CORA Cork Open Research Archive
Cartlann Taighde Oscailte Chorcaí

Title	Pregnancy outcomes in women with severe fear of childbirth
Authors	O'Connell, Maeve A.;Leahy-Warren, Patricia;Kenny, Louise C.;Khashan, Ali S.
Publication date	2019-03-14
Original Citation	O'Connell, M. A., Leahy-Warren, P., Kenny, L. C. and Khashan, A. S. (2019) 'Pregnancy outcomes in women with severe fear of childbirth', Journal of Psychosomatic Research, 120, pp. 105-109. doi: 10.1016/j.jpsychores.2019.03.013
Type of publication	Article (peer-reviewed)
Link to publisher's version	http://www.sciencedirect.com/science/article/pii/S0022399918310365 - 10.1016/j.jpsychores.2019.03.013
Rights	© 2019, Elsevier Inc. All rights reserved. This manuscript version is made available under the CC BY-NC-ND 4.0 license. - https://creativecommons.org/licenses/by-nc-nd/4.0/
Download date	2026-09-14 21:21:49
Item downloaded from	https://hdl.handle.net/10468/7760

UCC
University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

Abstract

Objective

To compare pregnancy outcomes for women with and without severe fear of childbirth (FOC) reported in the second trimester of pregnancy.

Methods

In a prospective cohort study, 389 singleton pregnancies were followed up using medical records of participants in a study investigating FOC in Cork, Republic of Ireland. FOC was measured using the Wijma Delivery Experience Questionnaire Part A (W-DEQ A). Severe FOC was defined as W-DEQ A ≥85, moderate FOC, W-DEQ-A 66-84 and low FOC, W-DEQ A 0-65. Outcome measures were birthweight, birthweight centile, gestational age, and Apgar scores at 1 minute and Apgar at 5 minutes. Linear regression was used to assess the association between FOC and each outcome measure with adjustment for maternal age, smoking, parity and marital status.

Results

There was no statistically significant difference in mean birthweight (mean difference = -0.03; [95% CI: -444.69, 315.82]), mean birthweight centile (mean difference= 0.03; [95%CI: -15.97, 23.53]), or mean gestational age (mean difference= -0.06; [95%CI: -11.69, 4.82]) in women with severe FOC (n=18) compared with women with low FOC (n=371). In the adjusted models, there was only a slight correlation between severe FOC and Apgar scores at 1 minute (mean difference= -0.09 [95%CI: -1.28, 0.32]) and Apgar scores at 5 minutes (mean difference= -0.18 [95%CI: -1.16, 1.08]).

Conclusion While a slight association was noted between severe FOC and Apgar scores, overall findings are reassuring and could inform educational interventions which may alleviate FOC. Awareness of FOC for health care professionals is vital to consider women's mental well-being.

Keywords

Pregnancy, fear of childbirth, tocophobia, outcomes, epidemiology

Introduction

Fear is a primal and basic emotion experienced universally [1]. Fear exists on a spectrum, ranging from worries and minor fears, to high fear, and severe phobia[2]. Pregnant women often experience worries and fear, including fear of childbirth (FOC). Severe FOC impacts women's experience of pregnancy, manifesting in sleep disturbance and physical complaints [3-5]. A Swedish study reported that 80% of pregnant women express some level of FOC, thus it could be considered normal [6], but a recent meta-analysis suggested that up to 14% of pregnant women could experience severe FOC worldwide [7].

FOC is categorised under the general umbrella of anxiety disorders in pregnancy [8] but is considered a psychological domain in its own right [2]. A meta-analysis [9] examining the difference between trait fear and trait anxiety concluded that fear has a distinct neurological mechanism, separate from anxiety and is, therefore, a separate emotion. Thus, various tools exist specifically to measure FOC [7]. The Wijma Delivery Experience Questionnaire Part A (W-DEQ A) with a cut-off greater than 85 defining severe FOC is considered the gold standard [10]. Psychometric analysis of the W-DEQ A [11] indicated the optimal cut-off value of 85 to detect fear of childbirth which is clinically relevant according to the psychiatric DSM-5 diagnosis of fear of childbirth with 100% sensitivity and 93.8% specificity in an Italian longitudinal study of nulliparous women (n=106).

Only one study to our knowledge previously examined the relationship between FOC and pregnancy outcomes [12]. Rather than using the validated tool (the W-DEQ A) to assess women's FOC levels, the previous study [12] was conducted by defining FOC using the International Classification of Diseases code O99.80, a code allocated to women who attended dedicated clinics for FOC using data from the Finnish Medical Birth Register to look at all singleton births during the period 1997 to 2010 (n=788, 317). Findings of this study concluded

that both nulliparous and multiparous women with FOC had an association with lower incidence of low birthweight, small for gestational age babies, preterm birth and low Apgar score at one minute [12]. While this study was large, the definition of FOC used in the study is a limitation, since it restricts the results to those who were diagnosed or who requested a Caesarean and were thus referred to phobia clinics and excluded those who attended primary care. It is possible that a true association was not captured due to an underestimation of the incidence of FOC using the ICD-10, thus using the W-DEQ A ≥85 is a more robust definition.

We hypothesise that severe FOC may have an adverse impact on pregnancy outcomes. Various factors may contribute to the possibility of adverse pregnancy outcomes in women with FOC. FOC may be associated with increased risk of Caesarean Section [13], unintended pregnancy, intimate partner violence [14] and a history of sexual abuse (adult or childhood) [15, 16]. Some evidence proposes there is a relationship between a history of childhood sexual abuse and preterm birth [17], and intimate partner violence has been correlated with low birthweight and preterm birth [18]. Moreover, unintended pregnancy could mean that women are less likely to have modified lifestyle behaviours such as smoking and alcohol consumption in early pregnancy, which are well-established as deleterious [19]. Therefore, the aim of this study was to compare the risk of adverse pregnancy outcomes for women with severe FOC as measured using W-DEQ A≥85 during pregnancy compared to women with lower levels of FOC.

Materials and Methods

This was a prospective cohort study of 389 women recruited in a maternity unit in the Republic of Ireland. The study primary aims were to establish the prevalence and risk factors of FOC in an Irish context [20]. A convenience sample of women attending routine antenatal care were recruited by a research midwife undertaking doctoral studies, and by undergraduate students, who were trained by the midwife to recruit participants, in 2015 and 2016. Findings and full

recruitment details are published elsewhere [20]. Full ethics approval was obtained from the Cork Research Ethics Committee for the Teaching and Learning Hospitals [ECM 4 (06/01/15) and ECM 3 (03/03/15)].

Inclusion criteria were; pregnant women ≥ 18 years, 12-24 weeks' pregnant and booked to give birth in a large university-based tertiary maternity hospital (approximately 8,000 births annually). Exclusion criteria were; women who self-determined they had insufficient English to independently carry out the Questionnaire. Questionnaires were completed in clinics, after research assistants gained written informed consent. Women were invited to provide their medical records number to allow follow-up. Each woman completed a questionnaire including socio-demographic and obstetric questions and the W-DEQ A. The W-DEQ A [10] consists of 33 questions using a Likert scale. A total score was calculated; with scores between 0 and 165 possible, scores 0-65, low fear, ≥66, moderate fear, and a score ≥85 defining severe FOC [4, 10]. In Ireland at the time of the study, there were no phobia clinics available to women with FOC and a formal diagnosis of FOC would be unusual due to a lack of awareness of perinatal mental health [21].

Of 690 women invited to participate, 451 gave consent to postnatal data collection (65%). Women who had incomplete W-DEQ A scores (n=29), stillbirths (n=2) and miscarriages (n=1) were excluded due to incomplete datasets, and 21 women were lost to follow-up. For the final analysis we excluded twin pregnancies (n=9), limiting to singleton pregnancies, in order to increase homogeneity of the sample. Stillbirth was defined per the World Health Organisation (WHO) definition [22] as the birth at, or after 28 weeks gestation of a baby with no signs of life. Although there are various definitions of miscarriage, in this study, miscarriage was defined as spontaneous fetal loss, from conception to 24 completed weeks gestation [23]. The final study population consisted of 389 women.

Pregnancy outcome data were extracted from medical records by hand, directly from medical records where possible, or from delivery logbooks and e-health record (Maternal and Newborn-Clinical Management System) as necessary in July 2017. Birthweight centiles were calculated using a customised centile calculator for Irish mothers [24]. Outcome data were entered into a secure encrypted SPSS file by the first author.

The following pregnancy outcomes were investigated for their association with severe FOC; birthweight in grams, birthweight centile, gestational age in days, and Apgar scores at 1 minute and 5 minutes.

Statistical analysis was performed using SPSS Version 22.0 Software programme (Chicago, USA). Continuous variables were tested for normality using histograms and box plots, and described using means and standard deviation (SD) if normally distributed, and median and interquartile range (IQR) if not normally distributed. Due to non-normal distribution of the data, a non-parametric technique (Kruskall-Wallis test) was used to test the hypothesis in relation to Apgar scores. Analyses were conducted separately for nulliparous and multiparous women to investigate outcomes in each group. A linear regression model was performed to investigate the relationship between antenatal experience of FOC and neonatal outcome (birthweight, birthweight centile, gestational age, and Apgar scores). Models were adjusted for potential confounding factors: maternal age (<35 years vs >=35 years), marital status (partner vs no partner), smoking (smoker vs non-smoker) and parity (nulliparous vs multiparous). Results were reported using the mean difference and 95% confidence intervals (CIs). For the comparison of normally distributed continuous variables, the independent t-test was used and Mann-Whitney U Test was performed for non-normally distributed data. An overall significance level $p \leq 0.05$ was considered to be statistically significant and $p \leq 0.05$ also considered significant for individuals mean difference of each analysis.

Results

In the final cohort, eighteen women (4.6%) had W-DEQ A ≥85, 103 (26.5%) women had W-DEQ A ≥66, and 268 (68.9%) women had W-DEQ A ≤65. Mean W-DEQ A score for the whole sample was 55.42 (SD= 18.43). Women under 25 years had the highest mean W-DEQ A score (60.53, SD=17.72). Married women had a lower mean W-DEQ A score (54.87, SD=18.37) when compared with single women (60.52, SD=18.49). Nulliparous women had a higher mean W-DEQ A score (59.17, SD=16.64) when compared with multiparous women (52.93, SD=19.73). There was no difference in mean W-DEQ A score in women with no pregnancy loss (55.67, SD= 17.96) versus those with one pregnancy loss (55.71, SD= 17.79). Women with two or more pregnancy loss had a slightly lower W-DEQ A score (53.24, SD=22.49).

The mean birthweight in the total sample was 3521g (SD=542.41), mean birthweight centile was 44.86 (SD=29.04), median gestational age was 279 days (IQR=12), median Apgar score at 1 minute were 9.00 (IQR=1) and Apgar score at 5 minutes were 10.00 (IQR= 1) (Table 1). In the exposure group (W-DEQ A≥85), birthweight, mean gestational age, Apgar score at 1 minute and Apgar score at 5 minutes were similar overall (Table 1). There was an increase in the mean birthweight and birthweight centile for nulliparous women with severe FOC (n=7), 3786g (SD=415.19), 45.59 (SD=24.39), in comparison with nulliparous women with low exposure 3386g (SD=562.08), 36.17, (SD=25.97), but the number of women in this group is too small to be reliable. Apgar score at 1 minute and Apgar score at 5 minutes were similar in all groups except the severe FOC group, which had a mean Apgar score at 1 minute of 8.11 and mean Apgar score at 5 minutes of 9.11.The results of the linear regression showed a significant correlation between the exposure (severe FOC) and Apgar scores at 1 minute (mean difference= -0.09 [95%CI -1.28, 0.32]) and Apgar scores at 5 minutes (mean difference= -0.18 [95%CI: -1.16, 1.08]) when adjusted for possible confounders (Table 2).

When labour and delivery outcomes were compared for women with W-DEQ A≥85 versus those with W-DEQ A 0-84, there was no statistical difference in use of epidural analgesia, induction of labour or Caesarean Section (Table 3).

Discussion

Overall, there was no evidence of an association between FOC and birthweight, birthweight centile, or gestational age. There was a statistically significant difference in relation to severe FOC and Apgar scores however, this association is not clinically relevant. This study rejects our hypothesis that there is an association between antenatal experience of severe FOC and adverse pregnancy outcomes.

One possible explanation of this finding that FOC may not be associated with negative outcomes is that women have increased opportunities during the second trimester to ask doctors and midwives questions, which may alleviate FOC and provide reassurance, rather than earlier on in pregnancy, when typically women have few antenatal appointments.

Only one previous study [12], to our knowledge investigated a relationship between FOC and pregnancy outcomes. Our study confirms the findings of this large population-based epidemiological study [12] conducted using the Finnish Medical Birth Register which found no relationship between severe FOC and pregnancy outcomes.

Strengths and Limitations

The main strength of the present study is that, to our knowledge, it is the first to investigate FOC and pregnancy outcomes using the W-DEQ A.

Data were complete for the majority of variables. Study limitations must be acknowledged. The W-DEQ A was measured once, in the second trimester, but FOC may be triggered at any point during pregnancy, thus a study which measured FOC in the first and/ or third trimester

may find different results. The study used a convenience sample which limits the generalizability of the findings. The sample consisted of mainly Caucasian women, therefore a study including a more heterogeneous sample or women with a different ethnicity may result in different findings. The analysis was not adjusted for potential confounding factors related to pregnancy complications or high risk pregnancy. It must be acknowledged that the number of women with severe FOC in the sample were small (n=18), therefore the study was not adequately powered which led to wide confidence intervals. However, the prevalence of women with FOC (4.3%) in this study is similar to the findings of previous studies in other countries which also found a prevalence of approximately 5% [7]. Finally, the Finnish study [12] reported other pregnancy outcomes which we did not, such as incidence of low birthweight (<2500g), and small for gestational age babies.

Conclusions

This study suggests maternal exposure to severe FOC in the second trimester of pregnancy has no adverse impact on birth weight, birth weight centile, and gestational age or Apgar scores. Findings of this study are reassuring and may be useful to inform women and clinicians, adding to our limited understanding of severe FOC in an Irish context, highlighting similarities between Finnish and Irish populations. Awareness of FOC in health care professionals is vital to integrate management of FOC in antenatal care and enhance emotional support for women, which may result in a reduction in medical interventions and Caesarean Section rates. Further research should focus on investigating pregnancy outcomes in othr countries and in different ethnic groups. In addition, future studies should evaluate the pregnancy outcomes of women with FOC in the first or third trimester.

Conflicts of interests

The authors have no potential conflicts of interest to disclose. The authors have no financial relationships relevant to this article to disclose.

Acknowledgements

We are grateful to all the participants who made the study possible. The author would like to acknowledge the following students from the Dept. of Epidemiology and Public Health at University College Cork who worked on the project in 2015/2016; Kristina Mendelis, Nicola Kelleher, Eimear Carr, Stefanie Boehm, from Johannes Gutenberg University Mainz, as well as Dr Michelle McCarthy from the Dept. of Obstetrics and Gynaecology at University College Cork for their support.

Maeve O'Connell, Prof Louise Kenny, Dr Ali Khashan and Dr Patricia Leahy-Warren conceived and designed the study. Maeve O'Connell recruited participants, collected the data and performed the analysis with advice from Dr Ali Khashan. All authors read and contributed to the manuscript. This study was carried out as part of doctoral studies at The Irish Centre for Fetal and Neonatal Translational Research (INFANT Centre), which is supported by Science Foundation Ireland (grant no. 12/ RC/ 2272)

Table 1. Gestational age, birthweight, birthweight centile and Apgar scores and antenatal experience of fear of childbirth

Variable	Gestational Age, days median, IQR (n)			Birthweight, g mean, SD (n)			Birthweight centile mean, SD (n)			Apgar at 1 minute median, IQR (n)			Apgar at 5 minutes median, IQR (n)		
	Total Sample	Nulliparous women	Multiparous women	Total Sample	Nulliparous women	Multiparous women	Total Sample	Nulliparous women	Multiparous women	Total Sample	Nulliparous women	Multiparous women	Total Sample	Nulliparous women	Multiparous women
Overall Sample W-DEQ 0-165	279, 12 (389)	281, 14 (120*)	278, 10 (266)	3521± 542 (389)	3422±553(122)	3568± 532 (266)	45±29 (389)	36±6 (120*)	49±29 (265*)	9., 0 (389)	9, 0 (122)	9, 0 (264*)	10, 1 (389)	10, 1 (122)	10, 1 (264*)
Low Exposure W-DEQ A 0-65	278, 11 (268)	280, 15 (76*)	277, 10 (189)	3529± 562 (268)	3387±600 (78)	3590± 537(189)	46±29 (268)	36±26 (76*)	50±29 (189)	9, 0 (268)	9, 0 (78)	9, 0 (187*)	10, 1 (268)	10, 0 (78)	10, 1 (187*)
Moderate Exposure W-DEQ A 66-84	280, 11 (103)	284, 12 (37)	278, 11 (65*)	3492± 478 (103)	3427±448 (37)	3529± 494 (66)	40±29 (103)	33±26 (37)	44±30 (65*)	9, 0 (103)	9, 0 (37)	9, 0 (66)	10, 1 (103)	9, 1 (37)	10, 1 (66)
Exposure W-DEQ A 85-165	281, 16 (18)	285, 8 (7)	274, 26 (11)	3566± 609 (18)	3788±415 (7)	3425± 686 (11)	54±28 (18)	46±24 (7)	60±30 (11)	9, 1 (18)	9, 0 (7)	9, 1 (11)	9, 1 (18)	9, 1 (7)	9, 1 (11)

SD=Standard Deviation, W-DEQ A= Wijma Delivery Experience Questionnaire Part A, *=missing data

Table 2. Results of linear regression predicting gestational age, birthweight, birthweight centile and Apgar score

Variable **N**	**Gestational Age, days**		**Birthweight, g**		**Birthweight Centile**		**Apgar at 1 minute**		**Apgar at 5 minutes**	
	Co-efficient (95%CI)		Co-efficient (95%CI)		Co-efficient (95%CI)		Co-efficient (95%CI)		Co-efficient (95%CI)	
	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted
Overall Sample **(continuous)** **W-DEQA 0-165** **N=389**	0.04 (-0.09, 0.14)	0.06 (-0.03, 0.10)	0.12 (-1.94, 9.69)	0.02 (-2.39, 3.48)	0.11 (-0.11, 0.45)	-0.11 (-0.18, 0.14)	-0.04 (-0.01, 0.01)	-0.06 (-0.01, 0.01)	0.36 (-0.01, 0.01)	-0.09 (-0.01, 0.01)
Low Exposure **W-DEQ A 0-65** **n=268**	-	-	-	-	-	-	-	-	-	-
Moderate Exposure **W-DEQ A 66-84** **n=103**	0.08 (-2.23, 6.43)	0.11 (0.27, 5.54)	-0.09 (-305.61, 92.91)	-0.03 (-161.42, 83.87)	-0.14 (-19.68, 1.01)	-0.10 (-13.29, -0.18)	0.06 (-0.27, 0.56)	0.04 (-0.15, 0.36)	-0.07 (-0.34, 0.14)	-0.02 (-0.18, 0.11)
Exposure **W-DEQ A 85-165** **n=18**	-0.06 (-11.69, 4.82)	-0.06 (-8.75, 2.37)	-0.03 (-444.69, 315.82)	0.02 (-210.22, 305.13)	0.03 (-15.97, 23.53)	0.07 (-4.14, 23.51)	-0.09 (-1.28, 0.32)	-0.11 (-1.16, -0.08)	-0.18 (-1.03, -0.12)	-0.16 (-0.81, -0.19)

Table Legend: W-DEQ A= Wijma Delivery Experience Questionnaire Part A
Adjusted for Age, Marital Status, Parity, Smoking

Table 3. Comparison of labour and delivery outcomes of women with and without a severe fear of childbirth

Labour and delivery outcome	W-DEQ A ≥85, n (%)	W-DEQ A ≤84, n (%)	p
Epidural analgesia	7 (1.8)	140 (35.9)	0.39
Induction of labour	5 (1.3)	130 (33.4)	0.57
Pre-labour Caesarean	5 (1.3)	44 (11.3)	0.06
Caesarean in labour	4 (1.0)	53 (13.6)	0.31

Table Legend: W-DEQ A= Wijma Delivery Experience Questionnaire Part A
p<0.05= significant

References

[1] I. Milosevic, R.E. McCabe, Phobias: The Psychology of Irrational Fear, Greenwood, California, 2015.

[2] E. Rondung, J. Thomtén, Ö. Sundin, Psychological perspectives on fear of childbirth, Journal of Anxiety Disorders 44 (2016) 80-91.

[3] Y. Richens, D.T. Lavender, D.M. Smith, Fear of Birth in Clinical Practice: A Structured Review of Current Measurement Tools, Sexual & Reproductive Healthcare (2018).

[4] E.L. Ryding, B. Wijma, K. Wijma, H. Rydhstrom, Fear of childbirth during pregnancy may increase the risk of emergency cesarean section, Acta Obstetricia et Gynecologica Scandinavica 77 (1998) 542-547.

[5] M. Lukasse, B. Schei, E.L. Ryding, G. Bidens Study, Prevalence and associated factors of fear of childbirth in six European countries, Sexual and Reproductive Healthcare 5(3) (2014) 99-106.

[6] H.L.R. Melender, Experiences of fears associated with pregnancy and childbirth: a study of 329 pregnant women, Birth 29(2) (2002) 101-111.

[7] M.A. O'Connell, P. Leahy-Warren, A.S. Khashan, L.C. Kenny, S.M. O'Neill, Worldwide prevalence of tocophobia in pregnant women: systematic review and meta-analysis, Acta Obstetricia et Gynecologica Scandinavica 96(8) (2017) 907-920.

[8] S. Nath, E.G. Ryan, K. Trevillion, D. Bick, J. Demilew, J. Milgrom, A. Pickles, L.M. Howard, Prevalence and identification of anxiety disorders in pregnancy: the diagnostic accuracy of the two-item Generalised Anxiety Disorder scale (GAD-2), BMJ open 8(9) (2018) e023766.

[9] P. Sylvers, S.O. Lilienfeld, J.L. LaPrairie, Differences between trait fear and trait anxiety: Implications for psychopathology, Clinical psychology review 31(1) (2011) 122-137.

[10] K. Wijma, B. Wijma, M. Zar, Psychometric aspects of the W-DEQ; a new questionnaire for the measurement of fear of childbirth, Journal of Psychosomatic Obstetics & Gynecology 19 (1998) 84-97.

[11] E. Calderani, L. Giardinelli, S. Scannerini, S. Arcabasso, E. Compagno, F. Petraglia, V.J.J.o.p.r. Ricca, Tocophobia in the DSM-5 era: Outcomes of a new cut-off analysis of the Wijma delivery expectancy/experience questionnaire based on clinical presentation, 116 (2019) 37-43.

[12] S. Raisanen, S. Lehto, H. Nielsen, M. Gissler, M. Kramer, S. Heinonen, Fear of childbirth in nulliparous and multiparous women: a population-based analysis of all singleton births in Finland in 1997-2010, BJOG : an international journal of obstetrics and gynaecology (2014).

[13] E.L. Ryding, M. Lukasse, A. Van Parys, A.M. Wangel, H. Karro, H. Kristjansdottir, A.M. Schroll, B. Schei, Fear of Childbirth and Risk of Cesarean Delivery: A Cohort Study in Six European Countries, Birth 42(1) (2015).

[14] E. Miller, M.R. Decker, H.L. McCauley, D.J. Tancredi, R.R. Levenson, J. Waldman, P. Schoenwald, J.G.J.C. Silverman, Pregnancy coercion, intimate partner violence and unintended pregnancy, Contraception 81(4) (2010) 316-322.

[15] R. Heimstad, R. Dahloe, I. Laache, E. Skogvoll, B. Schei, Fear of childbirth and history of abuse: implications for pregnancy and delivery, Acta Obstetrica et Gynecologica Scandinavica 85(4) (2006) 435-40.

[16] B. Leeners, G. Görres, E. Block, M.P. Hengartner, Birth experiences in adult women with a history of childhood sexual abuse, Journal of Psychosomatic Research 83 (2016) 27-32.

[17] B. Leeners, R. Stiller, E. Block, G. Görres, W. Rath, Pregnancy complications in women with childhood sexual abuse experiences, Journal of Psychosomatic Research 69(5) (2010) 503-510.

[18] Y. Neggers, R. Goldenberg, S. Cliver, J. Hauth, Effects of domestic violence on preterm birth and low birth weight, Acta Obstetricia et Gynecologica Scandinavica 83(5) (2004) 455-460.

[19] L.M. O'Keeffe, D.L. Dahly, M. Murphy, R.A. Greene, J.M. Harrington, P. Corcoran, P.M. Kearney, Positive lifestyle changes around the time of pregnancy: a cross-sectional study, BMJ Open 6(5) (2016) e010233.

[20] M.A. O'Connell, Leahy-Warren, P., Kenny, L., O'Neill, S.M., Khashan, A.S., The prevalence and risk factors of fear of childbirth among pregnant women: a cross sectional study in Ireland, Acta Obstetrica et Gynecologica Scandinavica (2019).

[21] H.S. Executive, Specialist Perinatal Mental Health Services: Model Of Care for Ireland, in: H.M.H. Services (Ed.) HSE, Dublin, 2017.
[22] W.H. Organisation, Stillbirth, Maternal, newborn, child and adolescent health Geneva, 2016.
[23] R.C.o.O.G. (RCOG), The investigation and treatment of couples with recurrent first-trimester and second-trimester miscarriage, Green-top Guideline No 17, 2011.
[24] GROW, Customised Centile Calculator, 2018. www.gestation.net..