Journal of Affective Disorders 251 (2019) 8–14

Contents lists available at ScienceDirect

Journal of Affective Disorders

journal homepage: www.elsevier.com/locate/jad

Research paper

Identifying postnatal depression: Comparison of a self-reported depression item with Edinburgh Postnatal Depression Scale scores at three months postpartum

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ARTICLE INFO

Keywords:
Postnatal depression
Edinburgh Postnatal Depression Scale (EPDS)
Self-identified

ABSTRACT

Background: Early identification of postnatal depression is important in order to minimize adverse outcomes. The Edinburgh Postnatal Depression Scale (EPDS) is commonly used as a screening tool but a single, direct question on depression may offer an alternative means of identifying women in need of support. This study examines the agreement between these methods and characteristics of women who self-identify as depressed and those with EPDS ≥ 13.

Methods: Secondary analysis of two national maternity surveys conducted in England and Northern Ireland. Agreement between the direct question and EPDS scores was assessed using Cohen's kappa. Logistic regression was used to identify characteristics of women in each group.

Results: 6752 women were included. At three months postpartum, 6.1% of women self-identified as having depression, 9.1% scored EPDS ≥ 13, 2.8% were positive on both. Agreement between the two methods was minimal (Cohen's kappa < 0.3). Women who self-identified as having depression had higher odds of being aged > 40 years (OR 1.8; 95% CI 1.2–2.8). EPDS ≥ 13 was associated with < 16 years of education (OR 1.4; 95% CI 1.1–1.8), minority ethnicity (OR 1.4; 95% CI 1.1–1.9), living without a partner (OR 1.7; 95% CI 1.3–2.2), and a less than happy reaction to the pregnancy (OR 1.7; 95% CI 1.4–2.1).

Limitations: Low survey response limits the representativeness of findings. The absence of a diagnostic interview limits conclusions on accuracy or internal validity of the measures.

Conclusions: A direct question about postnatal depression may offer a valuable addition to screening tools to identify women in need of support.

1. Introduction

The postnatal period is a time of increased risk for depression and other mental disorders as a result of physiological and psychosocial changes that occur during this time (Biaggi et al., 2016). Left untreated, persistent postnatal depression is associated with a range of adverse consequences for women and their children including poor mother-infant attachment and delayed child development (Howard et al., 2014). Early identification and management of postnatal depression is important in order to minimize these adverse outcomes (NICE 2014). During the perinatal period most women have regular contact with health services, providing a window of opportunity for identifying women suffering from depression or at risk of developing it (Gavin et al., 2005).

Identifying women with depression after birth is complicated by the 'baby blues' which is a normative postpartum experience occurring in 50–80% of women shortly after birth (Hatters Friedman and Resnick, 2009). Symptoms include irritability, tiredness and excessive tearfulness but do not include suicidal thoughts or feelings of worthlessness (Hirst and Moutier, 2010). Symptoms associated with the baby blues are thought to recede within a few days to a week unlike postpartum depression which lasts for more than two weeks. While baby blues are considered to be part of the normal postpartum experience there is some evidence to suggest that women with these symptoms are

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https://doi.org/10.1016/j.jad.2019.03.002
Received 1 November 2018; Received in revised form 31 January 2019; Accepted 3 March 2019
Available online 04 March 2019

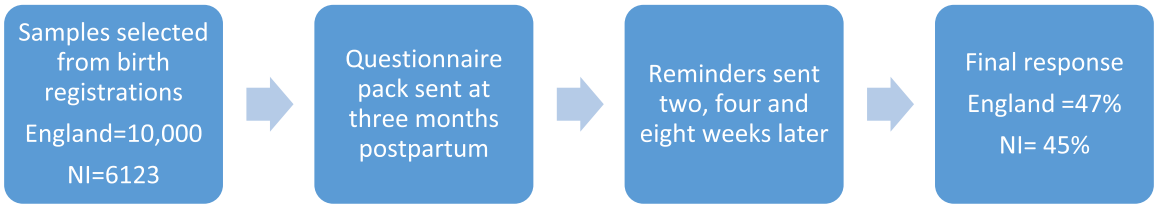

Fig. 1. Survey methodology.

at risk of progression to postpartum minor depression (Henshaw et al., 2004) and women may have difficulty understanding the difference between the two (Sword et al., 2008). Further complexities include the co-existence of postnatal depression with other mental disorders such as anxiety (Austin et al., 2010), and Post Traumatic Stress Disorder (PTSD; White et al., 2006). Also many symptoms of postnatal depression such as concentration difficulties, fatigue, reduced libido and sleeplessness are normal manifestations of the postnatal period (Coelho et al., 2011) and it is important to explore the relationship between these symptoms and reported depression.

A number of measures exist to facilitate the identification of women with symptoms suggestive of a mental disorder, but as yet there is no tool which serves as a universally agreed gold standard for screening for postnatal depression. In the UK, one of the most commonly used tools to screen women with symptoms suggestive of postnatal depression is the Edinburgh Postnatal Depression Scale (EPDS), a 10-item self-report questionnaire which asks women to rate how they have felt in the previous week (Cox et al., 1987). Those who score above a pre-defined threshold are recommended to have subsequent further assessment by an appropriately trained health professional. While there has been an increase in use of standardized measures for screening for postnatal depression in recent years, their introduction into practice internationally has been slow. A review of the EPDS found that while the measure was perceived to be generally acceptable, there may be issues around its administration within the clinic setting being “too distracting and uncomfortable for women” (Brealey et al., 2010).

An alternative approach is a single-item question which would be quicker to administer and respond to. Williams et al. (1999) found a single question ‘Are you depressed?’ detected 85–90% of patients with depression in primary care. The same direct question was found to be a useful tool for screening for depression in people with multiple sclerosis (sensitivity 91%; Vahtler et al. 2007). More recent studies have not demonstrated such a strong relationship. For example, when responding to one direct question was compared with the Becks Depression Inventory in cardiology patients the agreement was minimal (Frazier et al., 2014) and when compared to the Subjective Health Complaints Inventory in chronic pain groups the agreement was minimal to moderate (Reme and Erikson, 2010).

It is currently unclear if the use of one direct question would be beneficial in maternity care where there are multiple contacts throughout pregnancy and the postpartum. There has been a strong tradition of asking women about their experiences of health care and their perception of their psychological health using simple survey questions (eg Redshaw et al., 2007; Redshaw and Heikkila, 2010). However the response to a single self-report question has not been compared to the use of self-reported standardised measures. We hypothesise that a woman who reports being depressed using one self-report question will score highly on the EPDS delivered at the same time point.

This study used data from the 2014 National Maternity Surveys in England and Northern Ireland to explore the use of a simple, direct question asking postpartum women whether they self-identified as having depression and to assess how it compares to their score on the self-reported EPDS. The study objectives were (1) to establish the extent of agreement between women's responses to a single direct question and EPDS scores; and (2) to compare the socio-demographic, clinical and psychological characteristics of women who (i) answered ‘yes’ to a direct question about depression, (ii) scored highly on the EPDS, and (iii) answered ‘yes’ to the direct question as well as scoring highly on the EPDS.

2. Methods

2.1. Study setting and participants

This study was a secondary analysis of two cross-sectional datasets from the United Kingdom: the National Survey of Women's Experience of Maternity Care 2014 (England) and the Northern Ireland Survey of Women's Experience of Maternity Care 2014. Details of these datasets have been described elsewhere (Redshaw and Henderson 2015; Alderdice et al., 2016). Briefly, women who gave birth during a specified period in 2014 were identified through birth registrations in England and Northern Ireland (See Fig. 1). The sample in England was a random sample of 10,000 women giving birth during a two week period in January 2014 and in Northern Ireland the sample was all women giving birth between October and December 2014(n = 6123). Questionnaire packs were sent to women three months after they had given birth. Questionnaires asked about clinical events and care during pregnancy, labour and birth and the postnatal period and included self-identified physical and mental health outcomes. Women whose babies had died and those aged under 16 years were excluded. A tailored design was used with reminders and additional questionnaires sent after two, four and eight weeks (Dillman 2007). An online version of the questionnaire was available; 8% of participants in England and 6% of participants in Northern Ireland used this method of return. Usable response rates, excluding undeliverable questionnaires, were 47% and 45% in England and Northern Ireland respectively.

2.2. Assessments

The EPDS is a ten-item questionnaire focusing on psychological symptoms of postnatal depression (Cox et al., 1987). Each item is scored 0–3 with a maximum total score of 30. Higher scores indicate a greater severity of symptoms. The threshold for a positive screen varies according to the geographical and cultural context and participant characteristics (Gibson et al., 2009). The most commonly-used cut-offs are ≥ 10 to indicate minor depression and ≥ 13 to indicate major depression. The same cut-offs are also used to indicate ‘possible’ and ‘probable’ diagnoses of depression, respectively (Cox et al., 1987). In this study, scores of ≥ 13 were used for the main analyses to maximise consistency with other studies (Matthey et al., 2006).

Self-identified depression during the postpartum period was assessed using the following question: ‘Did you experience depression ten days / one month / three months after the birth of your baby?’. Responses were coded separately for each time point. Women were also asked whether they experienced the ‘baby blues’ at each of these times. For this study, women were defined as having self-identified depression if they responded ‘yes’ to having either depression or the baby blues or both at three months postpartum. The baby blues were included at three months because symptoms of this condition persisting beyond the

first month postpartum were considered to be indicative of depression (Hirst and Moutier, 2010).

The presence of physical symptoms postpartum was derived by asking women whether they had experienced a range of physical symptoms at ten days, one month or three months postpartum including painful stitches, incontinence, painful sexual intercourse. The presence of other psychological symptoms postpartum was determined by asking women whether they had experienced any of the following symptoms at ten days, one month or three months postpartum: fatigue, anxiety, sleep problems and post-traumatic stress disorder (PTSD)-type symptoms. PTSD-type symptoms were defined as the presence of any two out of the three following symptoms concurrently at ten days, one month or three months postpartum: flashbacks, relationship problems and difficulty concentrating. Women were also asked if they had experienced or sought help from a midwife or doctor for anxiety or depression during their pregnancy. Those who answered 'yes' to experiencing or seeking help for either condition were defined as having experienced antenatal depression and antenatal anxiety.

2.3. Statistical analysis

The two datasets were cleaned and prepared individually before merging. Descriptive characteristics of participants were summarised. Agreement between self-identified depression and EPDS ≥ 13 was explored by calculating the proportion of women with self-identified depression who also had EPDS ≥ 13 and the proportion of those with EPDS ≥ 13 scores who also self-identified depression. Cohen's kappa coefficient was used to quantify the agreement between these two measures taking into account the possibility of the agreement occurring by chance (McHugh 2012). The kappa coefficient was interpreted using the following cut-offs: 0–.20 indicating 'no agreement'; 0.21–0.39 indicating 'minimal agreement'; 0.40–0.59 indicating 'weak agreement'; 0.60–0.79 indicating 'moderate agreement'; 0.80–0.90 indicating 'strong agreement'; and >0.90 indicating 'almost perfect agreement' (McHugh 2012). Logistic regression was used to identify the socio-demographic, clinical and psychological determinants of (i) women who answered 'yes' to the direct question about depression; (ii) those who scored EPDS ≥ 13; and (iii) those who answered 'yes' to the direct question as well as scoring EPDS ≥ 13. Variables significantly associated with the outcome in the univariable logistic regression analyses were tested for collinearity using the test for pairwise correlation. If a pair of variables was found to be strongly (correlation coefficient ≥ 0.8) and significantly ($p < 0.05$) correlated, only one was retained for inclusion in the multivariable model. A full case analysis was used. All analyses were conducted using STATA version 15.

3. Results

3.1. Baseline characteristics of participating women

Table 1 shows the baseline characteristics of the sample of 7300 participating women (4578 from England and 2722 from Northern Ireland) Over half (56.5%) of respondents were aged 30–39 years, the majority (85.9%) had completed 17 or more years of education, 10.9% of respondents were of minority ethnicity, 20.2% were born outside the UK, 86.5% were living with their partners and 49.1% were primiparous (Table 1).

3.2. Agreement between self-identified depression and EPDS ≥ 13

Of the 7300 participating women, 6752 (92.5%) completed all ten items of the EPDS and the item on self-identified depression. Subsequent analyses are limited to these complete cases. The proportion of women with depression at three months postpartum as assessed using different questions is summarised in Table 2. At three months postpartum, 6.1% self-identified depression, 9.1% scored EPDS ≥ 13

Table 1
Baseline socio-demographic, obstetric and psychological characteristics of participating women and number (proportion) of missing values (n = 7300).

	Proportion of participants n (%)[a]	Missing values n (%)
Age		2 (0.0)
<20 years	140 (1.9)	
20–29 years	2674 (36.6)	
30–39 years	4127 (56.5)	
≥40 years	357 (4.9)	
Age at leaving full-time education		120 (1.6)
≤16 years	1014 (14.1)	
≥17 years	6166 (85.9)	
Ethnicity		214 (2.9)
White British	6316 (89.1)	
Mixed, Black or minority ethnicity	770 (10.9)	
Country of birth		83 (1.1)
UK	5757 (79.8)	
Outside UK	1460 (20.2)	
Needs help with English		121 (1.7)
Does not need help	6944 (96.7)	
Needs help	235 (3.3)	
Partner status		0 (0.0)
Living with partner	6314 (86.5)	
Not living with partner	986 (13.5)	
Survey country		0 (0.0)
England	4578 (62.7)	
Northern Ireland	2722 (37.3)	
Parity		0 (0.0)
Primiparous	3583 (49.1)	
Multiparous	3717 (50.9)	
Planned pregnancy		67 (0.9)
Planned	5624 (77.8)	
Unplanned	1609 (22.3)	
Reaction to pregnancy		76 (1.0)
Happy	6006 (83.1)	
Mixed or unhappy	1218 (16.9)	
Birth experience relative to expectations		280 (3.8)
As expected	2187 (31.2)	
Better than expected	3068 (43.7)	
Worse than expected	1765 (25.1)	
Chronic medical condition complicating pregnancy		104 (1.4)
No	6568 (91.3)	
Yes	628 (8.7)	
Pregnancy-specific complications		184 (2.5)
No	5196 (73.0)	
Yes	1920 (27.0)	
Mode of delivery		147 (2.0)
Normal vaginal delivery	4110 (57.5)	
Instrumental delivery	1074 (15.0)	
Planned Caesarean section	906 (12.7)	
Emergency Caesarean section	1063 (14.9)	
Infant required NNU admission		673 (9.2)
No	5886 (88.8)	
Yes	741 (11.2)	
Mother any physical problems postpartum		45 (0.6)
No	1239 (17.1)	
Yes	6016(82.9)	
Antenatal depression		0 (0.0)
No	6822 (93.4)	
Yes	478 (6.6)	
Antenatal anxiety		0 (0.0)
No	6370 (87.3)	
Yes	930 (12.7)	
Fatigue postpartum[b]		46 (0.6)
No	3456 (47.6)	
Yes	3798 (52.4)	
Anxiety postpartum[b]		46 (0.6)
No	5456 (75.2)	
Yes	1798 (24.8)	
Sleep problems postpartum[b]		46 (0.6)
No	6470 (89.2)	
Yes	784 (10.8)	

(continued on next page)

Table 1 (*continued*)

	Proportion of participants n (%)[a]	Missing values n (%)
PTSD-type symptoms postpartum[b]		46 (0.6)
No	6461 (89.1)	
Yes	793 (10.9)	
Self-identified depression at 3 m **postpartum**		46 (0.6)
No	6807 (93.2)	
Yes	447 (6.8)	
EPDS 3 m **postpartum** median [IQR]	5 [2–8]	547 (7.5)[c]

[a] Results presented as n (%) unless otherwise stated.
[b] Self-identified symptoms, reported at either 10 days, 1 month or 3 months postpartum.
[c] EPDS variable was coded as 'missing' if any single item of the EPDS was missing.

Table 2
Proportion of women with depression at three months postpartum using single question, EPDS and both.

Definition	Proportion n/N	%
Self-reported depression	409/6752	6.1
EPDS ≥ 13	612/6752	9.1
EPDS ≥ 10	1277/6752	18.9
Self-reported depression and EPDS ≥ 13	187/6752	2.8
Self-reported depression and EPDS ≥ 10	278/6752	4.1

and 2.8% were positive on both measures (Table 2).

Of those with self-identified depression or baby blues, 68.0% (278/409) scored EPDS ≥ 10, 45.7% (187/409) scored EPDS ≥ 13, 32.0% (131/409) scored EPDS ≥ 15 and 22.7% (93/409) scored EPDS ≥ 17. Women with self-identified depression or baby blues had a significantly higher median EPDS score compared with women with no self-identified depression or baby blues (median 12 vs. 4; $p < 0.001$). Among women with EPDS ≥ 13, 30.6% self-identified depression or blues and this proportion increased with higher EPDS thresholds (Table 3). Cohen's kappa values suggest 'minimal' agreement between self-identified depression and elevated EPDS scores (Table 3).

3.3. Characteristics of women with self-identified depression and women with EPDS ≥ 13

Table 4 summarises the socio-demographic, clinical and psychological characteristics of (i) women who answered 'yes' to the direct question on depression; and (ii) those with EPDS scores ≥ 13. In the multivariable logistic regression analysis, the following factors remained significantly associated with answering 'yes' to the direct question: maternal age over 40 years compared with the reference age range of 30–39 years), antenatal depression and a number of other symptoms experienced postpartum including fatigue, anxiety, sleep problems and PTSD-type symptoms. The following variables remained significantly associated with EPDS scores ≥ 13 in the multivariable analysis: fewer years of completed education, Black or minority ethnicity; not living with a partner; a mixed or unhappy reaction to the pregnancy; antenatal depression; and other symptoms experienced postpartum including fatigue, anxiety, sleep problems and PTSD-type symptoms. For both groups of women, the strongest association was seen with postpartum anxiety.

4. Discussion

Findings from this study provide interesting insight into the implications of using different means of identifying postnatal depression. Our results suggest that using a direct question asking women whether they are depressed identifies a different group of women from those who score highly on the EPDS. In our sample, 6.1% of women reported having depression on the direct question, 9.1% of women scored EPDS ≥ 13, and 2.8% were positive on both measures. Of those who answered 'yes' to the direct question, two thirds (68.0%) scored ≥10 and almost half (45.7%) scored ≥ 13 on the EPDS. Conversely, of those women who scored ≥ 13 on the EPDS, under a third (30.6%) self-identified as having depression. We hypothesied that there would be a significant agreement between the two different approaches, however, although there was some overlap between these two groups, the results suggest low levels of agreement between the two measures with Cohen's kappa values of 0.3 and below.

The prevalence of depression using the EPDS ≥ 10 (18%) and EPDS ≥ 13 cut off (9%) was within the range of overall prevalence of clinically significant postpartum depressive symptoms reported by Jones (2014). On the other hand, our study suggests that the rate of self-identified postnatal depression was low when compared with estimates from other studies, which have relied largely on screening tools such as the EPDS. When faced with a direct question, women may not self-identify as depressed or may feel reluctant to disclose depression, for example due to persisting stigma around mental disorders. This may be the case particularly during the perinatal period, when women may be concerned about disclosing depressive symptoms due to fear of their parenting abilities being called into question and the potential involvement of social care services. Such factors have been identified previously as affecting women's responses to depression screening questions (Brealey et al., 2010; Henderson et al., 2018).

A major concern with using both these approaches in practice is missing women who chose not to identify themselves as having depression. A qualitative meta-synthesis by Button et al. (2017), which explored barriers to seeking help, suggests that some women see standardised questions as less personal and a poor substitute for face to face discussion. However other women found answering such questions more reassuring and an opportunity to admit they needed help. There is also evidence to suggest that the manner in which mental health is discussed matters more to women than the type of measure or phrasing used, such that disclosure of symptoms is heightened when women are made to feel at ease and an enabling environment without time constraints is provided (Darwin et al., 2016).

Irrespective of which measure was used, postpartum fatigue, anxiety, sleep problems and PTSD-type symptoms were most strongly associated with postnatal depression at three months. This is consistent

Table 3
Agreement between EPDS scores and self-identified depression.

EPDS cut-off	Total proportion of participants above threshold	Proportion of participants above threshold with self-reported depression	Cohen's kappa and level of agreement[a]
≥10	18.9% (1277/6752)	21.8% (278/1277)	0.2621 (minimal)
≥13	9.1% (612/6752)	30.6% (187/612)	0.3167 (minimal)
≥15	5.3% (359/6752)	36.5% (131/359)	0.3016 (minimal)
≥17	3.4% (227/6752)	41.0% (93/227)	0.2065 (minimal)

[a] Level of agreement based on 0–.20 None; 0.21–0.39 Minimal; 0.40–0.59 Weak; 0.60–0.79 Moderate; 0.80–0.90 Strong; >0.90 Almost perfect (McHugh 2012).

Table 4
Depression at three months postpartum: characteristics of women with self-identified depression and EPDS ≥ 13, (n = 6752).

	Self-identified depression				**EPDS ≥ 13**			
	Yes (n = 409)[a] n (%)	**No** (n = 6343)[a] n (%)	**Unadjusted OR** (95% CI)	**Adjusted OR**[b] (95% CI)	**Yes** (n = 612)[a] n (%)	**No** (n = 6140)[a] n (%)	**Unadjusted OR (95% CI)**	**Adjusted OR**[b] (95% CI)
Age				–				–
<20 years	11 (8.6)	117 (91.4)	1.59 (0.85–3.00)	1.46 (0.74–2.90)	20 (15.6)	108 (84.4)	**2.05 (1.25–3.35)**	
20–29 years	151 (6.2)	2289 (93.8)	1.12 (0.90–1.39)	1.04 (0.82–1.30)	239 (9.8)	2201 (90.2)	**1.20 (1.01–1.43)**	
30–39 years	215 (5.6)	3646 (94.4)	Ref	Ref	320 (8.3)	3541 (91.7)	Ref	
≥40 years	31 (9.7)	290 (90.3)	**1.81 (1.22–2.69)**	1.83 (1.20–2.79)	33 (10.3)	288 (89.7)	1.27 (0.87–1.85)	
Education				–				
≥17 years	351 (6.1)	5423 (93.9)	Ref		492 (8.5)	5282 (91.5)	Ref	Ref
≤16 years	57 (6.1)	872 (93.9)	1.01 (0.76–1.35)		115 (12.4)	814 (87.6)	**1.52 (1.22–1.88)**	**1.36 (1.05–1.77)**
Ethnicity				–				
White British	373 (6.2)	5619 (93.8)	Ref		515 (8.6)	5477 (91.4)	**Ref**	Ref
BME	31 (4.9)	605 (95.1)	0.77 (0.53–1.12)		82 (12.9)	554 (87.1)	**1.57 (1.23–2.02)**	**1.42 (1.06–1.90)**
Country of birth				–				–
UK	345 (6.3)	5113 (93.7)	Ref		486 (8.9)	4972 (91.1)	Ref	
Outside UK	60 (4.9)	1175 (95.1)	0.76 (0.57–1.00)		121 (9.8)	1114 (90.2)	1.11 (0.90–1.37)	
Help with English[c]								–
No	402 (6.2)	6116 (93.8)	Ref	–	586 (9.0)	5932 (91.0)	Ref	
Yes	3 (1.7)	172 (98.3)	**0.27 (0.08–0.83)**		20 (11.4)	155 (88.6)	1.31 (0.81–2.10)	
Living with partner				–				
With partner	339 (5.7)	5576 (94.3)	Ref		473 (8.0)	5442 (92.0)	Ref	Ref
Without partner	70 (8.4)	767 (91.6)	**1.50 (1.15–1.96)**		139 (16.6)	698 (83.4)	**2.29 (1.87–2.81)**	**1.69 (1.31–2.19)**
Survey country				–				–
England	271 (6.5)	3907 (93.5)	Ref		388 (9.3)	3790 (90.7)	Ref	
Northern Ireland	138 (5.4)	2436 (94.6)	0.82 (0.66–1.01)		224 (8.7)	2350 (91.3)	0.93 (0.78–1.11)	
Parity				–				
Primiparous	201 (6.1)	3119 (93.9)	Ref		287 (8.6)	3033 (91.4)	Ref	–
Multiparous	208 (6.1)	3224 (93.9)	1.00 (0.82–1.22)		325 (9.5)	3107 (90.5)	**1.11 (0.94–1.31)**	
Planned pregnancy				–				–
Planned	291 (5.6)	4951 (94.4)	Ref		404 (7.7)	4838 (92.3)	Ref	
Unplanned	117 (8.0)	1344 (92.0)	**1.48 (1.19–1.85)**		206 (14.1)	1255 (85.9)	**1.97 (1.64–2.35)**	
Reaction				–				
Happy	308 (5.5)	5277 (94.5)	Ref		412 (7.4)	5173 (92.6)	Ref	Ref
Mixed or unhappy	99 (8.9)	1017 (91.1)	**1.67 (1.32–2.11)**		192 (17.2)	924 (82.8)	**2.61 (2.17–3.14)**	**1.69 (1.35–2.11)**
Birth as expected				–				–
As expected	110 (5.4)	1937 (94.6)	Ref		169 (8.3)	1878 (91.7)	Ref	
Better	159 (5.6)	2680 (94.4)	**1.04 (1.17–1.97)**		221 (7.8)	2618 (92.2)	0.94 (0.76–1.16)	
Worse	131 (7.9)	1523 (92.1)	**1.51 (0.81–1.34)**		200 (12.1)	1454 (87.9)	**1.53 (1.23–1.90)**	
Chronic condition in pregnancy								–
No	345 (5.7)	5764 (94.3)	Ref	–	528 (8.6)	5581 (91.4)	Ref	
Yes	61 (10.6)	513 (89.4)	**1.99 (1.49–2.64)**		80 (13.9)	494 (86.1)	**1.71 (1.33–2.20)**	
Pregnancy complications				–				–
No	269 (5.6)	4558 (94.4)	Ref		422 (8.7)	4405 (91.3)	Ref	
Yes	136 (7.6)	1651 (92.4)	**1.40 (1.13–1.73)**		183 (10.2)	1604 (89.8)	1.19 (0.99–1.43)	
Delivery				–				–
NVD	224 (5.9)	3587 (94.1)	Ref		349 (9.2)	3462 (90.8)	Ref	
Instrumental	59 (5.8)	957 (94.2)	0.99 (0.73–1.33)		93 (9.2)	923 (90.8)	1.00 (0.79–1.27)	
Planned CS	50 (6.0)	783 (94.0)	1.02 (0.75–1.40)		67 (8.0)	766 (92.0)	0.87 (0.66–1.14)	
Emergency CS	65 (6.6)	920 (93.4)	1.13 (0.85–1.51)		92 (9.3)	893 (90.7)	1.02 (0.80–1.30)	
NNU				–				–
No	341 (6.2)	5169 (93.8)	Ref		499 (9.1)	5011 (90.9)	Ref	
Yes	37 (5.4)	646 (94.6)	0.87 (0.61–1.23)		69 (10.1)	614 (89.9)	1.13 (0.87–1.47)	
Physical problems PP				–				–
No	25 (2.2)	1092 (97.8)	Ref		58 (5.2)	1059 (94.8)	Ref	
Yes	384 (6.8)	5251 (93.2)	**3.19 (2.12–4.81)**		554 (9.8)	5081 (90.2)	**1.99 (1.51–2.63)**	
Antenatal depression								
No	317 (5.0)	6006 (95.0)	Ref	Ref	458 (7.2)	5865 (92.8)	Ref	Ref
Yes	92 (21.5)	337 (78.5)	**5.17 (4.00–6.69)**	**2.84 (2.15–3.77)**	154 (35.9)	275 (64.1)	**7.17 (5.76–8.93)**	**3.44 (2.65–4.46)**
Antenatal anxiety				–				–
No	273 (4.6)	5621 (95.4)	Ref		387 (6.6)	5507 (93.4)	Ref	
Yes	136 (15.9)	722 (84.2)	**3.88 (3.11–4.83)**		225 (26.2)	633 (73.8)	**5.06 (4.21–6.08)**	
Fatigue 3 m **PP**								
No	81 (2.6)	3091 (97.4)	Ref	Ref	129 (4.1)	3043 (95.9)	Ref	Ref
Yes	328 (9.2)	3252 (90.8)	**3.85 (3.00–4.93)**	**1.92 (1.46–2.52)**	483 (13.5)	3097 (86.5)	**3.68 (3.01–4.50)**	**1.65 (1.30–2.09)**
Anxiety 3 m **PP**								

(*continued on next page*)

Table 4 (*continued*)

	Self-identified depression				**EPDS ≥ 13**			
	Yes (*n* = 409)[a] n (%)	**No** (*n* = 6343)[a] n (%)	**Unadjusted OR** (95% CI)	**Adjusted OR**[b] (95% CI)	**Yes** (*n* = 612)[a] n (%)	**No** (*n* = 6140)[a] n (%)	**Unadjusted OR (95% CI)**	**Adjusted OR**[b] (95% CI)
No	144 (2.9)	4915 (97.1)	Ref	Ref	195 (3.9)	4864 (96.1)	Ref	Ref
Yes	265 (15.7)	1428 (84.3)	**6.33 (5.13–7.82)**	**3.62 (2.86–4.59)**	417 (24.6)	1276 (75.4)	**8.15 (6.80–9.77)**	**4.67 (3.79–5.76)**
Sleep problem 3 m **PP**								
No	274 (4.5)	5766 (95.5)	Ref	Ref	393 (6.5)	5647 (93.5)	Ref	Ref
Yes	135 (19.0)	577 (81.0)	**4.92 (3.94–6.15)**	**2.22 (1.73–2.85)**	219 (30.8)	493 (69.2)	**6.38 (5.28–7.71)**	**2.49 (1.99–3.11)**
PTSD-type symptoms 3 m **PP**								
No	287 (4.8)	5730 (95.2)	Ref	Ref	399 (6.6)	5618 (93.4)	Ref	Ref
Yes	122 (16.6)	613 (83.4)	**3.97 (3.16–4.99)**	**1.50 (1.16–1.94)**	213 (29.0)	522 (71.0)	**5.75 (4.76–6.94)**	**2.15 (1.71–2.70)**

Abbreviations: CS Caesarean section; NNU neonatal intensive care unit; NVD normal vaginal delivery; PP postpartum; PTSD post-traumatic stress disorder, 3 m 3 months.

Bold denotes statistical significance at $p < 0.10$ for univariable analysis and $p < 0.05$ for multivariable analysis.

[a] Number who responded to each item varies; some variables may not add up to total denominator.

[b] Adjusted OR shown for variables statistically significantly ($p < 0.05$) associated with the outcome in univariable analysis.

[c] Not included in multivariable model for self-reported depression due to small numbers.

with evidence of high levels of co-morbidity between perinatal depression and other mental disorders such as anxiety (Coelho et al., 2011). These findings suggest it is important to incorporate other psychological symptoms into assessments of women's wellbeing. It is also important to consider the characteristics of the women who identify themselves as depressed to identify potential risk factors. Women who self-identified as having depression using the direct question tended to be older (age over 40 years). The open-ended nature of the direct question leaves much scope for differences in personal and cultural interpretation, although we did not find any significant differences according to country of birth or English language ability. Even in the absence of high EPDS scores, women who consider themselves to be depressed constitute a group who require additional support, even in the absence of high EPDS scores. This group may benefit from a broader, integrated care packages including individualised advice or support for physical and psychological symptoms and with an emphasis on social support in the community.

Women who scored highly on the EPDS were more likely to have lower levels of education, be of Black or minority ethnic background, be living without a partner and feel unhappy or 'mixed' about their pregnancy. These women represent a high-risk group. Women living in conditions of disadvantage are known to be at higher risk of mental health disorders and there is evidence that women of ethnic minority backgrounds are significantly less likely to be asked about their mental health (Redshaw and Henderson 2016). Most women in this group did not self-identify as being 'depressed' on direct questioning, suggesting that the EPDS remains a valuable tool for identifying clinically significant symptoms which may otherwise not be disclosed by women themselves. The higher proportion of women who scored positively on the EPDS may also reflect the broader range of symptoms captured by the EPDS. For example, women might consider certain symptoms such as difficulty sleeping and tearfulness to be 'normal' aspects of the postpartum period rather than indicative of depression. Furthermore, the EPDS also elicits symptoms of anxiety (items 3, 4 and 5) and anhedonia (items 1 and 2) which are not captured by the direct question about depression (Brouwers et al., 2001; Matthey et al., 2013; Zanardo et al., 2017). The EPDS therefore provides an opportunity for women to disclose a wide range of individual symptoms without stating directly that they are depressed.

4.1. Limitations

There are a number of limitations to this research. First, the low overall survey response rate limits the representativeness of the findings (response rate of 47% in England and 45% in Northern Ireland, excluding questionnaires that were undeliverable). Specifically, women living in deprivation, from marginalised groups and those born outside of the UK are under-represented (Redshaw and Henderson 2015; Alderdice et al., 2016). This may have led to an underestimation of the associations between these factors and depression status. However, the completeness of questionnaires was generally high with missing values under 5% for most variables. Secondly, in the absence of a 'gold standard' diagnostic interview we cannot make any claims regarding the accuracy or internal validity of either of the screening tools. However, the purpose of this study was not to assess the validity of either measure but rather to compare two potential methods of identifying postnatal depression. Finally, the inclusion of baby blues at three months postpartum in our definition of depression may have led to an over-estimation of self-reported depression using a direct question. Given that the baby blues typically resolve within the first month postpartum, we felt that symptoms experienced at three months postpartum were indicative of depression. Women may feel more comfortable disclosing baby blues rather than depression due to the associated stigma.

5. Conclusion

Exploring the use of a direct question is important as women's own views on their psychological wellbeing, even if they do not meet the screening threshold on measures such as EPDS, are important to ensure women are gaining appropriate support during a vulnerable period. In-depth qualitative interviews with women both those who self-identified and those who did not will provide a better understanding of women's perception of what such direct questions mean to them. Our results suggest that different ways of asking about depression identify different groups of women although both groups had high co-morbidity with other psychological symptoms, particularly postnatal anxiety using both measures. Our findings highlight the need for broader assessment and understanding of psychological symptoms in the perinatal period to ensure we are meeting the needs of women.

Competing interests

All authors declare no conflict of interests.

Contributors

GF and FA conceived of the study. GF, CO and FA conducted data analysis. All authors contributed to data interpretation and article preparation. All authors approved the final manuscript.

Funding

This paper reports on an independent study which was funded by the Policy Research Programme in the Department of Health. The views expressed are not necessarily those of the Department. The Department of Health was not involved in any aspect of the study. The Northern Ireland study was funded by the HSCR&D NI.

Acknowledgements

Thank you to all the women who took part in the surveys

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jad.2019.03.002.

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