shown characteristics of fearful women such as first time mothers, women who have had a previous emergency caesarean

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65

with their most recent birth and women who report having anxiety and depression during their pregnancy were identified using both instruments.

This study has for the first time anchored the FOBS against the better known WDEQ-A and established a cut-point in relation to high fear as determined by the WDEQ-A \geq 85. For clinicians, the cut-point at which one can ascertain the seriousness of a woman's fear is important. The use of cut-points in screening of any type is vital to guiding clinicians as to when treatment or further investigation may be required. Previous studies using the WDEQ-A have varied in what constitutes a high level of fear (4,22,23) with some denoting high fear at the top quartile score from their sample (4, 23). From a clinical perspective using a top quartile mean score from a previous study for screening is problematic as women could be missed or included relative to the population they belong to. The population of women in this study for example had a lower overall mean score (M=49) on the WDEQ-A than a previously studied population of Australian women (4) where the mean score was 57.8. The decision was made in this study to use the WDEQ-A score of \geq 85 in line with other work (17,26,28) as the level constituting high fear, rather than basing the score on the highest quartile score which is sample specific. As per De Long et al. (38) the area under the curve (AUC) statistics was used to determine overall accuracy of FOBS in identifying these women with 0.89 being a very strong result for the cut-point of 54.

Ideally screening tests correctly identify all people with a condition, and similarly correctly identify all people who are free of that condition. Most clinical tests fall short of this ideal. The FOBS has a sensitivity (true positive) of 89 % and specificity of 79 % (true negative) when compared to the WDEQ-A, with a positive predictive value of 85% and a negative predictive value of 79%. These results compare well with the work of Rouhe et al (26) who also achieved favorable sensitivity and specificity when comparing a VAS instrument with the WDEQ-A and by established standards these results are very acceptable (39. **Notwithstanding, 20 % of participants classified as fearful on the WDEQ-A were not captured by the FOBS and for these women fear not disclosed to a caregiver may have negative outcomes for their experience of pregnancy and birth and their overall psycho-social health.** It is important to remember when comparing the two tests however, that the WDEQ-A is multidimensional (22,25,28). It contains factors other than pure fear of giving birth (e.g. social isolation) (22,25,28). This might explain why there are women that are identified as fearful on the WDEQ-A but not on the FOBS –some women may be socially isolated rather than wholly fearful of birth. **Further research is needed to establish the interaction between the factors of the WDEQ-A and the FOBS.**

When evaluating the use of any test, considerations such as cost, availability, and discomfort need to be considered (40). The FOBS is short and easy to use and could realistically be applied in a busy

1 antenatal clinic situation. It is easily translatable (41) and could therefore be a most useful tool when
2 working with foreign born women whose primary language is not that of their adoptive country.
3 These are important features to consider if the research findings surrounding fear of birth and its
4 detrimental effect on women are to move from empirical studies into the clinical setting. By asking a
5 woman two questions about fear and worry and recording her response on a VAS, the midwife or
6 doctor can discuss the upcoming birth in relation to her level of fear and explore if there are issues,
7 past and present that require therapeutic input. Screening with a short intuitive psycho-social
8 instruments are more likely to be taken up in the routine clinical setting than asking women to answer
9 a longer and more complex tool (40).

10
11
12
13
14
15
16 An important finding of this study is that women who self-reported anxiety and depression were more
17 likely to have high scores on both the FOBS and the WDEQ-A. The presence of anxiety or depression
18 increased the prevalence of fear of childbirth in other studies of pregnant women (16,17,) with
19 Storksens et al (16) further describing that the associations of anxiety and depression were similar
20 when using both a numerical rating scale for measuring fear of childbirth and the WDEQ. Asking
21 about fear of birth may be a useful first step in identifying women with risk factors for underlying
22 mental health problems.

23
24
25
26
27
28
29 There are known groups of women who are more likely to be afraid of giving birth. Consistent with
30 other studies (22,23), nulliparous women were more likely to be in the high fear group than
31 multiparous women measured by both the FOBS and the WDEQ-A. Also in line with previous work
32 (12) was the finding that multiparous women with a previous emergency caesarean were identified as
33 having high fear using both measures. Preferring a caesarean birth this pregnancy was associated with
34 being fearful when using the FOBS, however no association was seen with the WDEQ. This was an
35 interesting finding as earlier studies (6,26) show the strong influence of fear in women's decision to
36 choose CS without medical indication. It was suggested by Toohill et al (5) that women who have
37 been predetermined in early pregnancy to have an elective caesarean have difficulty in completing the
38 WDEQ-A questions as they relate to both labour and birth. The FOBS on the other hand simply asks
39 about the approaching birth. The adapted version of the WDEQ-A which has now been developed for
40 the population of women having an elective caesarean, was not available at the time of this current
41 study (5).

42 43 44 45 46 47 48 49 50 51 52 *Strengths and Limitations*

53
54 A strength of the current study was the large sample of Australian pregnant women who
55 simultaneously completed both the WDEQ-A and the FOBS. In interpreting the results however,
56 some limitations need to be considered such as the modification of several words in the WDEQ-A
57 from the original translation of Swedish to English versions to improve face validity with Australian
58
59
60
61
62
63
64
65

1 women (5). This may possibly change the intent of those questions and influence the results. A further
2 limitation may be that some previous work comparing numeric rating scales of childbirth fear and the
3 WDEQ-A were undertaken with women in their third trimester (16). The data for this study was
4 collected in the second trimester which may influence any comparisons with the earlier study.
5
6
7

8 *Conclusion*

9
10
11 This study supports the use of the FOBS measured with a cut-point of 54, to identify women with
12 high fear based on the WDEQ-A score of ≥ 85 . **When compared with the WDEQ-A in this study, the**
13 **FOBS has high levels of accuracy with better clinical utility.** While more work in other populations
14 of women is recommended to confirm or adjust the cut-point on the FOBS, this study supports the use
15 of the FOBS in clinical practice to help midwives and doctors open a conversation about fear with the
16 women in their care. This may additionally assist in discussing and identifying other mental health
17 issues such as anxiety and depression.
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65

References

1. Areskog B, Uddenberg N, Kjessler B. Fear of childbirth in late pregnancy. *Gynecologic and Obstetric Intervention*. 1981; 12:262-6.
2. Wijma K. Why focus on 'fear of childbirth'? *Journal of Psychosomatic Obstetrics & Gynecology*. 2003;24(3):141 - 3.
3. Haines H, Pallant JF, Karlström A, Hildingsson I. Cross-cultural comparison of levels of childbirth-related fear in an Australian and Swedish sample. *Midwifery*. 2011;27:560-7.
4. Fenwick J, Gamble J, Nathan E, Bayes S, Hauck Y. Pre- and postpartum levels of childbirth fear and the relationship to birth outcomes in a cohort of Australian women. *Journal of Clinical Nursing*. 2009;18(5):667-77.
5. Toohill J, Fenwick J, Gamble J, Creedy DK. Prevalence of childbirth fear in an Australian sample of pregnant women. *BMC Pregnancy and Childbirth*. 2014;14(275).
6. Karlström A, Nystedt A, Johansson M, Hildingsson I. Behind the myth - few women prefer caesarean section in the absence of medical or obstetrical factors. *Midwifery*. 2010;27(5):620-7.
7. Ayers S. Fear of childbirth, postnatal post-traumatic stress disorder and midwifery care. *Midwifery*. 2014;30(2):145-8.
8. Adams SS, Eberhard-Gran M, Eskild A. Fear of childbirth and duration of labour: a study of 2206 women with intended vaginal delivery. *BJOG: An International Journal of Obstetrics & Gynaecology*. 2012;119(10):1238-46.
9. Haines HM, Hildingsson I, Pallant JF, Rubertsson C. The Role of Women's Attitudinal Profiles in Satisfaction with the Quality of their Antenatal and Intrapartum Care. *Journal of Obstetric, Gynecologic, & Neonatal Nursing*. 2013;42(4):428-41.
10. Bewley S, Cockburn J. Responding to fear of childbirth. *The Lancet*. 2002;359(9324):2128-9.
11. Storksén HT, Garthus-Niegel S, Vangen S, Eberhard-Gran M. The impact of previous birth experiences on maternal fear of childbirth. *Acta Obstet Gynecol Scand*. 2013;92(3):318-24.
12. Nilsson C, Lundgren I, Karlstrom A, Hildingsson I. Self reported fear of childbirth and its association with women's birth experience and mode of delivery: A longitudinal population-based study. *Women and Birth*. 2011;16(7):16.
13. Hildingsson I, Nilsson C, Karlström A, Lundgren I. A Longitudinal Survey of Childbirth-Related Fear and Associated Factors. *JOGNN: Journal of Obstetric, Gynecologic & Neonatal Nursing*. 2011;40(5):532-43.
14. Stoll K, Hall WA. Attitudes and Preferences of Young Women With Low and High Fear of Childbirth. *Qualitative Health Research*. 2013;23(11):1495-505.
15. Haines H, Rubertsson C, Pallant JF, Hildingsson I. The influence of women's fear, attitudes and beliefs of childbirth on mode and experience of birth. *BMC Pregnancy and Childbirth*. 2012.

16. Storksens HT, Eberhard-Gran M, Garthus-Niegel S, Eskild A. Fear of childbirth; the relation to anxiety and depression. *Acta Obstetrica et Gynecologica Scandinavica*. 2012;91(2):237-42.
17. Zar M, Wijma K, Wijma B. Relations between anxiety disorders and fear of childbirth during late pregnancy. *Clinical Psychology & Psychotherapy*. 2002;9(2):122-30.
18. Eberhard-Gran M, Slinning K, Eskild A. Fear during labor: the impact of sexual abuse in adult life. *Journal of Psychosomatic Obstetrics & Gynecology*. 2008;29(4):258 - 61.
19. Lukasse M, Vangen S, Oian P, Kumle M, Ryding EL, Schei B. Childhood Abuse and Fear of Childbirth-A Population-based Study. *Birth-Issues in Perinatal Care*. 2010;37(4):267-74.
20. Nilsson C, Bondas T, Lundgren I. Previous birth experience in women with intense fear of childbirth. *JOGNN: Journal of Obstetric, Gynecologic & Neonatal Nursing*. 2010;39(3):298-309.
21. Wijma K, Wijma B, Zar M. Psychometric aspects of the W-DEQ: a new questionnaire for the measurement of fear of childbirth. *J Psychosom Obstet Gynecol*. 1998;19:84 - 97.
22. Johnson R, Slade P. Does fear of childbirth during pregnancy predict emergency caesarean section? *BJOG*. 2002;109:1213 - 21.
23. Zar M, Wijma K, Wijma B. Pre- and Postpartum Fear of Childbirth in Nulliparous and Parous Women. *Scandinavian Journal of Behavioural Therapy*. 2001;30:275-84).
24. Korukcu O, Kukulcu K, Firat MZ. The reliability and validity of the Turkish version of the Wijma Delivery Expectancy/Experience Questionnaire (W-DEQ) with pregnant women. *Journal of Psychiatric & Mental Health Nursing*. 2012;19(3):193-202.
25. Fenaroli V, Saita E. Fear of childbirth: A contribution to the validation of the Italian version of the Wijma Delivery Expectancy/Experience Questionnaire (WDEQ). *TPM Test Psychom Methodol Appl Psychol*. 2013;20(2):131-54.
26. Rouhe HK, Salmela-Aro E, Halmesmaki T, Saisto T. Fear of childbirth according to parity, gestational age, and obstetric history. *BJOG: An International Journal of Obstetrics & Gynaecology*. 2008;116(1):67-73.
27. Zar M, Wijma K, Wijma B. Pre and postpartum fear of childbirth in nulliparous and parous women *Scandinavian Journal of Behavioral Therapy* 2001;30(30):75-84.
28. Nieminen K, Stephansson O, Ryding EL. Women's fear of childbirth and preference for cesarean section – a cross-sectional study at various stages of pregnancy in Sweden. *Acta Obstetrica et Gynecologica Scandinavica*. 2009;88(7):807-13.
29. Lukasse M, Schei B, Ryding EL. Prevalence and associated factors of fear of childbirth in six European countries. *Sexual & Reproductive Healthcare*. 2014;5(3):99-106.
30. Wewers ME, Lowe NK. A critical review of visual analogue scales in the measurement of clinical phenomena. *Research in Nursing & Health*. 1990;13(4):227-36.
31. Ahearn EP. The use of visual analog scales in mood disorders: A critical review. *Journal of Psychiatric Research*. 1997;31(5):569-79.

- 1 32. Hildingsson I, Johansson M, Fenwick J, Haines H, Rubertsson C. Childbirth fear in expectant
2 fathers: Findings from a regional Swedish cohort study. *Midwifery*. 2013.
- 3 33. Fenwick J, Gamble J, Creedy DK, Buist A, Turkstra E, Sneddon A, et al. Study protocol for
4 reducing childbirth fear: a midwife-led psycho-education intervention. *BMC Pregnancy and*
5 *Childbirth*. 2013;13(1):190-.
- 6
7 34. Ryding E, Wijma B, Wijma K, Rydhström H. Fear of childbirth during pregnancy may
8 increase the risk of emergency cesarean section. *Acta Obstetrica Gynecologica Scandinavica*.
9 1998;77(5):542- 7.
- 10
11 35. Youden W. Index for rating diagnostic tests. *Cancer* 1950;3:32-5.
- 12
13 36. Efron B, Tibshirani R, editors. *An introduction to the bootstrap*. New York Chapman & Hall;
14 1993.
- 15
16 37. Dancey C, Reidy J. *Statistics without Maths for Psychology: using SPSS for Windows*.
17 London Prentice Hall; 2004.
- 18
19 38. DeLong D, DeLong D, Clarke-Pearson D. Comparing the areas under two or more correlated
20 receiver operating characteristic curves: a nonparametric approach. *Biometrics* 1988;44:837-
21 45.
- 22
23 39. Kraemer HC. *Evaluating medical tests: objective and quantitative guidelines*. Newbury Park,
24 CA Sage Publications 1992.
- 25
26 40. Austin M-P, Colton J, Priest S, Reilly N, Hadzi-Pavlovic D. The Antenatal Risk
27 Questionnaire (ANRQ): Acceptability and use for psychosocial risk assessment in the
28 maternity setting. *Women and Birth*. 2013;26(1):17-25.
- 29
30 41. Ternstrom E, Hildingsson I, Haines H, Rubertsson C. Higher prevalence of childbirth related
31 fear in foreign born pregnant women - Findings from a community sample in Sweden.
32 *Midwifery*. 2014.
- 33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65

Acknowledgements

The BELIEF study was funded by NHMRC (grant ID APP1025099) and registered with Australian and New Zealand Controlled Trials Registry ACTRN12612000526875, 17th May 2012.

The authors wish to acknowledge the Commonwealth of Australia, University Department of Rural Health Program in support of this work.

Author Contributions

HH drafted the manuscript. HH and JP analyzed and interpreted the data. HH, JP, IH, JT, JF, JG and DC contributed equally to refining the manuscript. JF is CI of the BELIEF study. All authors have read and approved the final manuscript.

Table 1. Participant characteristics n=1410

	n	%
Age (mean, SD)	28 (5.4)	
Born in Australia	1046	74.2
Born elsewhere	325	23.0
Missing	39	2.8
Aboriginal Torres Strait Islander	27	1.9
Educational status		
Did not complete High School	275	19.6
Completed High School only	427	30.4
Diploma Level	374	26.6
Bachelors Degree or higher	330	23.4
Income		
Annual Income >\$78,000 AUD	791	59.1
Annual Income <\$78,000 AUD	548	40.9
Relationship status		
In a relationship	1294	92.0
Not in a relationship	110	8.0
Level of partner support		
Good support	1329	95.5
Poor Support	62	4.5
Parity		
Nulligravida	609	43.0
Multigravida	801	57.0
Mode of most recent previous birth:		
CS emergency	131	16.3
CS elective	63	7.8
Vaginal Birth	522	65.4
Operative vaginal	78	9.7
Unknown	7	0.8
Preferred Mode of Birth		
Vaginal	1220	87.9
Caesarean	168	12.1
Fear of Birth		
WDEQ-A (mean score, SD)	49 (22)	
FOBS (mean score, SD)	34 (25)	
FOBS (median/ range)	28 (0-100)	

Table 2. Participant characteristics for fearful women identified by FOBS and W-DEQ.

	W-DEQ < 85	W-DEQ ≥85		FOBS <54	FOBS ≥ 54	
	n %	n %	p-value	n %	n %	p-value
Age Groups			0.9			0.9
≤20	73 (5.5)	5 (7.3)		61 (5.0)	19 (5.7)	
21-40	1224 (93)	62 (91.0)		991 (93.0)	310 (93.0)	
41 +	20 (1.5)	1 (1.5)		16 (2.0)	4 (1.3)	
Educational status			0.14			0.5
Did not complete secondary school	663 (50.5)	28 (41.2)		537 (50.4)	160 (48.0)	
Completed secondary school or higher	651 (49.5)	40 (58.8)		529 (49.6)	172 (52.0)	
Relationship status			0.3			0.3
In a relationship	1208 (92.0)	65 (96.0)		987(92.6)	300(90.6)	
Not in a relationship	104 (8.0)	3 (4.0)		79 (7.4)	31 (9.4)	
Level of Partner support			0.13			0.11
Poor support	55 (4.0)	6 (9.0)		42 (4)	20 (6.0)	
Good support	1246 (96.0)	61 (91.0)		1013 (96)	308 (94.0)	
Parity			0.02			0.005
Nullipara	565 (43.0)	39 (57.4)		440 (41.2)	169 (50.7)	
Multipara	753 (57.0)	29 (42.6)		629 (58.8)	164 (49.3)	
Emergency CS most recent previous pregnancy (multiparas)			0.02			0.003
Yes	114 (15.0)	9 (31.0)		90 (14)	40 (24.0)	
No	639 (85.0)	20 (69.0)		539 (86)	127 (76.0)	
Preferred mode of birth this pregnancy			0.5			< 0.001
Vaginal	1157 (89.0)	56 (86.2)		956 (91)	258 (79.4)	
Caesarean	143 (11.0)	9 (13.8)		99 (9)	67 (21.6)	
Self Report Mental Health Status			< 0.001			< 0.001
Anxiety or depression this pregnancy (moderate or severe)	213 (16.2)	34 (50.0)		128 (12)	126 (38.0)	
No anxiety or depression this pregnancy	1102 (83.8)	34 (50.0)		939 (88)	206 (62.0)	

Chi Square, 95% confidence

Figure 1. ROC curve for using FOBS as a predictor for $WDEQ \geq 85$

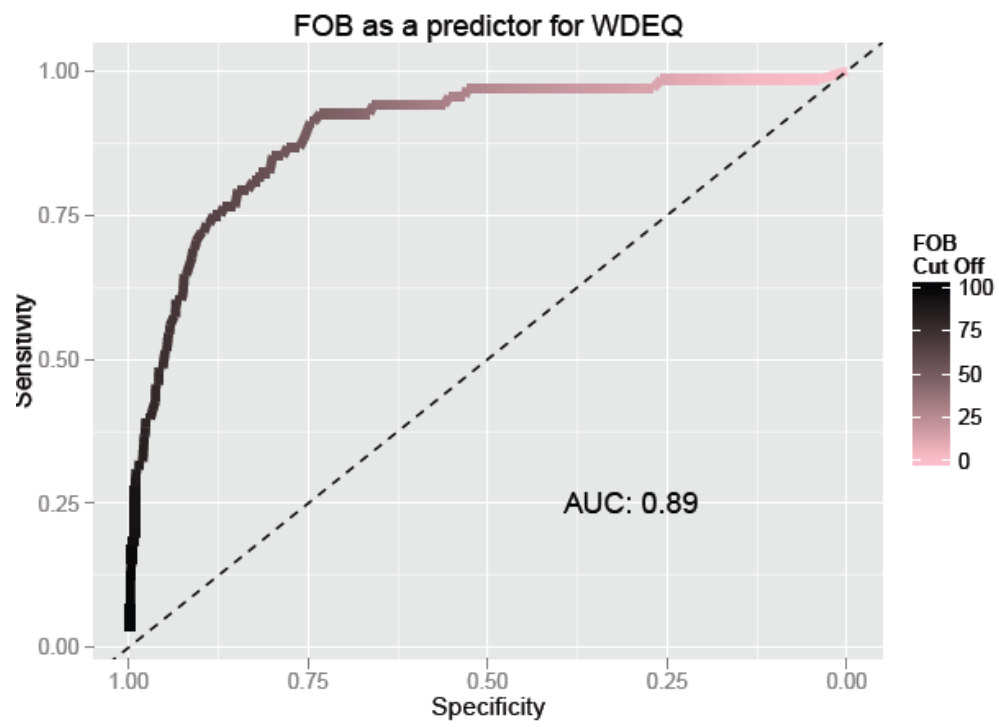


Figure 2. Box plot of scores on the FOBS for women above and below the WDEQ-A cut point of ≥ 85 showing a horizontal line at FOBS cut point of 54

