

The characteristics and prevalence of phobias in pregnancy

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Title page

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Conflict of interest

Professor Howard reports being a member of an NHS England perinatal mental health programme expert reference group. All other authors report no conflict of interest.

Ethical approval

Ethical approval was obtained by the National Research Ethics Service, London Committee - Camberwell St Giles (ref no 14/LO/0075). All participants provided written informed consent after receiving a complete description of the study and getting the opportunity to ask questions.

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Abstract

Objective: The primary objective was to estimate the population prevalence of specific phobias (including pregnancy related specific phobias) and associated mental disorders. The secondary objective was to investigate the effectiveness of routinely collected screening tools (depression and anxiety screens, Whooley and GAD-2 respectively) in identifying specific phobias. Specific phobias are the most common anxiety disorder to occur during pregnancy, but studies on prevalence and clinical correlates of specific phobias, including pregnancy related specific phobias are lacking.

Design: Cross-sectional survey using a two-phase sampling design stratified according to being positive or negative on the Whooley questions routinely asked by midwives. Approaching all whooley positive women and drawing a random sample of Whooley negative women. Sampling weights were used to account for the bias induced by the stratified sampling.

Participants: 545 pregnant women attending their first antenatal appointment. Language interpreters were used where required.

Setting: Inner-city maternity service, London, UK.

Measurements: The Structured Clinical Interview for DSM-IV Axis I Mental Disorders were administered to assess mental disorders and 544 women responded to the anxiety module on specific phobias.

Results: The maternity population prevalence estimate for specific phobias was 8.4% (95%CI: 5.8 – 12.1%) and for pregnancy related phobias was 1.5% (95%CI: 0.6 – 3.7%), most of which were needle phobias. The prevalence estimate of tokophobia was 0.032% (95%CI: 0.0044–0.23%). Over half (52.4%) the women with specific phobias had comorbid mental disorders. Routinely administered screening tools (Whooley and GAD-2) were not helpful in identifying phobias.

Key conclusions and implications for practice: Phobias in pregnancy are common but pregnancy related phobias are rare, particularly tokophobia. As routinely administered screening tools were not helpful in identifying phobias, other indicators could be considered, such as avoidance of blood tests and requests for caesarean sections.

Key words: Specific phobia, anxiety, pregnancy, antenatal, prevalence

Introduction

Anxiety disorders are common in women, with specific phobias being reported as one of the most common types of anxiety disorder to occur during pregnancy (Goodman et al., 2014; Li & Graham, 2017) and a potential predictor for future mental illness (Lieb et al., 2016; Trumpf et al., 2010). Some specific phobias such as emetophobia (fear of vomiting), blood-injection-injury (including needle phobia) and tokophobia (extreme fear of childbirth) are particularly relevant to pregnancy (Patel & Hollins, 2015) (pregnancy related specific phobias). Emetophobia has been associated with an avoidance of pregnancy, pregnancy terminations and avoidance of surgical procedures or general anaesthesia due to fear of vomiting (Veale & Lambrou, 2006). In severe cases of needle phobia, women may delay presenting to antenatal services and avoid blood tests and injections (McAllister et al., 2012). A case note review study found that pregnant women with needle phobias were at

increased risk of poorer obstetric and neonatal outcomes, including prematurity, small for gestational age infants and neonatal morbidity (Lilliecreutz et al., 2011). Furthermore, the Confidential Enquires into Maternal Deaths in the UK has reported on one case which led to maternal death for a woman with a pre-existing needle phobia refusing heparin injections after caesarean section (Lewis, 2011). Thus, pregnancy-related specific phobias may have adverse impacts on the mother and her baby if not treated before or during early pregnancy but have rarely been studied.

Tokophobia can be defined as an extreme fear of childbirth manifesting as a specific phobia, but most research has focused on the broader concept of fear of childbirth, rather than an extreme fear of childbirth that meets diagnostic criteria for a specific phobia. One recent study by Calderani et al. (2019) has showed that women with an extreme fear of childbirth measured using the Wijma Delivery Expectancy Questionnaire (a cut-off score of 85), met diagnostic criteria for a specific phobia. The broader “fear of childbirth” literature suggests a worldwide prevalence of 14% (O’Connell et al., 2017) and associations with increased maternal stress, longer labour, request for caesarean section and posttraumatic stress disorder (PTSD) (Alder et al., 2011; Ayers, 2014; Blackmore et al., 2016; Nieminen et al., 2009; Reck et al., 2013; Wiklund et al., 2007). Tokophobia is under-detected in maternity services where services often fail to have specific referral and care pathways for this condition (Richens et al., 2015). However, there has been very little research on tokophobia specifically. Nosocomophobia (fear of hospitals) can also prevent women from accessing medical services during pregnancy and influence choices about delivery methods (Ashwin, 2016), which in turn has implications for the health of the women during pregnancy and both mother and baby in the postnatal period.

The prevalence of specific phobias during pregnancy has been reported to range between 3.2% to 19.9% (Fairbrother et al., 2016; Goodman et al., 2014; Martini et al., 2015). Only one study has reported on an epidemiologically representative population (using diagnostic criteria) and reported an estimated population prevalence of 8.3% amongst pregnant women experiencing specific phobia within the last year prior to participation in the study (Vesga-López et al., 2008). The current study extends previous work by investigating the population prevalence of specific phobias, including pregnancy-related specific phobias, in a representative sample of pregnant women during early

pregnancy and describing their characteristics. The current study defines specific phobia as those meeting diagnostic criteria of the Structured Clinical Interview for DSM-IV. Specific phobias were considered to be pregnancy-related if it was either related to, or had implications for pregnancy (such as emetophobia, blood-injection-injury and tokophobia) (Patel & Hollins, 2015). The prevalence of specific phobias by type and co-morbid disorders are also reported.

The National Institute for Health and Care Excellence (NICE, CG192; 2014) has suggested that all maternity professionals could consider two depression (Whooley) and two anxiety questions (GAD-2) (National Institute for Health and Care Excellence, 2014; Spitzer et al., 2006; Whooley et al., 1997) as a part of a general discussion with women about their mental health and wellbeing. Additionally, NICE suggests that women with tokophobia, should be offered the opportunity to discuss their fears with a healthcare professional that has expertise in perinatal mental health. However, there are no specific guidelines on identification of women with tokophobia, blood-injection phobia or emetophobia. Women with such pregnancy-related specific phobias may not screen positively on the NICE-recommended questions and hence further discussion of their phobias may not arise. Therefore, we also investigate women's answers to the Whooley and GAD-2 questions which are suggested by NICE to be used in routine care.

The primary objective for the current paper was to estimate the population prevalence of specific phobias (including pregnancy-related specific phobias) and associated mental disorders (extending previous work by Howard et al. (2018) and Nath et al. (2018)). The secondary objective was to investigate the effectiveness of routinely collected screening tools (depression and anxiety screens, Whooley and GAD-2 respectively) in identifying specific phobias.

Methods

Study design and population

This is a secondary analysis of data from a cross-sectional study of women attending antenatal bookings at an inner-city maternity service in South East London, UK. 545 women were recruited as part of the Well-being in pregnancy study (WENDY) examining the effectiveness of the two brief depression screening questions (Whooley questions) against a gold standard diagnostic interview and a validated screening instrument in identifying antenatal depression at bookings (Howard et al., 2018;

Nath et al., 2018). Women were stratified according to whether they were positive (W+) or negative (W-) on the two Whooley questions asked during their first antenatal booking appointment (1: “During the past month have you often been bothered by feeling down, depressed, or hopeless?”; 2: “During the past month have you often been bothered by having little interest or pleasure in doing things?”) (Whooley et al., 1997). All participants who were W+ (women who answered “yes” to either one or both questions) and a random sample of W- (women who answered “no” to both questions) were invited to participate.

Exclusion criteria were women who declined to answer Whooley questions, women under 16 years of age, those who had a termination or miscarriage prior to baseline interview or had a detailed maternity booking elsewhere in the UK. Eligible pregnant women who agreed to participate were recruited into the study as soon as possible after their first antenatal booking appointment, within a maximum of three weeks from the original booking appointment (approximately 10 – 12 weeks gestation) and took part in a face-to-face research interview where the researchers administered the Structured Clinical Interview for DSM-IV to assess mental disorders (including specific phobias). The sample was recruited between November 2014 and July 2016, and were from a culturally and ethnically diverse population in inner London. Language interpreters were used where needed. This study population (n=545) was similar to the base population (n=9963, women booking at the maternity site during the study duration) on a number of socio-demographic factors including age, ethnicity and number of children. See original study paper for full details of study procedures, sampling, and representativeness of the study sample (Howard et al., 2018).

Ethical approval was obtained by the National Research Ethics Service, London Committee - Camberwell St Giles (ref no 14/LO/0075). All participants provided written informed consent after receiving a complete description of the study and getting the opportunity to ask questions.

Measures

Specific phobias, pregnancy-related specific phobias and other disorders

The Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I) is a researcher-administered semi-structured “gold standard” diagnostic interview, which has been widely used in psychiatric research and epidemiological studies (First et al., 2002; Spitzer et al., 1992; Weissman et

al., 1996; Williams et al., 1992). The interview consists of standardised diagnostic questions arranged in modules corresponding to each DSM-IV Axis I disorder (American Psychiatric Association, 2000). Diagnosis of specific phobias and other disorders including current major and minor depressive disorders, bipolar I and II disorder, post-traumatic stress disorder and current acute stress disorder were determined according to the diagnostic criteria

DSM-IV differentiates among four types of specific phobias which include 1) animal type (fear cued by animals such as dogs, snakes, insects or spiders), 2) natural environment type (fear cued by an aspect of a natural environment such as water, heights, storms, or the dark), 3) blood-injection-injury type (fear of seeing blood, receiving an injection or being injured), 4) situational type (fear cued by specific situations such as elevators, tunnels, bridges, enclosed places, driving, or flying), and 5) other (phobias that do not fit the prior four categories including vomit and tokophobia). Women were categorised as experiencing a pregnancy-related specific phobia if their specific phobia was blood-injection-injury, emetophobia or tokophobia. The DSM-V (Diagnostic, 2013) criteria for specific phobia (which were published after we had started study set-up) are the same as DSM-IV, except for the omission of the individual's recognition that the fear is excessive and the addition of 6 month duration of symptoms criteria. The SCID was carried out without specific reference to pregnancy specific fears, so pregnancy related phobias were disclosed when asked routine questions about any fears.

The Structured Clinical Interview DSM-IV Axis II Borderline Personality Disorders sub-section module for borderline personality disorders (SCID-II) was used for the diagnoses of DSM-IV Axis II borderline personality disorders which contains nine-items.

Sociodemographic information

Socio-demographic characteristics including age, employment status, ethnicity, relationship status and parity were obtained from all women as a part of the research interview. Baseline obstetric data and risk factors routinely collected by clinic midwives at antenatal bookings were also collected.

Anxiety symptoms

The Generalized Anxiety Disorder Scale (GAD-2) was used in the current study as a measure of symptoms of anxiety. The scale consists of the first two questions of the Generalized Anxiety

Disorder Scale (GAD-7) measure (Spitzer et al., 2006). The two questions are, “Over the last two weeks, how often have you been bothered by any of the following problems? 1) Feeling nervous, anxious or on edge; 2) Not being able to stop or control worrying.” Answers are reported on a Likert scale (not at all=0, several days=1, more than half the days=2, and nearly everyday=3). Total scoring ranges from 0 – 6, with a cut-off score of 3 or more indicative of high anxiety symptoms (GAD2+) and less than 3 as low anxiety symptoms (GAD2-).

Data analysis

Data were analysed using Stata v.15 (StataCorp, 2017). Expansion weights were used to account for bias introduced by the stratified sampling (ie oversampling of Whooley positives and under-sampling of Whooley negatives) – a standard method used to account for stratified sampling as described by Pickles et al. (1995). More specifically, weights were based on the number of W+ and W- women in the study, out of all those that had maternity appointment bookings at the maternity unit during the study period (the sampling frame); the weights for W+ were 906/287 and for W- were 9057/258. 1 participant had missing data on specific phobia, and therefore was not included in analyses.

Population prevalence's (with 95% CI) were computed by examining the frequency of women that met SCID criteria for current specific phobia (including types of specific phobias) where the “svy” setting in Stata was used to account for the sampling weights. Descriptive statistics of characteristics, comorbid mental disorders and status (positive + vs negative -) on screening questions (Whooley and GAD-2) were calculated for women that met SCID criteria for current specific phobia.

Results

Prevalence and types of specific phobia

42 (of 544) women met diagnostic criteria for current specific phobia; the population prevalence estimate was 8.4% (95% CI: 5.8% - 12.1%). Age of onset was often during childhood (38%; 0 – 9 years old) and adolescence (33%; 10 – 19 years old). Most were categorised as mild phobias (81%). Amongst women that met criteria for specific phobia, the most common type was animal (35.7%), followed by situational (23.8%) (see Table 1 for all types). Eight (19.1%) were pregnancy-relevant phobias. These included blood-injection-injury ($N=6$; blood $n=1$, needle $n=4$, blood & needle $n=1$), emetophobia ($N=1$) and tokophobia ($N=1$). The population prevalence for pregnancy related specific

phobias was estimated as 1.5% (95% CI: 0.6% - 3.7%) and tokophobia was estimated as 0.032% (95% CI: 0.0044 - 0.23).

[INSERT TABLE 1 HERE]

Characteristics and comorbid mental disorders

Most women with specific phobias (n=42) were aged between 20 – 39 years old (97.6%) with a mean age of 31 years (SD: 5.9). Most were White (38.1%) or Black African/Caribbean (47.6%) and the rest were either Asian, Arab or mixed multiple ethnicities (14.3%). The majority of women had a degree or postgraduate level qualifications (42.9%), were employed (64.3%), were married/cohabiting (69%), were multiparous (59.5%) and the current pregnancy was planned (61.9%) (see Table 2 for all socio-demographic characteristics). In comparison to women without specific phobia, women with specific phobias were significantly younger. There were no other socio-demographic differences in the characteristics between women with and without specific phobias.

Many women with a current specific phobia also experienced a co-morbid mental disorder (52.4%; any current SCID diagnosis); most commonly Major Depressive Disorder (MDD, 31%), followed by Generalised Anxiety Disorder (GAD, 14.3%), social phobia (11.9%), Obsessive Compulsive Disorder (OCD, 9.5%) and borderline personality disorder (4.8%). There were no women that had a current specific phobia comorbid with eating disorders or PTSD. Twenty were W+ and twenty-two were W-; six were GAD2+ and thirty-five were GAD2- (1 participant had missing data on GAD2). Of the women with pregnancy-related specific phobias (n=8), four were W+ and four W-; one was GAD2+ and six were GAD2-. Among women with pregnancy-related specific phobias, 5 experienced a co-morbid mental disorder including MDD, GAD and OCD.

[INSERT TABLE 2 HERE]

Discussion

Specific phobias are common during early pregnancy with 8.4% population prevalence estimate of women meeting diagnostic criteria for a current specific phobia, confirming the previously reported estimate during pregnancy (Vesga-López et al., 2008). Most specific phobias had their onset in childhood or adolescence. The prevalence of specific phobias by subtype was comparable to other studies, with animal phobia being the most common (Lieb et al., 2016). Amongst women with

specific phobias, 19% were of relevance to pregnancy (including blood-injection-injury, emetophobia and tokophobia). Just over half of the 42 women with specific phobias were also experiencing a comorbid mental disorder, particularly major depressive disorder (31%). This finding adds to previous literature which found that both anxiety and depressive disorder prior to and during pregnancy were associated with the broader concept of pregnancy related fears (Calderani et al., 2019; Martini et al., 2016; Martini et al., 2009). Thus, pregnancy may be associated with complications related to phobias that are particularly relevant in pregnancy and will need to be addressed to prevent adverse outcomes (Lilliecreutz et al., 2011).

Detection and optimal management of specific phobias in pregnancy remains under-researched and more information is needed on the impact of particular phobias on women and their offspring in the perinatal period (Goodman et al., 2014; Lilliecreutz et al., 2011). In this study, the Whooley and GAD-2 questions that are routinely asked in English maternity services since NICE 2014 (National Institute for Health and Care Excellence, 2014), were not helpful in identifying these phobias. It is unclear how pregnancy related phobias could be effectively identified early in pregnancy, so that treatment could be provided to reduce potential complications (e.g. detection of medical problems through blood tests). There is some, though limited, evidence that specific phobias in pregnancy can be effectively treated using psychological therapies such as cognitive-behavioural therapy (CBT) (Lilliecreutz et al., 2010; Stoll et al., 2018). To date, there has been one open trial on blood-injection-injury phobia in pregnancy by Lilliecreutz et al. (2010) which demonstrated a significant reduction in anxiety associated with injections from a group CBT intervention delivered by midwives. Several studies have found CBT and psychoeducation reduces fear of childbirth (Rouhe et al., 2015; Salmela-Aro et al., 2012; Stoll et al., 2018; Striebich et al., 2018; Toohill et al., 2014), but these studies have not focused on women meeting the diagnostic criteria for the specific phobia tokophobia. Larger studies investigating treatment for pregnancy related specific phobias in early pregnancy would be helpful.

The strengths of this study include the study design, diverse study population, and the use of language interpreters to enable non-English speaking women to take part (who are often excluded from studies), making the sample representative of the maternity population of South East London (Howard

et al., 2018). Additionally, we used a gold standard diagnostic interview to measure specific phobia. Limitations include the low numbers of women with pregnancy-related phobias (and therefore relatively wide confidence intervals). Although we collected data on specific phobia, as the current study was not originally designed to investigate specific phobias (including pregnancy-related specific phobias), the procedures did not include additional enquiries about pregnancy-related phobias. Therefore, the prevalence of pregnancy-related specific phobias in the current study may be an under-estimation. Here, as a stratified sampling design was used to recruit participants, the use of sampling weights accounts for potential bias that may have been introduced as a result of over sampling women that met criteria on the depression screen questions used for the purpose of the original study (Pickles et al., 1995; Howard et al., 2018). Future prospective longitudinal cohort studies primarily aimed at investigating specific phobias and pregnancy related specific phobias would add to the current findings and improve knowledge on predictors and outcomes of specific phobias during pregnancy. This could also include other phobias, such as fears of offspring vomiting (emetophobia), parental attitudes towards immunisations and fears of hospitals (nosocomophobia) (Veale & Lambrou, 2006; Taddio et al., 2012; Ashwin, 2016), which have implications for both mothers and infants. Finally, although the sample were representative of the base population, the use of a single site in London may limit generalisability to maternity populations elsewhere across the UK.

In conclusion, this study confirmed that the prevalence of specific phobias in early pregnancy is around 8% (95%CI: 6 – 12%) and for pregnancy-related specific phobias is 1.5% (95%CI: 1 – 4%). Many women have additional comorbid mental disorders, but routinely asked questions regarding women's mental health in English maternity services (NICE 2014), were not useful in detecting those with specific phobias. Thus, phobias in pregnancy are common but pregnancy related phobias are rare, particularly tokophobia. Avoidance of blood tests and requests for caesarean sections may indicate phobias, so midwives need to be alert to the possibility of these rare specific pregnancy related phobias and ask about specific fears when such indicators are present or when women present with anxiety and depressive disorders. These phobias could be treated, potentially reducing obstetric morbidity. Given that there is currently limited specialised support for women presenting with

pregnancy related specific phobias, future studies on interventions focused on identifying and treating pregnancy relevant phobias in the perinatal period, and potentially pre-conception, are needed.

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Tables:**Table 1. Specific Phobias by Type**

Specific Phobia Type	N	Mean age of onset ^a	Women with Specific phobia (n=42)	Population prevalence women in the whole sample (n=544)	
			Unweighted %	Unweighted %	Weighted % (95% CI)
Animal	15	10 years	35.7	2.8	3.7 (2.0 - 6.6)
Natural Environment	3	15 years	7.1	0.6	1.1 (0.3 - 3.2)
Blood-Injection-Injury	5	11 years	11.9	0.9	0.8 (0.2 - 2.7)
Situational	10	17 years	23.8	1.8	1.6 (0.6 - 3.8)
Other (or >1 type) ^b	9	7 years	21.4	1.6	1.2 (0.5 - 3.3)

^aThere were 7 women with missing data on age of onset due to not being able to remember

^bThese included women who had more than one type of phobia and other types that did not fit the DSM categories such clowns, vomit and tokophobia.

Table 2. Characteristics of women with specific phobia (n=42), without specific phobia (n=502) and the WENDY sample (n=545)

	Women with specific phobias N=42 ¹	Women without specific phobias N=502 ¹	P	Women in the whole WENDY sample N=545
Translator required			1.000	
Yes	3 (7.1%)	37 (7.4%)		40 (7.3%)
No	39 (92.9%)	465 (92.6%)		505 (92.7%)
Age (years)			0.019	
16 – 19	1 (2.4%)	7 (1.4%)		8 (1.5%)
20-29	18 (42.8%)	132 (26.3%)		150 (27.5%)
30-39	23 (54.8%)	317 (63.1%)		341 (62.6%)
40-46	0 (0%)	46 (9.2%)		46 (8.4%)
Ethnicity			0.229	
White	16 (38.1%)	267 (53.2%)		284 (52.1%)
Black/ Caribbean	20 (47.6%)	157 (31.3%)		177 (32.5%)
Asian/Asian British	1 (2.4%)	24 (4.8%)		25 (4.6%)
Mixed/Multiple ethnicity	2 (4.8%)	21 (4.2%)		23 (4.2%)
Other/Arab	3 (7.1%)	33 (6.6%)		36 (6.6%)
Highest Education level			0.267	
None/school qualifications	8 (19%)	57 (11.4%)		65 (11.9%)
College/Diploma/Higher/Certificate/training	16 (38.1%)	182 (36.3%)		198 (36.3%)
Degree level/ Postgraduate qualifications	18 (42.9%)	263 (52.4%)		282 (51.7%)
Employment status²			0.986	
Employed	27 (64.3%)	321 (64.2%)		349 (64.3%)
Student	2 (4.8%)	20 (4.0%)		22 (4.0%)
Unemployed	5 (11.9%)	59 (11.8%)		64 (11.8%)

Homemaker	6 (14.3%)	68 (13.6%)		74 (13.6%)
Not working due to illness/Other	2 (4.7%)	32 (6.4%)		34 (6.3%)
Income ³			0.579	
< £15000	10 (29.4%)	67 (17.6%)		77 (18.5%)
£15,000-£30,999	4 (11.8%)	67 (17.6%)		71 (17.1%)
£31,000-£45,999	4 (11.8%)	55 (14.4%)		60 (14.4%)
£46,000-£60,999	5 (14.7%)	58 (15.2%)		63 (15.1%)
£61,000 or more	11 (32.3%)	134 (35.2%)		145 (34.9%)
Relationship status			0.770	
Single	5 (11.9%)	57 (11.4%)		62 (11.4%)
Partner but not cohabiting	7 (16.7%)	75 (14.9%)		82 (15.1%)
Married/cohabiting	29 (69%)	362 (72.1%)		392 (71.9%)
Separated/divorced	1 (2.4%)	8 (1.6%)		9 (1.6%)
Multiparous			0.261	
No	17 (40.5%)	253 (50.4%)		271 (49.7%)
Yes	25 (59.5%)	249 (49.6%)		274 (50.3%)
Planned pregnancy			0.635	
Yes	26 (61.9%)	329 (65.5%)		356 (65.3%)
No	16 (38.1%)	173 (34.5%)		189 (34.7%)
Late booker			0.887	
Yes	7 (16.7%)	414 (82.5%)		450 (82.6%)
No	35 (83.3%)	88 (17.5%)		95 (17.4%)

¹ 1 participants from the WENDY sample had missing data on the SCID specific phobia. For this reason the 42 + 502 = 544.

² 2 participants had missing data on employment

³ 129 participants had missing data on income. Of these women, 8 participants had specific phobia and 2 had pregnancy-related specific phobia