



Disclosure of sensitive material at routine antenatal psychosocial assessment: The role of psychosocial risk and mode of assessment

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ABSTRACT

Problem: While routine psychosocial assessment is acceptable to most pregnant women, some women will not fully disclose psychosocial concerns to their clinician.

Aims: To assess the impact of psychosocial risk, current symptoms and mode of assessment on women's honesty of disclosure at psychosocial assessment.

Methods: Logistic regression was used to examine associations between disclosure and a range of psychosocial characteristics in women who were 'always honest' and 'not always honest'. Mixed ANOVAs were used to test the influence of mode of assessment and honesty on scores on a repeated measure of psychosocial risk.

Findings: 10.8% (N = 193 of 1788) of women did not fully disclose at psychosocial assessment. Non-disclosure was associated with a mental health history (aOR = 1.78, 95%CI: 1.18–2.67, $p < 0.01$) and lack of social and partner support (aOR = 1.74, 95%CI: 1.16–2.62, $p < 0.05$; aOR = 2.08, 95%CI: 1.11–3.90, $p < 0.05$, respectively). Those reporting not always being honest at face to face assessment showed a greater increase in psychosocial risk score when the assessment was repeated online via self-report, compared to women who were always honest.

Discussion: A history of mental health issues and lack of social and partner support are associated with reduced disclosure at face to face assessment. Online self-report assessment may promote greater disclosure, however this should always be conducted in the context of clinician feedback.

Conclusion: Greater psychosocial vulnerability is associated with a lower likelihood of full disclosure. Preliminary findings relating to mode of assessment warrant further exploration within a clinical context.

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Statement of significance

Problem

The stigma associated with the presence of psychosocial and mental health issues can reduce likelihood of disclosure, making it harder for clinicians to provide timely intervention. This is especially important in perinatal women where

untreated illness can affect maternal and infant outcomes. Increased understanding of whether particular groups of women are less likely to disclose at routine psychosocial assessment during pregnancy, and whether alternative modes of assessment may facilitate disclosure, would assist clinicians to more promptly respond to the needs of their patients.

What is already known

Women with greater psychosocial morbidity are less likely to respond honestly at routine depression screening and there is some evidence that women prefer, and disclose more freely at, assessment undertaken via online self-report compared to face to face. There is a need to better

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understand what factors may enhance or reduce disclosure of sensitive information at routine antenatal psychosocial assessment.

What this paper adds

This paper provides new insights into the risk factors associated with nondisclosure at psychosocial assessment in pregnancy and the impact that mode of administration may have on this.

1. Introduction

Some 20% of women will experience mental health morbidity during the perinatal period (pregnancy and the first postnatal year) [1]. Gaynes et al. [1] reported that 12.7% of pregnant women and 21.9% of women across the first postnatal year experienced major depression, while Dennis et al. [2] found anxiety disorder rates of 13.4% in pregnancy and 8.4% in the first six postnatal months. Furthermore, while perinatal depressive illness can be a self-limiting condition, recent studies report that 30% of women remain symptomatic into the fourth and fifth postnatal years [3,4]. Yet despite its prevalence, primary care physicians will only detect 33–42% cases of major depression when universal assessment is not part of routine clinical practice [5]. A large Australian study showed that 19% of pregnant women who were screened were referred to psychosocial services compared to 3.7% of those not screened [6] and that enquiry about emotional health (compared to not being asked) was associated with greater professional help seeking by women experiencing mental health symptoms [7]. A recent review of the clinical effectiveness of perinatal depression screening concluded that the majority of studies showed an overall benefit of depression screening programs. Screening was associated with increased referral to, and engagement with, appropriate psychosocial services and improved scores on a number of key symptom-based measures in women screened compared to those who were not screened [8]. Previous studies demonstrate an overall benefit of psychosocial assessment on mental health help-seeking and help-uptake among pregnant and postpartum women [9,10].

Early detection of psychological symptoms and psychosocial risk through routine structured assessment in pregnancy has the potential to identify women who would benefit from referral into treatment, thereby leading to improved maternal and infant outcomes [11]. In Australia, *psychosocial assessment* was recommended as part of routine pregnancy care in the 2017 guidelines for mental healthcare in the perinatal period and is inclusive not only of depression screening (assessing for current depressive symptoms) but other sensitive topics including adverse childhood experiences or abuse, past mental health episodes, interpersonal violence and substance misuse [12]. Higher levels of psychosocial risk identified during pregnancy are strongly associated with higher rates of diagnosed postnatal depression and anxiety [13]. Moreover, risk factors such as substance and alcohol use is associated with antenatal depression and anxiety [14]. Hence early identification and intervention for vulnerable women is an important element in the drive to reduce mental health morbidity, as well as improve offspring health outcomes, which is strongly associated with maternal mental health [15].

Recent studies have shown that about 20% of perinatal women report do not fully disclose depressive symptoms to their perinatal care provider, with those who are experiencing interpersonal violence, social disadvantage and/or a mental health history being the least likely to fully disclose [16], along with women who fear being seen as a bad mother [16,17].

Routine *psychosocial assessment* by midwives has been found by our group to be highly acceptable with over 90% of pregnant

women reporting they were not at all distressed at assessment with their midwife [13]. However, there was no enquiry about level of disclosure in this study. A study of pregnant women undertaking a self-report psychosocial assessment inclusive of a range of sensitive items, found about 18% of women did not fully disclose psychosocial concerns to their clinician [18], a similar rate of nondisclosure to depression screening alone [16,17]. Kingston et al. [17] also found that pregnant women were more comfortable and likely to disclose depressive symptoms with anonymous paper-based (90%) or online (82%) self-assessment as compared to phone based screening with a study nurse (62%) [17]. As compared with clinical practice, these research studies provided a degree of anonymity to participants, because women's responses were not shared with her maternity care provider, and mental health follow up, when needed, was organised directly by the research associate [19].

The relationship between mode of assessment and disclosure in relation to particularly sensitive topics such as domestic violence and childhood abuse, has been explored in non-pregnant populations. In a meta-analysis comparing methods of screening women for domestic violence, Hussain et al. found that disclosure was 37% lower when screening was administered via face–face interview compared to computer-assisted self-administered methods (pooled OR 0.63, 95%CI 0.31–1.30) [20]. In contrast, DiLillo et al. found that disclosure about childhood maltreatment in college students did not vary by mode of assessment (face to face, pen and paper self-report, computer assisted self-report) [21]. Nonetheless, participants reported a preference for the computer condition, which they saw as the most confidential means of assessing a maltreatment history. Similarly, Tourangeau and Smith [22] found that online self-report was associated with two to four times the level of disclosure compared to interview with a research assistant when participants were asked about sexual and other sensitive behaviours.

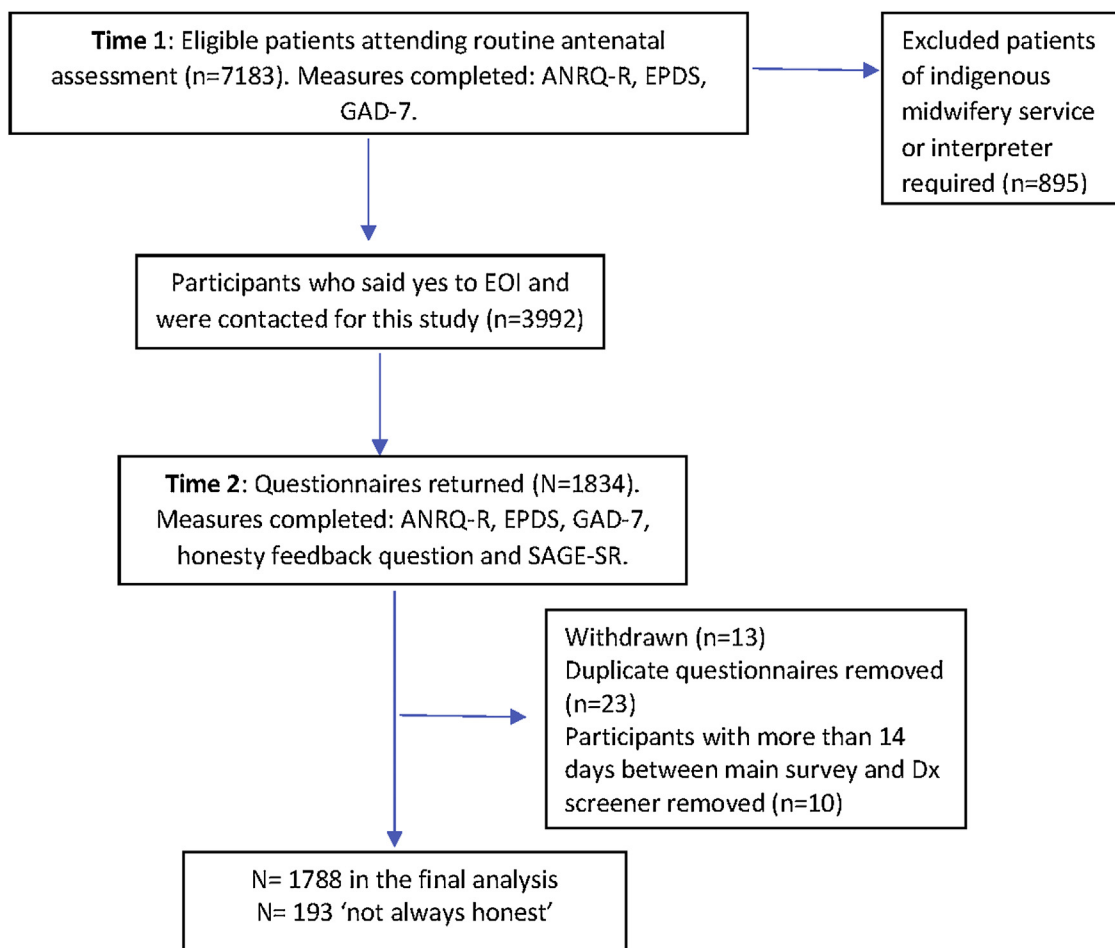
Our study aimed to extend this literature by prospectively exploring factors associated with pregnant women's level of disclosure at psychosocial screening in a real-world clinical setting where discussion with a midwife of psychosocial and mental health concerns forms part of routine assessment. A secondary aim was to examine whether honesty and mode of assessment (face–face with their midwife versus self-report online) were associated with a difference in scores on a repeated measure of psychosocial risk.

We hypothesised that women who reported being less honest about their psychosocial circumstances when asked by their midwife would be those with higher psychosocial risk and higher mental health symptom scores or a current probable mental health diagnosis. Secondly, we hypothesised that women at higher psychosocial risk would be more likely to disclose at online self-report than at face-to-face assessment with a midwife.

2. Methods

2.1. Participants

This study is part of a larger research project undertaken at a large tertiary public maternity hospital based in Sydney, Australia [23]. Women were eligible to participate if they attended the antenatal clinic of the participating site for a routine booking-in appointment between 28th of March 2017 and 27th May 2019, expressed an interest in being contacted by the research team, were able to complete study measures in English and were not clients of the hospital's Indigenous midwifery or maternal fetal medicine services (due to differences in the models of care and service delivery). Fig. 1 below describes the participant recruitment process and measures completed for the current study.



SAGE-SR: Series of Assessments to Guide Evaluation – Self Report; EPDS: The Edinburgh Postnatal Depression Scale, ANRQ-R: Antenatal Risk Questionnaire-Revised, GAD-7: The Generalised Anxiety Disorder Assessment.

Fig. 1. Participant flow chart and data collection.

2.2. Study measures and procedures

2.2.1. Time 1

Participants completed a psychosocial assessment with their midwife as part of routine antenatal care. The psychosocial assessment comprised the following measures:

Antenatal Risk Questionnaire-Revised (ANRQ-R): the ANRQ-R is an updated version of the validated Antenatal Risk Questionnaire (ANRQ) [24]. It is a brief psychosocial risk measure that asks about past mental health history, adverse childhood experiences (ACE), perfectionist or anxious personality style, current stressors, emotional support from partner and anticipated support with the baby. Additional items assessed for recent or current domestic violence, and substance misuse. The ANRQ-R consists of dichotomous (Yes/No) and Likert-type items and has a total score range of 0–55, with higher scores indicating higher levels of psychosocial risk. ACE was considered to be present if one or more of the childhood emotional abuse or neglect, physical or sexual abuse questions were endorsed on the ANRQ-R. This was recorded as a binary variable in keeping with the approach taken by Plant et al. [25].

The Edinburgh Postnatal Depression Scale (EPDS) [26]: the EPDS is a 10-item self-report depression screening scale that has been validated for use in pregnancy and postnatally [27]. It asks about the presence of depressive symptoms within the previous seven

days, with higher scores indicating more symptoms (total score range 0–30). A score of 13 or above indicates possible major depression and 10 and above minor depression.

Time 1 ANRQ-R and EPDS data, along with information relating to maternal age, parity, country of birth, partner status, age and gestation, were extracted from eMaternity, the administrative health data platform used at the participating site.

2.2.2. Time 2

Participants completed the following measures approximately two weeks after their routine psychosocial assessment.

Honesty of disclosure of psychosocial concerns at routine antenatal appointment: women were asked to indicate the extent to which they were “completely honest when answering questions about my emotional health and wellbeing with my midwife”. Responses were collapsed to form two categories: ‘Always honest’ (honest every time) and ‘Not always honest’ (honest most of the time/some of the time/never).

The GAD 7 [28]: a 7-item self-report anxiety scale, designed to evaluate the presence and severity of Generalised Anxiety Disorder (GAD). A score of 10 or more is considered indicative of moderate anxiety and higher scores with greater levels of anxiety. The measure has good reliability, as well as criterion, construct, factorial, and procedural validity [29].

The SAGE-SR questionnaire [30]: an online, structured self-report diagnostic screener, compatible with international behavioural health diagnostic standards that generates probable DSM-5 diagnoses. Preliminary test-retest reliability in a small non-clinical sample has shown good to excellent reliability for the mood and anxiety disorders modules [30].

A repeat ANRQ-R and EPDS were also completed at Time 2, completed within two weeks of the Time 1 antenatal assessment. Participants completed all Time 2 measures via the online 'Key Survey'TM and Qualtrics platforms, with the exception of the SAGE-SR, which was completed via the TeleSage platform.

2.3. Data analysis

Characteristics of women who did and did not participate in the study, and who were and were not always honest with their midwife, were initially compared using descriptive statistics. The psychosocial characteristics of women who were and were not always honest were compared using cross tabulations and Chi-Squared goodness of fit analyses. Independent samples t-tests were used to compare differences in mean EPDS, GAD-7 and ANRQ-R scores among women who were and were not always honest. Logistic regression techniques were then used to further examine associations between women who were and were not 'always honest', in terms of sociodemographic characteristics (age, parity and years of education) and the following psychosocial variables, as reported at Time 2: current or recent domestic violence, a past mental health history or history of adverse childhood experiences (as measured by the ANRQ-R), current depressive or anxiety symptoms (as measured by the EPDS and GAD-7) and any probable current diagnosis (as measured by the SAGE-SR). Univariate logistic regressions were first performed to identify any significant variables. All significant variables ($p < 0.1$) were then included in a multivariable model. For the multivariable analyses, key variables were added into the model in a stepped fashion using a logical order, starting with demographic variables. The variance inflation factor (VIF) was used to assess multicollinearity and showed that there was no correlation severe enough to warrant corrective measures ($VIF < 3$). Mixed ANOVAs were used to test the influence of mode of assessment (within-subject factor) and honesty (between-subjects factor) on total ANRQ-R scores. All analyses were conducted using SPSS version 25 [31].

3. Ethics

The project was approved by South Eastern Sydney Local Health District Human Research Ethics Committee (Ref. 14/117).

4. Results

Psychosocial assessment administered by the midwife was completed by 7183 women at their booking-in appointment as part of usual care. Of these, 1788 (24.9%) eligible women consented to participate and completed study measures at Time 2. The mean age of study participants was 33.4 years ($SD = 4.1$; range = 19–50) and on average these women were 15.6 weeks gestation ($SD = 3.2$; range = 6–38). Nearly two-thirds (63.3%) were nulliparous, with 76.1% planned spontaneous pregnancies, 8.9% pregnancies resulting from assisted reproductive technology and the remainder spontaneous and unplanned. Almost half of the participants (48%) were born overseas (mostly in English-speaking countries) and 78.9% had a university degree. There were no clinically significant differences between women who did and did not participate in the study in terms of these characteristics, or in terms of scores on the EPDS (all phi effect sizes = 0.1 or less indicating small effect size).

The mean EPDS score for Time 2 women was 4.58 ($SD 4.00$), the proportion of these with an EPDS score 10 or more was 11.4% and score of 13 or more was 4.9%.

Overall, 11.2% of participants ($N = 193$) reported not always being honest when responding to the psychosocial questions with their midwife at the booking-in assessment. There was 60 (3.4%) women in our sample who did not respond when asked about honesty at psychosocial health assessment with their midwife. There were no statistical or clinical differences between women who were and were not always honest in terms of age, gestation, parity, mode of conception, being non-Australian born or educational level (all phi effect sizes = 0.1 or less indicating small effect size). However, compared to women who were always honest, women who were not always honest reported higher rates of past history of mental health issues, current or recent domestic violence, ACE, probable diagnosis of depressive or anxiety disorder, current or recent substance misuse, lower levels of expected practical support with baby and lower levels of emotional support from their partner (all $p < 0.001$; see Table 1). The Time 2 EPDS, GAD-7 and ANRQ-R mean scores were also all significantly higher in the 'not always honest' group than in the 'always honest' (see Table 2). Moreover, 24.1% of the 'not always honest' women scored 10 or more on the EPDS versus 9.9% in the 'always honest' group; and 7.3% women who were 'not always honest' scored 13 or more on the EPDS versus 4.7% women who were 'always honest' (see Table 1), although this was not statistically significant ($p = 0.162$).

5. Sociodemographic characteristics, psychosocial risk and honesty of disclosure at routine antenatal appointment

Results of the regression analyses are presented in Table 3. Having a mental health history, adverse childhood experiences, current or recent domestic violence and having any probable current disorder across the diagnostic modules in the SAGE-SR questionnaire were all individually associated with increased odds of not always being honest. After adjusting for age, parity and educational level in model (a), women with a mental health history or adverse childhood experiences had up to double the odds of reporting not always being honest with their midwife at routine assessment than women without such history (aOR = 2.03, 95%CI: 1.47–2.79; $p < 0.001$; aOR 1.74, 95%CI: 1.26–2.41, $p < 0.01$, respectively).

Once all other factors were included in the model (b), women with a mental health history were 78% more likely (aOR = 1.78, 95%CI: 1.18–2.67, $p < 0.01$) to report not always being honest when compared to women without a mental health history. Further, women with a lack of social support were 74% more likely, and women with a lack of support from their partner more were more than twice as likely (aOR = 1.74, 95%CI: 1.16–2.62, $p < 0.05$ and aOR = 2.08, 95%CI: 1.11–3.90, $p < 0.05$, respectively) to report not always being honest at their routine assessment, relative to women with these supports. Current or recent domestic violence, current or past substance misuse concern and an ACE were not predictive of honesty of disclosure in this regression model.

6. Mode of assessment

Results of the mixed ANOVA analysis are presented in Table 4 and Fig. 2. There was a simple main effect of mode of administration, a simple main effect of honesty, and a significant interaction between mode of administration and honesty in terms of total ANRQ-R scores. Women who reported not always being honest had higher ANRQ-R total scores overall than women who were always honest and the impact of mode of administration on their scores was more pronounced. Specifically, women who reported not always being honest with their midwife at

Table 1
Psychosocial characteristics of women who reported being always honest vs. not always honest at their routine antenatal appointment.

	Always honest (%)	Not always honest (%)	Chi square difference
Mental health history ^a			
Present	419 (27.4)	87 (46.3)	28.76**
Not present	1110 (72.6)	101 (53.7)	
Current or recent domestic violence			
Present	50 (3.3)	15 (8.0)	8.94**
Not present	1479 (96.7)	173 (92.0)	
Adverse childhood experiences ^b			
Present	411 (26.9)	80 (42.3)	18.92**
Not present	1118 (73.1)	109 (57.7)	
Current or recent substance misuse			
Present	17 (1.1)	9 (4.80)	12.67**
Not present	1511 (98.9)	180 (95.2)	
Lack of support with baby ^d			
Present	349 (22.8)	80 (42.6)	33.72**
Not present	1180 (77.2)	108 (57.4)	
Lack of partner emotional support ^d			
Present	94 (6.1)	34 (18.1)	32.87**
Not present	1435 (93.9)	154 (81.9)	
Probable current diagnosis ^c			
Present	64 (5.9)	18 (14.0)	10.49**
Not present	1015 (94.1)	111 (86.0)	
EPDS			
13 or above	72 (4.7)	14 (7.3)	1.95
Below 13	1460 (95.3)	177 (92.7)	
GAD-7			
10 or above	34 (2.2)	9 (4.8)	3.47
Below 10	1496 (97.8)	180 (95.2)	

Note: Boldface indicates statistically significant result, **p < 0.001.

^a ANRQ-R items: present if 'yes' to past mental health problem that had significant impact on socio-occupational function (score of 3 or more) or for which professional help was sought.

^b ANRQ-R items: present if 'yes' to one of more of childhood emotional abuse or neglect, physical or sexual abuse.

^c Present if met SAGE-SR criteria for any diagnosis across any of the diagnostic modules in the SAGE-SR questionnaire.

^d ANRQ-R item: dichotomised into low scoring (1–2; risk factor not present) or high scoring (3 or more; risk factor present).

Table 2
Mean scores for the EPDS, GAD-7 and ANRQ-R among women who were and were not always honest at their routine antenatal appointment.

Measure (range of possible scores)	Always honest (N = 1606) M (SD)	Not always Honest (N = 193) M (SD)	Mean difference T value (df) ^a
EPDS (0–30)	4.29 (3.93)	6.91 (3.85)	–8.69 (1729)**
GAD-7 (0–21)	2.23 (2.69)	3.76 (3.11)	–7.26 (1725)**
ANRQ-R (0–55)	13.20 (6.95)	17.69 (7.13)	–8.35 (1724)**

Note: Boldface indicates statistically significant result, **p < .001.

^a Excludes missing data. Missing data for EPDS n = 10, GAD-7 n = 68 and ANRQ-R n = 69.

assessment showed a significant increase in scores (moderate effect size) when completing the repeat ANRQ-R via online self-report (M = 17.66) than face-face with their midwife (M = 13.87), compared to women who were always honest (M = 12.37 vs. M = 13.19, respectively).

7. Discussion

This study showed that lack of partner and social support and a past mental health history are associated with lack of full disclosure at multivariate analysis. As in the Forder et al. [16] study, this study also found that it is those women who are more psychosocially vulnerable who find assessment more challenging and may thus be less likely to be identified and offered care.

The finding that a history of mental health issues is associated with reduced disclosure is likely associated with a woman's sense of stigma at the presence of such history. This is in keeping with the finding that about a third of individuals with a mental health condition report a significant sense of stigma [32], which in turn has been shown to be associated with reduced disclosure and help-seeking behaviour [33].

Our finding of a significant association between a lack of support and reduced honesty fits with the Prevatt and

Desmarais' [34] study which reported that lack of social support was associated with reduced disclosure in multivariate models.

Only about 11% of women in our sample reported not always being honest about their psychosocial circumstances, compared to up to 20% of women in previous studies [16–18]. There are a number of possible explanations for this difference. Firstly, women in the current study were assessed by midwives in a setting where it has been longstanding policy to undertake routine psychosocial assessment, and staff are trained and experienced in such assessment, likely making it easier for women to engage with them in a trusting manner and disclose more openly [35]. In contrast, the Kingston et al. [19] study noted that study participants undertook the assessment (either with a research nurse or by means of self-report) without there being the opportunity for discussion of her results with her maternity clinician.

Another reason for this study's lower nondisclosure rates may be the overall psychological 'wellness' of our participants where only 11.4% of the total sample reported an EPDS score of 10 or more (indicative of possible minor depression) at assessment compared to the much larger proportion of women reporting possible depression (19.6%) in the Forder et al. [16] study.

Table 3
Association between sociodemographic characteristics, psychosocial risk factors and honesty of disclosure at routine antenatal appointment.

Variable	Multivariate models		
	Univariate OR (95% CI)	(a) ^a aOR (95% CI)	(b) ^b aOR (95% CI)
Age (35 or more)	1.22 [0.90–1.66]	1.05 [0.76–1.45]	1.05 [0.70–1.57]
Parity (primiparous)	0.75 [0.56–1.03]	1.29 [0.93–1.79]	1.18 [0.78–1.79]
Education (University degree)	2.2 [0.94–5.10]	2.33 [1.0–5.46]	1.88 [0.71–4.98]
Mental health history (present) ^c	2.28 [1.68–3.11]***	2.03 [1.47–2.79]***	1.78 [1.18–2.67]**
Adverse childhood experiences (present) ^d	2.00 [1.46–2.72]***	1.74 [1.26–2.41]**	1.41 [0.93–2.14]
Domestic violence (present)	2.57 [1.41–4.66]**		1.50 [0.67–3.35]
Any probable current diagnosis (present) ^e	2.57 [1.47–4.50]***		1.69 [0.91–3.17]
Substance misuse			
Present	4.44 [1.95–10.12]***		1.41 [0.37–5.45]
Lack of social support			
Present	2.51 [1.83–3.42]***		1.74 [1.16–2.62]*
Lack of partner support			
Present	3.37 [2.20–5.16]***		2.08 [1.11–3.90]*

Note: Boldface indicates statistical significance (*p < 0.05, **p < 0.01, ***p < 0.001).

^a Model (a): adjusted for (i) sociodemographic variables (age, education, parity) and (ii) mental health history and adverse childhood experiences.

^b Model (b): adjusted for (i) sociodemographic variables (age, education, parity), (ii) mental health history and adverse childhood experiences, (iii) current or recent domestic violence, any current probable diagnosis (SAGE-SR) and current substance misuse and (iv) lack of social support and partner support.

^c ANRQ-R items: present if ‘yes’ to past mental health problem that had significant impact on socio-occupational function (score of 3 or more) for which professional help was sought.

^d ANRQ-R items: ACE present if ‘yes’ to one of more of childhood emotional abuse or neglect (lack of maternal emotional support), physical or sexual abuse growing up (score of 3 or more).

^e Present if met SAGE-SR criteria for any diagnosis across any of the diagnostic modules in the SAGE-SR questionnaire.

Table 4
Descriptive statistics and mixed ANOVA results for ANRQ-R scores among women who were and were not always honest at routine antenatal appointment.

Measure	Mode of administration	Always honest (N = 1531)	Not always honest (N = 187) ^a	ANOVA		
				Honesty	Mode of administration	Interaction
ANRQ-R total score	Face-face (midwife)	M = 12.37 SD = 6.81	M = 13.87 SD = 6.61	$F_{(1, 1716)} = 35.27^*$, partial $\eta^2 = 0.02$	$F_{(1, 1716)} = 171.70^*$, partial $\eta^2 = 0.09$	$F_{(1, 1716)} = 71.26^*$, partial $\eta^2 = 0.04$
	Online (self-report)	M = 13.19 SD = 6.94	M = 17.66 SD = 7.17			

^a N = 187 because not all the “not always honest” women (N = 193) completed the ANRQ-R at Time 2.

* p < .001; η^2 (effect size): 0.01 = small effect; 0.06 = moderate effect; 0.14 = large effect 28.

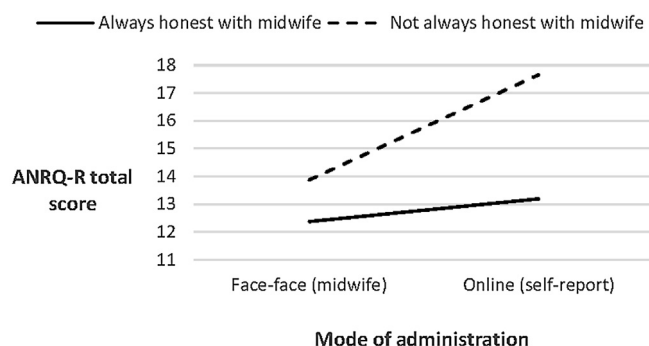


Fig. 2. Estimated marginal means of ANRQ-R total scores by group and mode of administration.

We were also interested to know if greater anonymity – as conferred by setting and mode of assessment – specifically online self-report without clinician feedback at Time 2 compared to face to face assessment with a clinician inclusive of feedback at Time 1—would make a difference to disclosure. We found that the more ‘anonymous’ mode of assessment was associated with a greater increase in ANRQ-R scores (suggesting increased reporting of psychosocial risk) in the ‘not always honest’ group compared to women who were ‘always honest’. An alternative explanation, that the greater scores at the Time 2 repeat assessment were due to new or emerging risk factors, is unlikely because the intervening time period was short at only two weeks. While this finding is

preliminary it aligns with earlier papers showing that online self-report, which participants perceive as more anonymous, facilitates greater disclosure of sensitive information compared to face to face or over the phone [17,20,22]. Conversely, other studies have shown that some women prefer to discuss sensitive issues face to face with a clinician. For example, Fincher et al. [36] have reported that disadvantaged African-American women were twice as likely to report intimate partner violence when asked face-face by a clinician compared to a computer-assisted self-report option, and preferred the face-face option. Harrison et al. [37] in another study of very disadvantaged young, single pregnant women found that about 50% of participants reported additional risk at a repeat face to face clinician interview administered some two months after the initial interview.

8. Strengths and limitations

Methodologically this study minimised risk of recall bias compared to Forder et al. [16] where there was an interval of up to three years between emotional health assessment and feedback about honesty of responding [16]. However, the majority of women in our sample were highly educated, older, and partnered, and only a small proportion had elevated depression and psychosocial risk scores. This makes it difficult to generalise our findings to other populations.

The possibility of self-selection bias in the study cannot be discounted, given that about one-fifth (18%) of Time 1 women participated in data collection at Time 2. Crucially, however, there

were no significant differences between participants and non-participants in terms of key sociodemographic characteristics or clinical scores, suggesting that, despite this, the study sample was representative of the general population of women attending the participating site for antenatal care. Finally, the increase in ANRQ-R score at Time 2 in the not always honest group can only be seen as suggestive of increased disclosure and will need to be directly enquired about in further study.

9. Clinical implications and future directions

These initial results warrant replication ideally by means of a randomised controlled trial undertaken in a real world setting and in a sample with greater psychosocial morbidity. Such a study would need to enquire about preferred mode/s of assessment and to examine how this relates to disclosure of sensitive material. In addition, given that the present study focused on psychosocial screening early in antenatal care, there would be value in examining whether rates of disclosure are greater if women are asked at subsequent appointments, once greater rapport with a particular midwife has been established. Such a study would also explore important individual and contextual factors, including women's computer literacy, accessibility and feasibility of online self-report.

From a clinical perspective, our study underscores the importance of clinicians engaging women in a trustworthy manner when exploring and discussing sensitive psychosocial domains and mental health symptoms. Adequate training and clinical supervision of clinicians is also critical. Our study supports the conclusion that having different options in terms of assessment mode 'may help women overcome some of the current disclosure barriers and enable them to engage in the process'. Regardless of preferences around mode of administration, all forms of assessment must be undertaken alongside feedback and further discussion of a woman's responses with her clinician at the time of assessment. This is particularly the case where her responses are indicative of increased risk for poorer maternal mental health and parenting outcomes.

Author contributions

Marie-Paule V. Austin: Conceptualization; funding acquisition, supervision, writing - review & editing. **Nicole M. Reilly:** Conceptualization, funding acquisition, methodology, formal analysis, writing - review & editing. **Victoria Mule:** Conceptualization, project administration, methodology, formal analysis, original draft, writing - review & editing. **Dusan Hadzi-Pavlovic:** Formal analysis, writing - review & editing. **Dawn Kingston:** Writing - review & editing. **Emma Black:** Writing - review & editing.

Ethical statement

The research on which this manuscript is based involved human research. Ethical approvals for this scientific research study were granted from the South Eastern Sydney Local Health District Human Research Ethics Committee (SESLHD HREC; Ref. 14/117) on the 23 October 2014. The scientific value, methodological value and safety of the research has been reviewed and approved by the SESLHD HREC, Scientific Review Sub-Committee.

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Conflict of interest

The authors declare that they have no conflicts of interest.

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