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# Prevalence and predictors of poor mental health among pregnant women in Wales using a cross-sectional survey

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## Abstract

### Objectives

To assess the prevalence of self-reported mental health problems in a cohort of women in early pregnancy.

To describe the relationship between poor mental health and sociodemographic characteristics, self-efficacy and support networks.

To assess if participants were representative of the local antenatal population.

### Research design and setting

The UK government has pledged money to provide more support for women with perinatal mental health issues. Understanding the prevalence and predicting women who may need support will inform clinical practice. This paper reports part of a larger study 'Mothers Mood Study', which explored women's and midwives' experience of mild to moderate perinatal mental health issues and service provision. Routinely collected population level data were analysed and a smaller cross-sectional survey design used to assess predictors of poor mental health in early pregnancy in one health board in Wales.

### Participants

Routinely collected data were extracted for all women who registered for maternity care between May 2017 and May 2018 (n=6312) from the electronic maternity information system (pregnant population). Over a three month period 302 of these women completed a questionnaire at the antenatal clinic after an ultrasound scan (participants). Eligible women were aged  $\geq 18$  years, with sufficient spoken and written English to complete the questionnaire and a viable pregnancy of  $\leq 18$  weeks'

gestation. The questionnaire collected data on sociodemographic status, self-efficacy and support networks and self-reported mental health problems. Current anxiety and depression were assessed using the General Anxiety Disorders Assessment and Edinburgh Postnatal Depression Scale.

## **Findings**

Among the pregnant population 23% (n=1490) disclosed a mental health problem during routine questioning with anxiety and depression being the most common conditions. Participants completing the detailed questionnaire were similar in age and parity to the pregnant population with similar levels of depression (15.6%; n=15.6 v 17.3%, n=1092). Edinburgh Postnatal Depression Scale and General Anxiety Disorders 7 scores identified 8% with symptoms of anxiety (n=25) or depression (n=26) and a further 24.2% (n=73) with symptoms of mild anxiety and 25.2% (n=76) with mild depression. Low self-efficacy (OR 1.27, 95% CI 1.12-1.45), a previous mental health problem (OR 3.95, 95% CI 1.37-11.33) and low support from family (OR 1.13, 95% CI 1.00-1.27) were found to be associated with early pregnancy anxiety and/or depression.

## **Key conclusions and implications for practice**

Around one in five women who register for maternity care may have a mental health problem. Mild to moderate anxiety and depression are common in early pregnancy. Services need to improve for women who do not currently meet the threshold for referral to perinatal mental health services. Assessment and active monitoring of mental health is recommended, in particular for pregnant women with risk factors including a history of previous mental health difficulties, poor family support or low self-efficacy.

**Keywords: Mental health; pregnancy; prevalence; predictors; self-efficacy**

## **Introduction**

Negative consequences of poor mental health in pregnancy have long been reported. Short and long term complications for the child, such as increased risk of preterm birth (Smith et al., 2019; Smith et al., 2020), impaired neurodevelopment during childhood (Glover and Capron, 2017; Savory et al., 2020; Wieckowski et al.,

2017) and mental health disorders (Van den Bergh et al., 2020) have also been reported. Anxiety and depression have been shown to increase the prevalence of a fear of childbirth (Storksen et al., 2015), a preference for caesarean section (Rubertsson et al. 2014) and increased levels of pain in labour (Haines et al., 2012). In addition estimated maternal mental health disorders have a long term cost to UK society (Bauer et al., 2014; Margiotta et al., 2021).

Due to the burden of poor mental health, the National Institute for Health and Care Excellence (NICE) (2014) recommends support for women. In the last few years the governments in Wales, Scotland and England have pledged money to improve perinatal mental health services (Maternal Mental Health Alliance, 2018; National Health Service, 2015; Scottish Government, 2017). All health boards in Wales currently have a perinatal mental health service (Witcombe-Hayes, 2018) providing care for all women with severe mental health problems. Support for women with mild to moderate perinatal mental health problems is recommended (All Wales Perinatal Mental Health Group and Community of Practice, 2018; National Institute for Health and Care Excellence, 2014), but frequently falls outside the scope of specialist services.

Previous studies have identified a rise in the proportion of women with mental health issues over the past 15 years (Mental Health Foundation, 2016) including among pregnant women in the UK (Pearson et al., 2018). Rates of self-reported symptoms of anxiety during the antenatal period of 18% to 24% and clinically diagnosed anxiety of 15% (Dennis et al., 2017) have been reported and a systematic review suggested depression rates of 17.2% (Underwood et al., 2016) in pregnancy. In Wales the Perinatal Mental Health Network estimated rates of perinatal mental health to design their services (Witcombe-Hayes 2018). To our knowledge the only study reporting prevalence of mental health issues in Wales related to late pregnancy (Janssen et al. 2018).

As recommended by NICE (2014) initial questions relating to women's mental health history are asked when women register for maternity care. These may not detect women who are reluctant to disclose mental health problems or those who are unsure if symptoms they have relate to pregnancy rather than a problem with their mental health. An understanding of risk factors may help to target questioning and

support for this group of women. A systematic review of 97 papers reviewing risk factors for poor mental health in pregnancy found previous mental health problems and stressful life events to be a major contributing factor and suggested protective factors such as self-esteem, self-efficacy and social support. Associations with sociodemographic and economic factors were mixed. Three-quarters of the studies assessed associations with social support and over half which reviewed coping styles included women from middle income countries or low income settings (Biaggi et al., 2016). Suggested protective factors such as self-esteem and self-efficacy during pregnancy have shown a relationship between intention to breastfeed, fear of childbirth, social support and psychological problems (Yuksel et al 2019). Few studies have assessed the combination of self-efficacy, and mental health in pregnancy in high income countries with a developed healthcare system.

In this first report of the Mothers Mood Study, the rates of mental health problems in a cross-sectional cohort of pregnant women were determined and the association with maternal sociodemographic characteristics, self-efficacy and support networks analysed. To assess the extent to which participants were representative, using routinely collected NHS data, characteristics of the sample were compared to those of the total local maternity population. Understanding the extent of antenatal mental health problems and factors which are associated with poor mental health will inform future required antenatal mental health services.

## **Methods**

This paper, part of a larger study, used a cross-sectional study design. The study was conducted in one health board in Wales, which serves a diverse population in terms of sociodemographic and ethnic mix and provides maternity care for around 6000 women per year. The maternity unit provides obstetric led care for women with complicated pregnancies and an alongside midwifery led unit for women who are at low risk of developing complications during labour or after the birth. Routine data were collected for a year's cohort of women who registered their maternity care (population) and paper-based self-reported questionnaire completed over a three-month period by women attending their first antenatal clinic appointment

(participants) in one health board in Wales. Ethical approval for the study was granted by the Wales Research Ethics Committee (Ref: 17/WA/0319).

### **Routine data (pregnant population)**

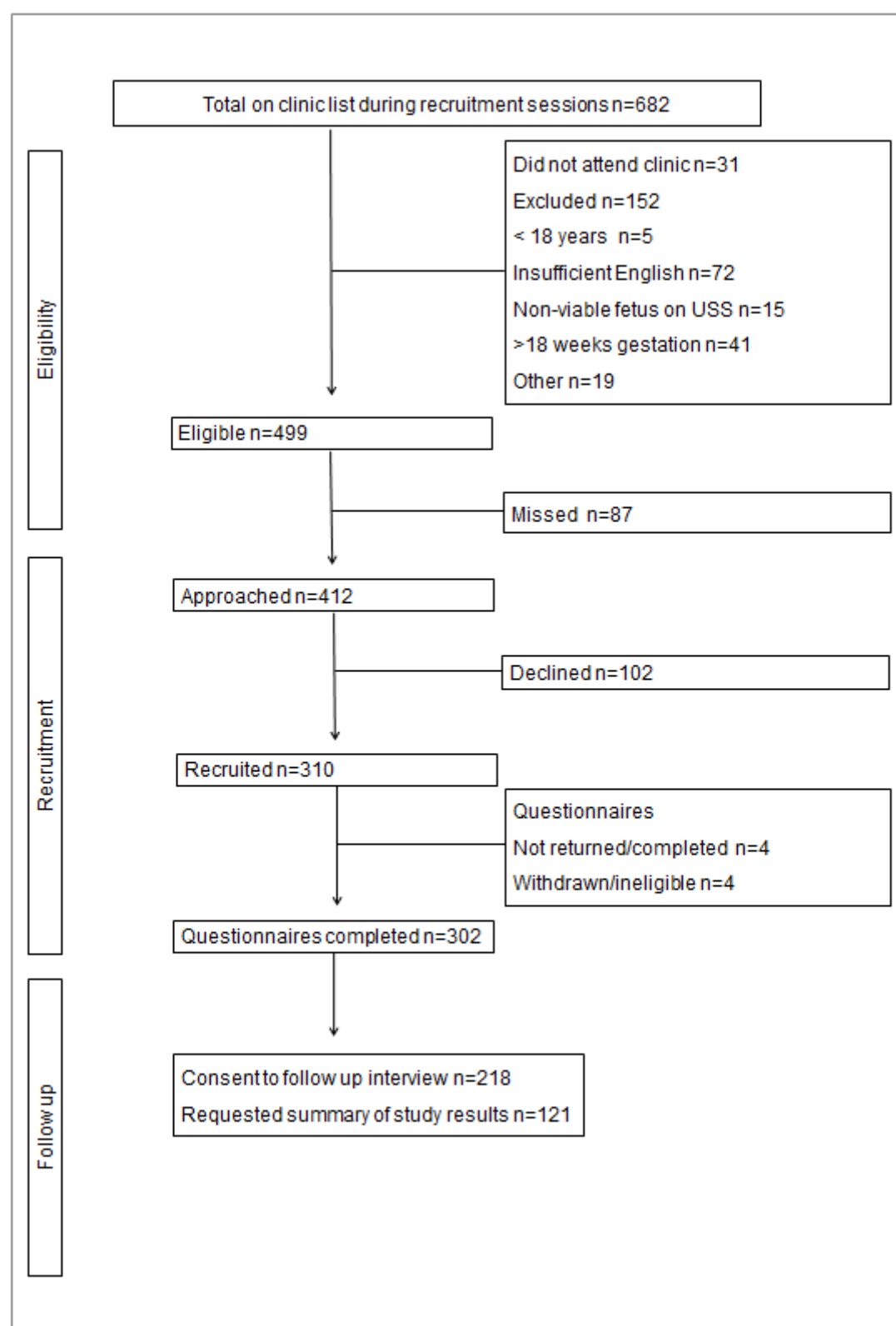
Routinely collected data were extracted from the electronic maternity information system relating to women presenting for maternity care between 1<sup>st</sup> June 2017 to 31<sup>st</sup> May 2018. This was to establish the prevalence of self-reported mental health problems in a large cohort of pregnant women and make an assessment of the extent to which study participants were representative of the local maternity population. The information in the maternity database was obtained from the history taken during the women's first appointment with a community midwife. For the majority this would have been around nine to ten weeks gestation but would also include small numbers of women who registered their maternity care later in pregnancy. Extracted data items included age, parity, ethnicity, employment status, occupation, marital status, past or current mental health problems and current medication or counselling.

### **Participants and recruitment procedure**

All women booked to give birth at this Health Board attend an antenatal clinic for an ultrasound scan at around 12 to 15 weeks gestation at either the recruiting hospital or the stand alone clinic at the neighboring hospital. Recruitment took place between November 2017 and January 2018. Women (n=499) were eligible to join the study at their first antenatal clinic appointment if they met the inclusion criteria of being aged  $\geq 18$  years, having sufficient spoken and written English and a viable pregnancy of  $\leq 18$  weeks' gestation confirmed by ultrasound scan without a confirmed or suspected serious fetal anomaly (Figure 1). Eligible women were identified by clinic staff. Of those eligible, 87 (17%) were not recruited either because they were processed too quickly through the clinic with no time to recruit or because the clinic was busy with no capacity to approach all eligible women. Study information was offered by the researcher to 412 women with a chance to ask questions, written consent was obtained and a questionnaire provided to complete whilst in clinic. Ethical approval was not obtained to probe women for their reasons for not wishing to participate but some women expressed this spontaneously which included being too busy to participate, having concerns about providing personal data and others

stating they could not read. Questionnaires were provided to 310 women. Four (1%) women did not return the questionnaire or provided insufficient data and four (1%) were excluded as they fell outside the inclusion criteria  $\leq 18$  weeks' gestation (Figure 1). Of the 302 women, 121 accepted the offer to receive a summary of the study findings and 218 consented to a follow up interview later in pregnancy to explore their experiences of poor mental health (X). Women commented how important they felt the study was and apologised for not being able to support the next stage of the study citing for example a lack of time due to work or childcare and several women mentioned they were moving out of the area.

Figure 1. Total number of women in clinic during the recruitment period.





## **Data collection**

The self-completed questionnaire assessed the prevalence of perinatal mental health problems and their association with sociodemographic factors, support networks and self-efficacy. Sociodemographic questions included national identity, ethnicity, educational attainment, employment, occupation and relationship status. Questions relating to mental health asked about previous or current mood disorder(s) and if participants were currently receiving pharmacological treatment or counselling. Self-reported depression and anxiety symptoms were measured using the Edinburgh Postnatal Depression Scale (EPDS) (Murray and Cox, 1990) and the Generalised Anxiety Disorder 7 (GAD-7) (Spitzer et al., 2006) respectively.

The remaining screening tools used in the questionnaire related to factors known to be associated with perinatal mental health (Kline, 2013). These included:

- Subjective Social Status used to assess perceived social standing (Goodman et al., 2001)
- Social Support Networks to assess money available for everyday living (Dunst, 1994)
- Adaptive Functioning relating to day to day life (Bernard et al., 1999)
- The General Self-efficacy Scale was used to predict coping with daily stresses (Schwarzer and Jerusalem, 1995)
- Multidimensional Scale of Perceived Social Support (Zimet et al., 1988) to assess support from three subscales: significant other, family and friends

All scales used were validated and suitable for use in the English language.

Demographic data including age, gestation, gravidity and parity were extracted, with consent, from the participants' maternity records. The Welsh Index of Multiple Deprivation (WIMD) values were derived from postcodes. WIMD is the Welsh Government's official measure of relative deprivation designed to identify small geographical areas in Wales' with the 'highest concentration of deprivation' (Welsh Government 2014).

## **Data analyses**

Data from questionnaires and NHS records of participants were linked to a personal identification number and entered into IBM SPSS Statistics Version 25 and checked for errors by a second researcher. Verification of data entry revealed an error rate of 0.2%.

For the participants' questionnaire data the EPDS cut off of  $\geq 13$  (Matthey et al., 2006) was taken to indicate symptoms of probable depression and a GAD-7 cut off of  $\geq 10$  used to indicate symptoms of probable anxiety (Simpson et al., 2014). Sociodemographic and WIMD data were analysed as categorical variables, EPDS and GAD-7 as dichotomous variables and the remaining screening tools as continuous scale variables. Data were analysed using chi-square (categorical variables) and Mann-Whitney U tests (scale variables) to explore associations between anxiety and/or depression and background characteristics, self-efficacy and perceived social support. Factors potentially associated with the outcomes of interest were included in the next step of the model as well as variables identified in the literature. These were entered into a binary logistic regression model, to identify predictors of poor mental health. Statistical significance was set at  $p < 0.05$ .

## **Results**

### **Prevalence of routinely recorded mental health problems**

Routine electronic maternity data for 6312 pregnant women were extracted, 23.6%, ( $n=1490$ ) disclosed a current or previous mental health problem. Depression (17.3%,  $n=1092$ ) and anxiety (12.8%,  $n=810$ ) were reported as the most frequent conditions, followed by postnatal depression (1.6%,  $n=106$ ) and post-traumatic stress disorder (1.4%,  $n=89$ ) (Table 1).

### **Participants**

For the 302 women completing the questionnaire the mean gestational age was 12.2 weeks ( $SD=1.08$ , range 9-18). Self-reported mental health problems included 32.5% ( $n=98$ ) with one or more mood disorders, most commonly anxiety (22.2%,  $n=67$ ) or depression (15.6%,  $n=47$ ), followed by stress (6.3%,  $n=19$ ), postnatal depression and post-traumatic stress disorder (2%,  $n=6$ ) (Table 1). Participants' current symptoms of anxiety and depression were assessed by the GAD-7 and EPDS. These found 8.3% ( $n=25$ ) and 8.6% ( $n=26$ ) of participants screened positive, for

probable current anxiety or depression respectively. A further 24.2% (n=73) scored between 5-9 on the GAD-7 indicating symptoms of mild anxiety (Spitzer et al., 2006) and 34.1% (n=76) between 7-12 on the EPDS indicating symptoms of mild depression (McCabe-Beane et al., 2016). EPDS and GAD-7 were found to be significantly correlated ( $r_s=0.75$ ,  $p<0.001$ ).

### Comparison between pregnant population and participants

Participants were found to have similar characteristics to the pregnant population in terms of age, *mean* 31.1 years (SD=1.13, *range* 18-45) v *mean* age 31.7 years (SD=5.76, *range* 16-57) and nulliparity (46.4%, n=140 v 44.1%, n= 2783). Higher rates of participants (84%, n=254 v 74.6%, n=4706) described their ethnic background as white compared to the pregnant population (Table 1). Insufficient information was available in the routine data to make comparisons on occupation and national identity.

Overall mental health problems were more commonly reported by participants (32.5%, n=98) than recorded by the pregnant population (23.6%, n=1490). Self-reported levels of anxiety were nearly twice as high in the participant group compared to the pregnant population (22.2%, n=67 v 12.8%, n=810), whereas self-reported rates of depression were higher in the pregnant population compared to participants (17.3%, n=1092 v 15.6%, n=47) (Table 1).

Table 1. Sociodemographic characteristics of pregnant population and participants.

| Background characteristics   | Pregnant population<br>n=6312 | Participants<br>n=302 |
|------------------------------|-------------------------------|-----------------------|
|                              | M (IQR) R                     | M (IQR) R             |
| Age                          | 31.7 (8) 16-57                | 31.1 (7) 18-45        |
|                              | n (%)                         | n (%)                 |
| Parity                       |                               |                       |
| Nulliparous                  | 2783 (44.1)                   | 140 (46.4)            |
| Multiparous                  | 3529 (55.9)                   | 162 (53.6)            |
| Ethnic background            |                               |                       |
| White                        | 4706 (74.6)                   | 254 (84.1)            |
| Asian/Asian British          | 537 (8.5)                     | 24 (7.9)              |
| Black/African/Caribbean      | 292 (4.6)                     | 5 (1.7)               |
| Mixed/multiple ethnic groups | 191 (3.0)                     | 14 (4.6)              |

|                                                               |             |            |
|---------------------------------------------------------------|-------------|------------|
| Other ethnic group                                            | 318 (5.0)   | 1 (0.3)    |
| Missing                                                       | 268 (4.2)   | 4 (1.3)    |
| <b>Employment Status</b>                                      |             |            |
| In work or education                                          | 4024 (63.8) | 238 (78.8) |
| Unemployed and seeking work                                   | 453 (7.2)   | 11 (3.6)   |
| Out of work not seeking work                                  | 1420 (22.5) | 41 (13.6)  |
| Other                                                         | 29 (0.5)    | 11 (3.6)   |
| Missing                                                       | 386 (6.1)   | 1 (0.3)    |
| <hr/>                                                         |             |            |
| <b>Mental health status</b>                                   |             |            |
| <hr/>                                                         |             |            |
| <b>Have you been diagnosed with a mental health disorder?</b> |             |            |
| No                                                            | 4551 (72.1) | 198 (65.6) |
| Yes                                                           | 1490 (23.6) | 98 (32.5)  |
| Missing                                                       | 273 (4.3)   | 6 (2.0)    |
| <b>Mental health disorder</b>                                 |             |            |
| Anxiety                                                       | 810 (12.8)  | 67 (22.2)  |
| Depression                                                    | 1092 (17.3) | 47 (15.6)  |
| Stress                                                        | 17 (0.3)    | 19 (6.3)   |
| Postnatal depression                                          | 106 (1.6)   | 6 (2.0)    |
| PTSD                                                          | 89 (1.4)    | 6 (2.0)    |
| Bipolar disorder                                              | 46 (0.7)    | 3 (1.0)    |
| OCD                                                           | 52 (0.8)    | 1 (0.3)    |
| Prenatal depression                                           | 1 (0.0)     | 1 (0.3)    |
| Other                                                         | 288 (1.8)   | 4 (1.4)    |
| <b>Current Treatment</b>                                      |             |            |
| Medication                                                    | 538 (8.5)   | 16 (5.3)   |
| Counselling                                                   | 148 (2.3)   | 10 (3.3)   |

PTSD – Post-traumatic stress disorder

OCD – Obsessive compulsive disorder

### **Predictors of participants with symptoms of anxiety and/or depression**

To explore associations between maternal characteristics and anxiety and/or depression amongst participants, two groups were defined. Women with an EPDS  $\geq 13$  and/or GAD-7  $\geq 10$  were defined as ‘screen positive’ for probable depression and/or anxiety (11.6%, n=35) and the remaining women were described as ‘screen negative’ (88.4%, n=267) (Table 2). Amongst the 35 screen positive women, 28.5% (n=10) screened positive on the EPDS but not GAD-7, 25.7% (n=9) screened

positive on the GAD-7 but not EPDS and 45.7% (n=16) screened positive on the EPDS and GAD-7 (Table 2).

### **Associations between participants' maternal characteristics and screening results**

No significant associations were found between screening results and gestational age, parity, maternal age, national identity, ethnicity or employment (Table 2).

The following characteristics were found to be associated with a higher incidence of women screening positive: lower education level (OR 2.34, 95% CI 1.05-5.21,  $p<0.037$ ); non-professional occupation (OR 3.95, 95% CI 1.66-9.38,  $p=0.002$ ); having a partner but not living together (OR 3.45, 95% CI 1.45-8.34,  $p=0.005$ ) and lower adaptive functioning (OR 1.47, 95% CI 1.03-2.09,  $p=0.034$ ). Characteristics found to be associated with a lower incidence of women screening positive: older maternal age (OR 0.93, 95% CI 0.87-0.99,  $p=0.038$ ); higher subjective social status (OR 0.75, 95% CI 0.59-0.96,  $p=0.023$ ); higher social support and networks (OR 0.88, 95% CI 0.81-0.97,  $p=0.010$ ); higher self-efficacy (OR 0.93, 95% CI 0.88-0.97,  $p=0.002$ ); higher social support from family (OR 0.93, 95% CI 0.89-0.98,  $p=0.003$ ) and living in areas of lower multiple deprivation (OR 0.47, 95% CI 0.23-0.97,  $p=0.041$ ).

Table 2. Odds ratios for associations between independent variables and screen positive women.

| <b>Variable of interest</b>          |                  |                     |                  |
|--------------------------------------|------------------|---------------------|------------------|
|                                      | <b>M (IQR) R</b> | <b>M (IQR) R</b>    |                  |
| <b>Gestation</b>                     | 12.2 (1) 9-18    | 12.3 (1) 9-17       | 0.867            |
|                                      | <b>OR</b>        | <b>95% CI</b>       | <b>p</b>         |
| <b>Previous mental health issues</b> | Ref              |                     |                  |
| Yes                                  | 0.18             | <b>0.09 to 0.39</b> | <b>&lt;0.001</b> |
| No                                   |                  |                     |                  |
| <b>Nationality</b>                   | Ref              |                     |                  |
| British                              | 1.43             | 0.56 to 3.80        | 0.430            |
| Other                                |                  |                     |                  |
| <b>Ethnicity</b>                     | Ref              |                     |                  |
| White                                | 1.87             | 0.78 to 4.43        | 0.156            |
| Other                                |                  |                     |                  |
| <b>Education</b>                     | Ref              |                     |                  |
| Degree and above                     |                  |                     |                  |

|                                                              |             |                     |              |
|--------------------------------------------------------------|-------------|---------------------|--------------|
| Below degree level                                           | <b>2.34</b> | <b>1.05 to 5.21</b> | <b>0.037</b> |
| <b>Employment</b>                                            |             |                     |              |
| In education, training or work                               | Ref         |                     |              |
| Not in education, training or employment                     | 1.14        | 0.49 to 2.64        | 0.766        |
| <b>Occupation</b>                                            |             |                     |              |
| Professional                                                 | Ref         |                     |              |
| Non professional                                             | <b>3.95</b> | <b>1.66 to 9.38</b> | <b>0.002</b> |
| <b>Partner</b>                                               |             |                     |              |
| Yes, live together                                           | Ref         |                     |              |
| Yes, not living together                                     | <b>3.45</b> | <b>1.45 to 8.24</b> | <b>0.005</b> |
| No                                                           | 0.77        | 0.09 to 6.15        | 0.802        |
| <b>Parous</b>                                                |             |                     |              |
| Nulliparous                                                  | Ref         |                     |              |
| Multiparous                                                  | 1.34        | 0.65 to 2.75        | 0.424        |
| <b>Age (years)</b>                                           | <b>0.93</b> | <b>0.87 to 0.99</b> | <b>0.038</b> |
| <b>Subjective social status</b>                              | <b>0.75</b> | <b>0.59 to 0.96</b> | <b>0.023</b> |
| <b>Financial means</b>                                       | <b>0.89</b> | <b>0.81 to 0.97</b> | <b>0.010</b> |
| <b>Adaptive functioning</b>                                  | <b>1.47</b> | <b>1.03 to 2.09</b> | <b>0.034</b> |
| <b>Self-efficacy</b>                                         | <b>0.93</b> | <b>0.88 to 0.97</b> | <b>0.002</b> |
| <b>Social support</b>                                        |             |                     |              |
| Significant other                                            | 0.96        | 0.91 to 1.02        | 0.160        |
| Family                                                       | <b>0.93</b> | <b>0.89 to 0.98</b> | <b>0.003</b> |
| Friends                                                      | 0.96        | 0.91 to 1.02        | 0.157        |
| <b>Living in an area of multiple deprivation (WIMD)</b>      |             |                     |              |
| 1 <sup>st</sup> and 2 <sup>nd</sup> quartile (Most deprived) | Ref         |                     |              |
| 3 <sup>rd</sup> and 4 <sup>th</sup> quartile                 | <b>0.47</b> | <b>0.23 to 0.97</b> | <b>0.041</b> |

### Predictors of anxiety and/or depression for participants

Using the conventional cut-off of  $p < 0.1$ , factors potentially associated with the outcomes of interest were included in the next step of the model as well as variables identified in the literature as being associated with adverse mental health (age, poor adaptive functioning and living in an area of multiple deprivation) (Akiki et al., 2016; Schetter et al., 2016). The analysis was run without the variable for education because data were missing for this variable for nine out of the 35 women in the screen positive group. Assessment of multicollinearity was performed for all variables entered into a bivariate logistic regression and no associations were found.

The model was statistically significant,  $\chi^2(df=14, n=256) = 61.87, p < 0.001$ , indicating the model was able to distinguish between screen positive and screen negative

participants. Sensitivity of the model was 99.1% and specificity was 36.7%, with a positive predictive value of 84% and a negative predictive value of 92.6%. Three of the independent variables were predictive of adverse mental health; the presence of a previous mood disorder (OR 3.95, 95% CI 1.37-11.33,  $p=0.011$ ), low self-efficacy (OR 1.27, 95% CI 1.12-1.45,  $p=0.001$ ) and low support from family (OR 1.13, 95% CI 1.00-1.27,  $p=0.044$ ). Low support from friends (OR 0.83, 95% CI 0.70-0.99,  $p=0.040$ ) was a protective factor for adverse mental health (Table 3).

Table 3. Binary logistic regression predicting women who screened positive for mental health problems.

|                                  | <b>Sig.</b>  | <b>OR</b>   | <b>95% CI</b> |              |
|----------------------------------|--------------|-------------|---------------|--------------|
| <b>Previous mood disorder</b>    | <b>0.011</b> | <b>3.95</b> | <b>1.37</b>   | <b>11.33</b> |
| Low social status                | 0.702        | 0.93        | 0.63          | 1.36         |
| Low financial means              | 0.738        | 0.97        | 0.82          | 1.16         |
| Low adaptive function            | 0.585        | 0.85        | 0.48          | 1.51         |
| <b>Low self-efficacy</b>         | <b>0.001</b> | <b>1.27</b> | <b>1.12</b>   | <b>1.45</b>  |
| Low support from:                |              |             |               |              |
| Significant other                | 0.140        | 1.14        | 0.96          | 1.36         |
| <b>Family</b>                    | <b>0.044</b> | <b>1.13</b> | <b>1.00</b>   | <b>1.27</b>  |
| <b>Friends</b>                   | <b>0.040</b> | <b>0.83</b> | <b>0.70</b>   | <b>0.99</b>  |
| Non-professional                 | 0.182        | 0.43        | 0.13          | 1.49         |
| Live with partner                | 0.495        | 1.00*       |               |              |
| Not living together              | 0.749        | 0.80        | 0.20          | 3.16         |
| No partner                       | 0.320        | 4.25        | 0.25          | 73.40        |
| Younger age                      | 0.226        | 1.07        | 0.96          | 1.21         |
| Multiparous                      | 0.140        | 0.45        | 0.15          | 1.30         |
| Living in an area of deprivation | 0.236        | 1.87        | 0.66          | 5.27         |

\* reference value

## Discussion

Rates of self-reported mental health problems were obtained from routine data for 6312 women who registered their maternity care, which included 302 participants who also completed a detailed questionnaire. Data from the questionnaire was used to assess associations between symptoms of anxiety and/or depression and maternal sociodemographic characteristics, self-efficacy and support networks in early pregnancy.

## **Prevalence of anxiety and depression**

Previous rates of perinatal mental health problems have focused mainly on anxiety and depression. This study included the overall incidence of self-reported mental health problems in pregnancy by women when registering their maternity care. Findings indicate 32.5% (n=98) of participants self-reported one or more mental health problems, higher than the 23.6% (n=1490) of the pregnant population. The 4.3% missing data for mental health history in the routinely collected data, may have contributed to this, but cannot account for the whole difference in findings. Similar levels of mental health problems (30%, n=92) were found between a cohort of women in late pregnancy in the Grown in Wales study conducted in the same hospital as this study in 2016 (Janssen et al., 2018) and participants.

In this study the most common conditions reported by women in both groups were anxiety and depression. A larger proportion of participants in this study completing the questionnaire reported a history or current anxiety (22%, n=67) compared to the pregnant population (12.8%, n=810). Reasons for higher reported mental health history among study participants might be increased recognition of, and women with, mental health problems being keen to share their experiences. Additionally under-reporting mental health history during the initial maternity appointment may have occurred as this was not the specific focus. In contrast to self-reports by participants, the GAD-7 and EPDS found lower rates of anxiety (8.3%, n=25) and depression (8.6%, n=26) symptoms. This is lower than two systematic reviews which reported rates of anxiety of 18-24% (Dennis et al., 2017) and depression of 17% (Underwood et al., 2016). The use of various screening tools and cut off scores could account for some of the difference.

Higher rates of mild compared with major depression have previously been reported in pregnancy (Ashley et al., 2016). This study also found rates of both anxiety and depression to be higher than major depression or anxiety; nearly a quarter of participants had symptoms of mild anxiety and a third with symptoms of mild depression. Screening tools are not routinely used in practice to assess women's mental health. Results of this study suggest many self-reported mental health problems by women relate to mild to moderate anxiety and depression. As with many conditions anxiety and depression exist along a continuum and it may be



difficult to determine a threshold when a condition has a detrimental effect and requires support.

### **Predictors of probable anxiety and/or depression**

Consistent with other studies the strongest predictor for anxiety and/or depression was a history of a previous mood disorder (Janssen et al., 2018; Kinser et al., 2017). New episodes or an increase in the severity of mental health problems can occur during pregnancy, furthermore women may not be aware they have any problems (Smith et al., 2019) or are reluctant to disclose an issue due to stigma around mental health (Prevatt and Desmarais, 2017). Therefore opportunities should be provided throughout the perinatal period to allow discussions and providing information related to mental health between women and the health care professionals.

Low self-efficacy was the second strongest predictor of anxiety and/or depression, it is related to the extent to which individuals believe they can overcome challenges (Ackerman, 2020) and is an important element of mental wellbeing. Pregnancy signals a time of adjustment for women both physically and emotionally and may impact financial and social aspects of their lives. Where a woman feels she cannot cope with changing situations this can lead to anxiety (Brunton et al., 2020). Although low self-efficacy is a predictor of poor mental health it may be challenging to incorporate into antenatal history taking. Education interventions in pregnancy have been shown to be effective in increasing maternal self-efficacy for childbirth (Timmermans et al., 2019) and may go some way to reducing anxiety in pregnancy, particularly in nulliparous women (Brunton et al., 2020).

In this study higher levels of perceived social support in pregnancy were associated with lower rates of depression and/or anxiety in line with previous research (Herbell et al., 2019; Racine et al., 2019). Counterintuitively this study found high support from friends was associated with an increased risk mental health problems, possibly due to the small numbers of screen positive women in the study or because women were more reluctant talking to friends regarding their mental health (Boots Family Trust Alliance, 2013). Support from a 'significant other' was not significantly associated with lower anxiety and/or depression, inconsistent with previous findings which reported good support from partners as a factor in supporting mental health (Akiki et al., 2016). The MSPSS does not stipulate that a 'significant other' is directly

related to partners, some women may attribute support from a parent or friend as their 'significant other' (Jonsdottir et al., 2017), which may partly explain the difference in this study.

### **Strengths and limitations**

The strengths of this study include the high response rate of 75% (n=302). In addition the routine data for a year's cohort of pregnant women provides an indication of the prevalence and scope of mental health problems. This also offered the ability to assess if participants were representative of the pregnant population. Although not all categories between the anonymised data and the questionnaire data matched, there were similar characteristics of age and parity.

It is acknowledged that diagnoses of mental health conditions should be made using diagnostic interviews by qualified psychiatrists. In contrast, this study relied on self-reported tools, requiring caution when reporting rates of anxiety and depression. The EPDS and GAD-7 reflect the recommended screening tools for use in the perinatal period by NICE (2014) meaning these findings are more reflective of practice. Conversely previous research suggested many women either hide or are unaware they have mental health issues (Boots Family Trust Alliance 2013), suggesting rates of mental health issues could be higher than reported.

There was an overrepresentation of white, employed women in the participant group who are less likely to experience mental health problems (van Heyningen et al., 2017). This might relate to the inclusion criteria 'having sufficient spoken and written English' and the geographical spread of the area of residence of ethnic minority populations in the city, with more women from ethnic minorities registering at the non-recruiting clinic. An additional limitation was the small number of women who screened positive (11.6%, n=35), yet the similarities in predictive factors reported elsewhere (Akiki et al., 2016; Jonsdottir et al., 2017) gives weight to the findings.

### **Implications for practice**

This study reiterates the importance of accurately recording and being aware of previous mental health diagnosis. It is essential to ensure questions regarding mental health are repeated throughout the perinatal period as recommended by NICE (2014) and not just at the initial assessment as some women can develop

mental health problems during pregnancy despite having no history of mental health problems (Grussu et al., 2020). This necessitates continuous monitoring of mental health, similar to assessments of physical health. Routine questions may still fail to detect women with mental health problems due to lack of time at appointments (Megnin-Viggars et al. 2015) or poor mental health literacy. Continuity of carer may help to improve detection of mental health problems, such as health professionals noticing a change in women's demeanour.

One in four women reported a mental health problem in early pregnancy, the majority of which were mild to moderate anxiety or depression who may not be supported by perinatal mental health teams which concentrate on the care of women with severe mental illness. Services and support need to be developed for this group of women who make up the majority of those with mental health problems. This is especially important due to the negative consequences of antenatal mental health problems and findings that suggest 33% of women with postnatal depression first experienced their mental health problems in pregnancy (Howard et al., 2017).

Emotional and social support and having self-confidence have been reported as protective factors for mental health (Ginja et al., 2018). Health professionals providing antenatal care should be aware of and signpost women to online websites such as the MIND or NHS websites which provide tools to support women's own mental health. Identifying women without support networks and suggesting support such as antenatal groups ought to be an important part of antenatal care. Sharing experiences with peers has been shown to be an important function of the antenatal groups and beneficial for emotional wellbeing (Wadephul et al., 2019). Providing information and ensuring women are able to ask questions may enable them to feel involved and informed around their pregnancy care, which may improve their self-efficacy and reduce anxiety.

### **Suggestions for future research**

Little research exists relating to improving women's self-efficacy in pregnancy. A systematic review suggested that providing individual or group educational sessions particularly when led by midwives were effective in increasing maternal self-efficacy for childbirth (Timmermans et al., 2019). Research to assess the effect of information and education for pregnancy to improve self-efficacy is required. In addition

interventions such as motivational interviewing have been used by health care professionals during outpatient appointments. These were shown to improve confidence of patients, making them more effective as a holistic approach to care (Chisholm et al., 2016) and could be incorporated into routine antenatal care. Research to assess the effectiveness of this in routine appointments during the perinatal period could assess its suitability as an intervention to improve self-efficacy and reduce anxiety in pregnancy. Further research to understanding the intricacies of social support from friends, family and partners is required to assess alternative provision for those without this support network.

## **Conclusion**

Mental health problems in the antenatal period are very common and have negative consequences for women and their children. Specialist perinatal mental health services lack capacity and by necessity concentrate on women with severe mental illnesses. Assessment and active monitoring of mental health by midwives, as the lead profession in the care of pregnant women, is recommended with particular attention paid to women with risk factors including a history of previous mental health difficulties, poor family support and low self-efficacy. There is a need to develop and test new interventions to improve care for this group of women.

## **Ethical approval**

Ethical approval for the study was granted by Wales Research Ethics Committee (Ref: 17/WA/0319).

## **Declaration of Competing Interest**

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## **CRedit authorship contribution statement**

**N.A. Savory:** Conceptualization, Methodology, Validation, Formal analysis, Investigation, Data curation, Writing –original draft, Writing –review & editing, Funding acquisition. **B. Hannigan:** Conceptualization, Methodology, Validation, Formal analysis, Writing –review & editing, Supervision. **R.M. John:**

Conceptualization, Methodology, Validation, Formal analysis, Writing –review & editing, Supervision. **J. Sanders:** Conceptualization, Methodology, Validation, Formal analysis, Writing –review & editing, Supervision. **S.M. Garay:** Validation, Formal analysis, Writing –review & editing.

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