

Identification of women at risk of depression in pregnancy: using women's accounts to understand the poor specificity of the Whooley and Arroll case finding questions in clinical practice

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Abstract Antenatal mental health assessment is increasingly common in high-income countries. Despite lacking evidence on validation or acceptability, the Whooley questions (modified PHQ-2) and Arroll 'help' question are used in the UK at booking (the first formal antenatal appointment) to identify possible cases of depression. This study investigated validation of the questions and women's views on assessment. Women ($n=191$) booking at an inner-city hospital completed the Whooley and Arroll questions as part of their routine clinical care then completed a research questionnaire containing the Edinburgh postnatal depression scale (EPDS). A purposive subsample ($n=22$) were subsequently interviewed. The Whooley questions 'missed' half the possible cases identified using the EPDS (EPDS threshold ≥ 10 : sensitivity 45.7 %, specificity 92.1 %; ≥ 13 : sensitivity 47.8 %, specificity 86.1 %), worsening to nine in ten when adopting the Arroll item (EPDS ≥ 10 : sensitivity 9.1 %, specificity 98.2 %; ≥ 13 : sensitivity 9.5 %, specificity 97.1 %). Women's accounts indicated that under-disclosure relates to the context of assessment and perceived relevance of depression to maternity services. Depression symptoms are under-identified in current local practice. While validated tools are needed that can be readily applied in routine maternity care, psychometric

properties will be influenced by the context of disclosure when implemented in practice.

Keywords Mixed methods · Perinatal mental health · Pregnancy · Screening · Whooley questions

Introduction

Perinatal mental health (PMH) encompasses new onset and pre-existing mental health illness that continues or recurs in the period spanning pregnancy, childbirth, and the first postnatal year (Austin 2004; Matthey 2004). This includes severe mental illness (e.g. severe depression, schizophrenia, bipolar disorder, psychosis), which has been implicated in maternal death (Centre for Maternal and Child Enquiries 2011) and more common mild–moderate forms of depression and anxiety, estimated to affect 9–15 % women at some stage during or after pregnancy (Bennett et al. 2008; Gavin et al. 2005; Robertson et al. 2004). Clinical guidelines in several countries recommend mental health assessment early in pregnancy to identify women who have or are at risk of having mental health problems (American College of Obstetricians and Gynecologists 2006; American College of Obstetricians and Gynecologists 2010; Austin et al. 2005; Carroll et al. 2005; National Collaborating Centre for Mental Health 2007; Scottish Intercollegiate Guidelines Network 2012). In the UK, Australia, and New Zealand, this initial assessment is likely to be undertaken by the midwife as the lead healthcare professional providing maternity care to women. In other areas including North America, assessment is more likely to be considered the remit of medical doctors such as family doctors and obstetricians.

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The Whooley questions (Whooley et al. 1997) have been introduced in England and Wales at booking (the first formal antenatal appointment) and postnatally as an initial “pre-screen” to identify possible cases of depression, based on current symptoms, that warrant further mental health review (National Collaborating Centre for Mental Health 2007). The questions are during the past month, have you been bothered by (i) feeling down, depressed or hopeless and (ii) having little interest or pleasure in doing things? (Whooley et al. 1997). Current National Institute for Health and Care Excellence (NICE) clinical guidelines (National Collaborating Centre for Mental Health 2007) advise additionally using the Arroll ‘help’ question (Arroll et al. 2003) to improve specificity, due to concerns that the Whooley questions may over-identify women, resulting in overburdening of systems and unnecessary negative impact on women falsely identified as possible cases (i.e. false positives). The Arroll question is: Is this something you feel you need/want help with? (Arroll et al. 2003).

The Whooley questions are a modified version of the PHQ-2 (Kroenke et al. 2003), a two-item version of the PHQ-9

(Kroenke et al. 2001), which is based on the DSM-IV clinical interview. Although addressing the same symptoms, the Whooley questions differ from the PHQ-2 regarding timescale (past 4 weeks instead of past 2 weeks) and response format (dichotomous instead of ordinal four-point Likert scale). Published validation studies on the Whooley questions (and the original PHQ-2) are summarised in Table 1.

No published studies have validated the tool as completed in clinical practice, and an evidence synthesis concluded that there was insufficient evidence to justify its clinical use (Hewitt et al. 2009). The NICE guidelines have therefore been criticised (Martin and Redshaw 2009) for rejecting the most commonly used measure of perinatal depression, the Edinburgh postnatal depression scale (EPDS) (Cox et al. 1987; Murray and Cox 1990), because of its suboptimal positive predictive value and the lack of high-quality randomised controlled trials demonstrating reduction in morbidity accompanying introduction of routine screening, yet advocating an instrument that “probably would not meet the criteria either” of the National Screening Committee (p.117) (National

Table 1 Summary of published literature on validation of the Whooley questions and original PHQ-2 in antenatal populations

Study —Author —Country	Details —Whooley ‘test’ criterion —‘Gold standard’ comparison —Gestational age —Sample size	Measures of performance			
		Sensitivity	Specificity	PPV	NPV
Bennett et al. 2008 USA	Whooley (yes to either item) EPDS ≥ 13 15 weeks $n=414$	93	75	44	98
Bennett et al. 2008 USA	Whooley (yes to either item) EPDS ≥ 13 30 weeks $n=334$	82	80	24	91
Smith et al. 2010 USA	PHQ-2 (≥ 3) Diagnostic interview Before 17 weeks $n=214$	59	77	n/r	n/r
Smith et al. 2010 USA	PHQ-2 (≥ 4) Diagnostic interview Before 17 weeks $n=214$	62	79	n/r	n/r
Mann et al. 2012 UK	Whooley (yes to either item) Diagnostic interview 26–28 weeks $n=126$	100	68	33	99
Mann et al. 2012 UK	Arroll (yes) Diagnostic interview 26–28 weeks $n=126$	58	91	77	82

Notes: sensitivity refers to the proportion of women who are possible cases (based on the EPDS) who are identified as possible cases (using Whooley/Arroll); specificity refers to the proportion of women who are non-cases (based on the EPDS) who are identified as being non-cases (using Whooley/Arroll); NPV (negative predictive value) refers to the proportion of women with negative test results (on Whooley/Arroll) who are correctly classified as non-cases; PPV (positive predictive value) refers to the proportion of women with positive test result (on Whooley/Arroll) who are correctly classified as possible cases; n/r refers to not reported; diagnostic interviews were completed approximately 2 weeks after completion of the Whooley questions and original PHQ-2; sample size is the number for which both data sets were available, not the number recruited

Collaborating Centre for Mental Health 2007). Another criterion of the National Screening Committee is that any procedure is considered acceptable to the population. The EPDS is recommended for routine clinical use in high-income countries including the USA and Australia (American College of Obstetricians and Gynecologists 2010; Austin et al. 2011) and whereas an evidence base exists for the acceptability of the EPDS, research on the Whooley questions is “urgently needed”, given usage in current clinical practice in the UK (Brealey et al. 2010).

The objectives of this study were to (i) provide the first validation of the Whooley and Arroll questions completed at booking in UK clinical practice and (ii) explore women’s views and experiences of antenatal mental health assessment that uses these questions.

Materials and methods

The study used a mixed methods cohort design with sequential sampling (Teddlie and Yu 2007). In the quantitative component, women attending their booking at an inner-city hospital were invited to take part, regardless of any obstetric or other characteristics; the only exception being those unable to complete English-language questionnaires unassisted. Information about the research accompanied the appointment letter and was additionally provided by the researcher, who attended the antenatal clinic over a 6-month period. Women self-completed the Whooley (Whooley et al. 1997) and Arroll (Arroll et al. 2003) questions as part of clinical care before completing a research questionnaire containing several measures, including the Edinburgh postnatal depression scale (EPDS) (Cox et al. 1987). The EPDS is a 10-item self-report measure rating depressive symptoms in the last 7 days (e.g. ‘I have felt sad or miserable’) using a four-point Likert scale (0–3). Despite its name, the EPDS is also validated for use during pregnancy (Murray and Cox 1990). In the absence of a definitive threshold (Matthey et al. 2006), we used thresholds of ≥ 10 and ≥ 13 , respectively, indicative of ‘possible’ and ‘probable’ depression, and the more conservative threshold of ≥ 15 which is not commonly reported but has been suggested for antenatal use (Cox and Holden 2003; Matthey et al. 2006). Additional demographic and clinical data were abstracted from health records.

In the qualitative component, a purposive subsample of women were invited to take part in three serial in-depth interviews, on the basis of scoring the above threshold on at least one of the measures of psychological distress (EPDS (Cox et al. 1987), state-trait anxiety inventory state scale (Spielberger et al. 1987), GAD-2 (Kroenke et al. 2007)) or psychosocial risk factors for postnatal depression (antenatal risk questionnaire (Austin 2003)). Topics included women’s experiences of maternal mental health and well-being; its recognition by health professionals, self and others; and available support. Discussion included women’s views and experiences

of mental health assessment during pregnancy and the postnatal period, including but not limited to the Whooley and Arroll questions. Interviews were audio-recorded and were conducted twice during pregnancy and once in the postnatal period, either at the participant’s home or in the hospital research suite, according to participant preference. Data were collected June 2010–October 2011. Informed consent was gained prior to participation in each component of the study.

Agreement between the Whooley and Arroll questions and the EPDS was analysed using standard diagnostic performance measures: sensitivity (the proportion of true positives correctly identified by the test), specificity (the proportion of true negatives correctly identified by the test), positive predictive value (PPV; the proportion of patients with positive test results who are correctly identified) and negative predictive value (NPV; the proportion of patients with negative test results who are correctly identified) (Altman and Bland 1994a, b). Here, the EPDS was treated as the gold standard against which the ‘test’ was compared, firstly, using a positive response to either Whooley item as the criterion for possible caseness and secondly, using the Arroll ‘help’ item as the criterion. The EPDS was treated as a ‘gold standard’ because the alternative to using the Whooley questions would be a different self-report measure, not clinical interview.

Qualitative data were transcribed verbatim and analysed using framework analysis, as described by Ritchie and Spencer (Ritchie and Spencer 1994). Rigour was promoted through strategies such as member checking with participants and searching for alternative explanations with the supervisory team (Lincoln and Guba 1985). Although the quantitative and qualitative components were primarily designed to answer different research questions, findings were integrated in the analysis stage, with women’s accounts offering insights into the quantitative findings.

Results

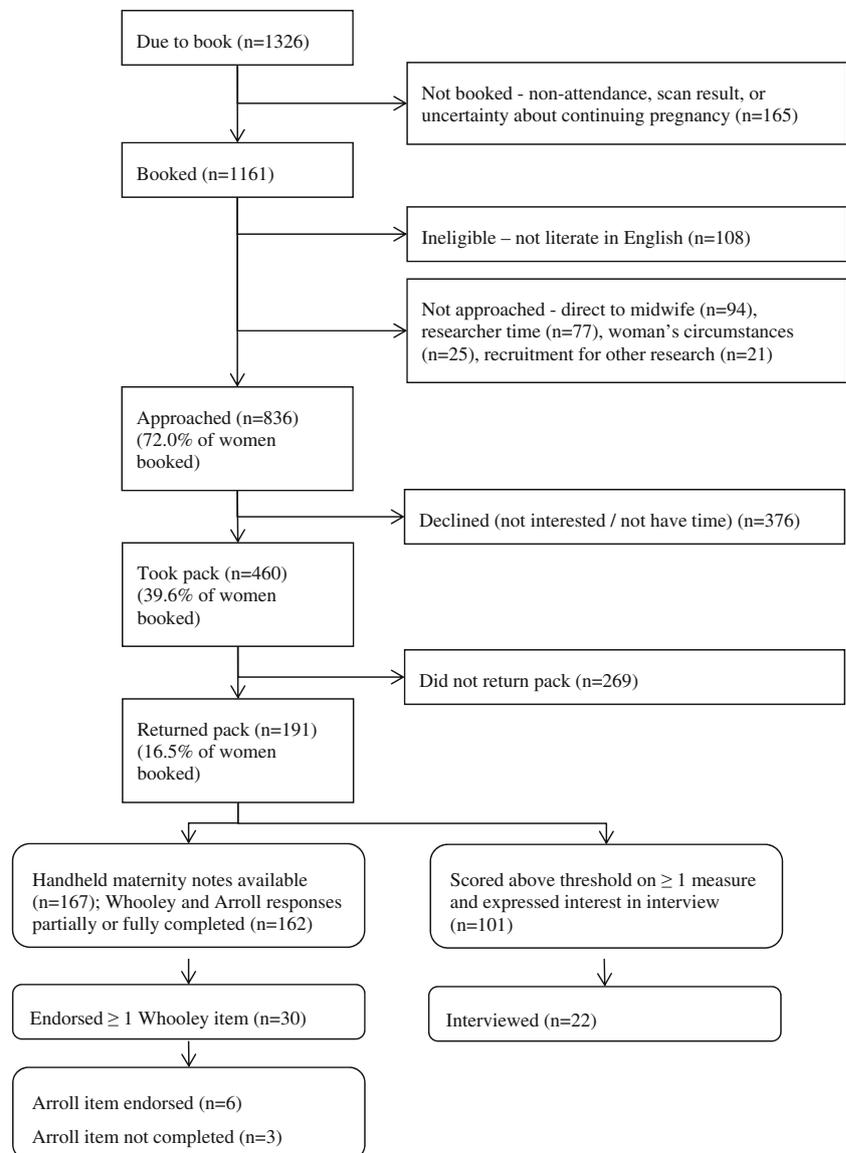
Characteristics for the full sample of women returning the research questionnaire ($n=191$) and the subsample interviewed ($n=22$) are presented in Table 2. These 191 women represented 16.5 % of the women booked in the study timeframe, with reasons for non-approach presented in Fig. 1. Comparison with local maternity data for the study period provided by the hospital found that white British women and older women were overrepresented in the research sample whereas parity was comparable. The full sample and subsample did not vary on any characteristics.

Validation of the Whooley and Arroll questions

Responses to the Whooley and Arroll questions were only available via the handheld maternity notes ($n=167$; see Fig. 1) and were uncompleted in five instances. Thirty women

Table 2 Sample characteristics

	Full sample completing research questionnaire ($n=191$)	Subsample interviewed ($n=22$)
Age (years)	Mean 31.1, SD 5.3 (19–46)	Mean 31.7, SD 4.2 (26–39)
Ethnicity	129 (67.9 %), white British	17 (77.3 %), white British
In a relationship	174 (91.1 %)	20 (90.9 %)
Primigravida (first pregnancy)	71 (37.2 %)	7 (31.2 %)
Primipara (first birth)	111 (58.1 %)	9 (40.9 %)
Gestation (weeks) at booking	Mean 13, SD 5.4 (8–38)	Mean 13, SD 2.8 (8–20)
Timing of interviews (weeks)	Not applicable	Antenatal Time 1: Mean 16, SD 2.8 (10–22) Time 2: Mean 33, SD 1.7 (28–36) Postnatal Time 3: Mean 10, SD 1.4 (7–13)

Fig. 1 Participant recruitment and data available

(18.5 %) endorsed at least one Whooley item; the Arroll ‘help’ item was endorsed by six of these and uncompleted by three.

Using either Whooley item as the criterion for possible caseness (Table 3) had strong specificity (i.e. most women identified as non-cases using the EPDS are identified as non-cases using the Whooley questions) but identified only half the women identified using the commonly adopted EPDS thresholds (EPDS ≥ 10 : sensitivity 45.7 %, specificity 92.1 %; EPDS ≥ 13 : sensitivity 47.8 %, specificity 86.1 %). Agreement with the EPDS was greater for the Whooley item concerning low mood than the item concerning anhedonia, with the latter leading to more false positives, possibly reflecting somatic aspects of pregnancy.

Using the Arroll ‘help’ question as the test criterion (Table 4) improved specificity but substantially compromised sensitivity, missing nine in ten possible cases (EPDS ≥ 10 : sensitivity 9.1 %, specificity 98.2 %; EPDS ≥ 13 : sensitivity 9.5 %, specificity 97.1 %). Of the six women endorsing the Arroll item, four were identified by the EPDS at the lower of the common thresholds. Details in health records indicated that the responses of the remaining two women reflected somatic aspects (sickness and backache) rather than psychological distress per se, suggesting that these were not possible cases ‘missed’ by the EPDS.

Regardless of test criterion, agreement was greatest at the more conservative EPDS threshold of ≥ 15 , but not substantially so (Whooley as criterion: sensitivity 57.1 %, specificity 84.9 %; Arroll as criterion: sensitivity 16.7 %, specificity 97.2 %) and, due to the positive predictive value being linked to the prevalence of possible cases in the population, performance was best at the lowest EPDS threshold.

Analysis of women’s views and experiences

Several themes emerged from the analysis; the theme *context of disclosure* is presented here to inform understanding the validation findings and limited disclosure in a clinical context.

Women’s accounts illustrated that disclosure required women to ‘admit’ symptoms of distress, both to themselves and to others; and that this was influenced by women’s views

on the relevance of mental health to maternity services. Such views were shaped by women’s individual understandings of maternal mental health, the context of the appointment and the perceived purpose of assessment.

Remit of maternity services

Perceived relevance was shaped by perceiving that the emphasis of maternity care was “98 % medical physical thing and 2 % emotional” (Lena, time 1). Thus, questions such as “How are you?” were interpreted as concerning physical aspects to do with the pregnancy, rather than emotional aspects to do with the woman:

“They’re more interested in you medically ... they’re asking you, “How are you? How are you feeling?” but it’s more, “Have you got any lumps and bumps and pains?” ... they’re not asking you emotionally.” (Anne, time 1)

Some women felt that their psychological distress was “just personal circumstances” (Jess, time 1) and therefore not a legitimate concern for midwives:

“I don’t feel I can turn round and go “Yeah, but there’s this that’s gone on and that that’s gone on” and actually it’s unrelated to the pregnancy. I feel like, for them, they need to concentrate on the pregnancy side of things really.” (Emily, time 2)

Context of maternity appointments

The context of appointments, both in terms of the nature of busy clinics and in relation to interactions with health professionals, influenced women’s views on the relevance of mental health to maternity services. Comments about appointments referred both to the booking appointments, which in this sample took place in a hospital antenatal clinic, and subsequent antenatal appointments either in the community or in the hospital; all of which involved consultations with midwives.

Table 3 Validation of the Whooley questions against the EPDS, using yes to either item as case criterion ($n=160$)^a

EPDS threshold	Whooley (either item)		Measures of performance			
	No ($n=130$)	Yes ($n=30$)	Sensitivity	Specificity	PPV	NPV
<10 ($n=114$)	105 (65.6)	9 (5.6)	21/46 (45.7)	105/114 (92.1)	21/30 (70.0)	105/130 (80.8)
≥ 10 ($n=46$)	25 (15.6)	21 (13.1)				
<13 ($n=137$)	118 (73.8)	19 (11.9)	11/23 (47.8)	118/137 (86.1)	11/30 (36.7)	118/130 (90.8)
≥ 13 ($n=23$)	12 (7.5)	11 (6.9)				
<15 ($n=146$)	124 (77.5)	22 (13.8)	8/14 (57.1)	124/146 (84.9)	8/30 (26.7)	124/130 (95.4)
≥ 15 ($n=14$)	6 (3.8)	8 (5.0)				

NPV negative predictive value, PPV positive predictive value

^a EPDS scores were not available for two women

Table 4 Validation of the Whooley questions against the EPDS, using Arroll ‘help’ item as case criterion ($n=157$)^a

EPDS threshold	Arroll ‘help’ item		Measures of performance			
	No ($n=151$)	Yes ($n=6$)	Sensitivity	Specificity	PPV	NPV
<10 ($n=113$)	111 (70.7)	2 (1.3)	4/44 (9.1)	111/113 (98.2)	4/6 (66.7)	111/151 (73.5)
≥10 ($n=44$)	40 (25.5)	4 (2.5)				
<13 ($n=136$)	132 (84.1)	4 (2.5)	2/21 (9.5)	132/136 (97.1)	2/6 (33.3)	132/151 (87.5)
≥13 ($n=21$)	19 (12.1)	2 (1.3)				
<15 ($n=145$)	141 (89.8)	4 (2.5)	2/12 (16.7)	141/145 (97.2)	2/6 (33.3)	141/151 (93.4)
≥15 ($n=12$)	10 (6.4)	2 (1.3)				

Arroll item was uncompleted by three women following a positive Whooley response

NPV negative predictive value, PPV positive predictive value

^a EPDS scores were not available for two women

Women’s accounts highlighted a sense that there are too many tasks for the time available, with appointments consequently feeling rushed and potentially limiting disclosure without the “time and space to actually go through those things” (Charlotte, time1):

“It’s just like a conveyor belt. You’re in and you’re out. They’re just: blood pressure, check your water, check the heartbeat, and then off. There’s no real conversation of how are you? So because I wasn’t really asked, I didn’t speak about it.” (Louise, time 1)

Alongside the pace of appointments, it was the manner in which they were asked that mattered to women and some felt that factors such as trust and confidence were more important for disclosures concerning mental health and well-being than discussions of physical aspects of health. Although continuity was valued, this was considered less important than skills such as “really listening” (Abbie, time 1) which were contrasted with interactions that felt “a little bit false” (Abbie, time 2), as though they “were going through the motions of it” (Charlotte, time 1) with “bullet type things that they have to ask” (Helen, time 2). Some women also described feeling that staff seemed to lack confidence and felt uncomfortable in discussing mental health.

Understandings of maternal mental health

Disclosure of symptoms was also influenced by women’s personal understandings of maternal mental health, and several described struggling to determine whether their feelings were “normal” (Louise, time 2); here, some women felt that screening questions helped them to recognise to themselves that they were struggling. Women could however feel deterred from seeking support not only because assessing symptoms and severity was “so subjective” (Katie, time 1) but also because women needed themselves to be “at the stage where you’ve thought about, “yeah, I could really do with some support”” (Hannah, time 1).

Purpose of assessment and implications of disclosure

Admitting to self and others was influenced by the implications of disclosure. This extended beyond stigma (indicated by terms such as “loony bin”, “bonkers”, “crazy”, “bring branded”) and was more concerned with the perceived purpose of assessment. Women’s accounts suggested great uncertainty around implications:

“If I tick yes [to the Arroll item], what does that mean, what’s going to happen?” (Emily, time 1)

Some women held concerns about possible treatment options, both pharmacological and psychological, that could deter them from seeking help. Several women felt that maternity services could, theoretically, be in a position to help with early intervention, most felt that, in reality, the purpose of assessment was to identify risk of harm:

“The only question that she [health visitor] was more worried about is, would I self-harm or hurt the baby. I went “no”. That’s all she was more worried about, not dealing with the fact that, why am I upset?” (Rebecca, time 1)
 “Unless you’ve been suffering from sort of psychosis, you’re not gonna get any *real*, you know, *service* or support from anywhere anyway. It’s always like “worst case scenario then we will help you” (Michelle, time 1)”.

Women were sometimes therefore either wary of potential social services involvement or simply cynical about health professionals’ ability to do anything to help them address their underlying causes of distress (Abbie, time 3; Katie, time 2).

Discussion

This is the first study to offer validation of Whooley questions and Arroll ‘help’ item in UK clinical practice. Contrary to concerns that clinical use of the Whooley questions may

unnecessarily overburden systems through high rates of false positives, they were found to identify only half of women identified by the EPDS completed in a research context. Sensitivity substantially worsened by reliance on the Arroll 'help' item, missing nine in ten possible cases identified using the EPDS.

Performance was far poorer in the current study than reported elsewhere (Bennett et al. 2008; Mann and Gilbody 2011; Smith et al. 2010). The EPDS does not offer diagnosis and is itself vulnerable to issues of sensitivity and specificity; however, this does not explain the poor sensitivity because stronger performance has been found both for validation against diagnostic clinical interview (Mann and Gilbody 2011; Smith et al. 2010) and against the EPDS (Bennett et al. 2008). Our finding is also unlikely to be due to gestational age at assessment, as the mean age is similar in the current study and the study by Bennett et al. (2008), as is the percentage of women scoring above threshold (respectively, 14.4 and 17.4 %, using a threshold of ≥ 13).

Analysis of women's accounts indicates that a likely explanation for the poor sensitivity found is that women under-disclosed when completing the Whooley and Arroll questions and primarily because of the context of disclosure, which could similarly inhibit disclosure if the EPDS were completed in this manner. In our study, the Whooley and Arroll questions were self-completed as a part of routine clinical care; the EPDS was also self-completed, but as part of a research study. In contrast, both measures were completed with a physician or a nurse in the IMPLICIT network study (Bennett et al. 2008), and both were completed in a research context for the other studies (Mann and Gilbody 2011; Smith et al. 2010).

Women's accounts conveyed that the manner in which mental health was discussed was considered more important than the exact phrasing used to ask the depression questions, illustrating the need to provide an enabling environment to ensure the process is both acceptable to the population and effective. Thus, rather than endorsing routine use of the EPDS in preference to the Whooley and Arroll questions, this study speaks to the significance of the context of disclosure for mental health assessment which is relevant regardless of the measure used, the setting or healthcare professional involved. The need for enabling environments and challenges around implementation echoes that raised when routine enquiry for domestic abuse was introduced (Taket et al. 2003). Ensuring an enabling environment includes addressing consultation-level factors such as time limitations and work pressures that impact patient-centredness (Mead and Bower 2000) and can influence women's help seeking for depression in various maternity settings (Bennett et al. 2009). It is unsurprising that we found parallels with the literature on acceptability of the EPDS. Authors of a review on EPDS acceptability concluded that although the EPDS was "generally acceptable", there could be issues around its administration and they considered the clinic setting "too distracting and uncomfortable for

women", instead recommending completion at home, affording more privacy and time (Brealey et al. 2010).

Alongside consultation-level factors, staff need the appropriate training and skills in psychological assessment. Low staff confidence in handling perinatal mental health has been reported amongst midwives in the UK (King et al. 2012); similarly, in Australia where mental health assessment is also carried out at booking by midwives, training needs have been identified, including knowledge of perinatal mental health and resources available to women and staff (McCauley et al. 2011). Some women in the current study picked up on staff discomfort and lack of confidence, linked to the perception that mental health is not the remit of maternity services. These findings resonate with a North American study that reported women perceived a lack of mental health expertise amongst obstetricians (i.e. those healthcare professionals who would be expected to undertake mental health assessment during the perinatal period) and that this acted as a potential barrier to depression help-seeking (Bennett et al. 2009).

Perceived relevance also included the purpose of assessment. Women's concerns around implications of disclosure, including others' views of parenting ability and potential involvement of social services, have been raised in relation to the EPDS and women's ability to answer depression screening questions honestly (Brealey et al. 2010). However, unlike the EPDS, the Arroll approach asks women directly about wanting or needing help and our study demonstrated concerns and uncertainty amongst some women about possible implications of reporting this to a healthcare professional; here, a midwife. This is consistent with our quantitative data indicating the extremely poor sensitivity of the Arroll question. The finding that reliance on the Arroll 'help' item may risk false negatives is consistent with the findings of Mann and Gilbody (2011), but is considerably more marked in our study. Such findings suggest that, whereas concerns over high false-positive rates are consistently raised in respect of ultra-brief screening tools (Mitchell and Coyne 2007) and national screening programmes for postnatal depression have been advised against mainly due to the costs of false positives (Hewitt et al. 2009), of equal concern may be high rates of false negatives and the potential for delayed access to interventions (Martin and Redshaw 2009). The guidelines for England and Wales (National Collaborating Centre for Mental Health 2007) position the Whooley and Arroll items as the first assessment stage, to be followed up with further assessment. Such two-stage processes require strong sensitivity in the first step to avoid 'missing' potential cases (Bennett et al. 2008; Gjerdingen et al. 2009), yet this is compromised by the use of the 'help' item in its current format and women's uncertainty around the purpose of assessment.

The validation component of this study had two main methodological limitations: (i) threats to internal validity by lacking comparison with diagnostic interviews and (ii) threats

to external validity due to sampling constraints. Analysing the validation data alongside women's accounts offered alternative perspectives and richer understandings through considering the context of disclosure, illustrating the potential benefit of integrating mixed methods in the analysis stage to provide an end product greater than the constituent parts (Bryman 2007; Moran-Ellis et al. 2006). Although qualitative research does not have the same need for representativeness, it is important to acknowledge the views that are being represented. Interviews were limited to those with high levels of maternal stress as defined by the chosen measures, and acceptability may be different in those below and above threshold. In addition, the findings are taken from one local unit, and within the sample, white British women and older women were overrepresented; care must therefore be taken in extending the findings beyond the study.

Conclusion

Contrary to concerns about the numbers of false positives encountered when using ultra-brief mental health assessment, this study suggests that the greater concern when administering the Whooley and Arroll questions in antenatal care is the number of false negatives. A mixed methods approach illustrated the significance of context of disclosure for psychometric properties when measures developed in research settings are adopted in clinical practice. Further research is needed to validate the use of this approach in maternity care and to determine the optimal approach to identifying possible depression in pregnancy; this extends beyond the instrument of choice to include enabling environments and subsequent management. Meanwhile, health professionals and policymakers should be aware that while the Whooley questions offer a simple and quick means of identifying women who need support, they fail to identify a substantial proportion of women.

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Conflict of interest The authors declare that they have no conflict of interest.

Ethical standards The study received favourable ethical opinion from the Greater Manchester East Research Ethics Committee (10/H1013/12) and relevant governance approval from the hospital and was performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments.

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