



A population survey of prevalence rates of antenatal depression in the Irish obstetric services using the Edinburgh Postnatal Depression Scale (EPDS)

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Abstract

Ireland has the second-highest birth rate in Europe and poorly developed perinatal psychiatry services. There are no screening services for antenatal depression and no data available on prevalence rates of depression among women attending the Irish obstetric services. The aim of this study was to assess the prevalence rates of depression during pregnancy in a population sample in Ireland using the Edinburgh Postnatal Depression Scale (EPDS) as a screening tool. Pregnant women during all stages of pregnancy were recruited from five maternity hospitals throughout the Republic of Ireland. Approximately 5000 EPDS questionnaires were collected. Information on the participant's age, gestational week, gravidity, parity, and level of education attained was also collected. A score of > 12 was used as a measure of probable depression. Overall, 15.8% of pregnant women scored > 12 in the EPDS. There was a significant association between gestational week and rates of depression, with increasing rates occurring with advancing pregnancy ($p < 0.001$). Overall, higher socioeconomic groups were over-represented in the sample although we replicated the well-established findings of higher EPDS scores in women with lower educational attainment ($p < 0.005$). This study demonstrates that prevalence rates of probable antenatal depression are high among women attending the obstetric services in Ireland and highlight the importance of increasing awareness of antenatal depression. These high rates of antenatal depression may be related to certain conditions that are specific to an Irish setting: the absence of screening for depression in the context of grossly under-resourced perinatal psychiatry services. These findings provide indirect confirmatory evidence for the need for streamlined mental health services within reproductive health services.

Keywords Antenatal depression · Pregnancy · Edinburgh postnatal depression scale · Prevalence rates

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Introduction

Ireland had the second-highest birth rate in the European Union (EU) in 2014, with 1.94 live births per woman recorded that year (Eurostat 2016). Despite this, there is no available data on the prevalence rates of depression during pregnancy in Ireland in contrast to other EU states. There has been much interest in postpartum depression since the seminal studies by Cox and Brockington in the 1980s (Cox et al. 1982; Brockington 1988; Brockington et al. 1988), including an Irish community study that found a 14.4% prevalence rate of postpartum depression (Crotty and Sheehan 2004). However, far less attention has been paid to antenatal depression compared to postpartum depression, despite evidence that a third

to a half of postpartum depression begins during pregnancy (Gotlib et al. 1989; Wisner et al. 2013).

Hormonal changes, in addition to physical, psychological, and social changes, contribute to the increased vulnerability for depression in this period (Bennett et al. 2004; Parry and Newton 2001). Risk factors for developing depression during pregnancy are multifactorial, with past history of depression, life stress, poor social supports, unplanned pregnancy, domestic violence, lower socioeconomic status, higher maternal age, maternal race/ethnicity, lower educational attainment, lower income, unemployment, nulliparity, and a history of obstetric complications all conferring increased risk (Lancaster et al. 2010; O'Keane and Marsh 2007).

Possibly relevant to antenatal depression rates, Ireland is unique among OECD countries, apart from some very small EU states (Malta, The Vatican), in having no therapeutic abortion services (Library of Congress 2017). Screening for antenatal depression is not routine in maternity hospitals in Ireland, largely due to grossly under-resourced perinatal mental health services. Since there is no literature on the prevalence rates of antenatal depression in Ireland, it is timely to now examine these rates to better allocate new dedicated funding for perinatal mental health services.¹

Literature reviews show varying rates of antenatal depression worldwide, dependent on the method used to identify depression, socioeconomic status, and other factors. A systematic review by Bennett et al. (2004), looking at interview and self-report depression data from worldwide studies, found prevalence rates of 7.4% in the first trimester, 12.8% in the second trimester, and 12% in the third trimester. In another systematic review of studies using clinical diagnostic criteria for antenatal depression, Gavin et al. (2005) found a period prevalence of 18.4% during pregnancy, with 12.7% of these women having a major depressive episode. Fisher et al. (2012) published a systematic review looking at studies from low- and middle-income countries, and found a 15.9% weighted mean prevalence of depression during pregnancy, increasing to 21.7% in studies using diagnostic assessments. The Avon Longitudinal Study of Parents and Children (ALSPAC) in the UK found prevalence rates of 11.8% in the second trimester using the Edinburgh Postnatal Depression Scale (EPDS) as a screening tool (Evans et al. 2001), while third trimester studies in the UK have found rates of 29% in a lower socioeconomic status population (Bolton et al. 1998), 9.8% (Johanson et al. 2000), and 13.5% (Evans et al. 2001).

The aim of this study was to evaluate prevalence rates for depression during pregnancy in Ireland. A second aim was to examine select socioeconomic risk factors including age and

education in an Irish context for antenatal depression. We hoped to highlight the extent of the need for antenatal mental health services to aid future service development.

Methods

Sample

Participants for this cross-sectional population survey were recruited from six urban and rural maternity health treatment facilities in the Republic of Ireland – the National Maternity Hospital, Dublin; the Rotunda Hospital, Dublin; Cork University Hospital, Cork; Mayo General Hospital, Castlebar; University Hospital, Limerick; and antenatal classes in primary care, Tallaght. Ethical approval was obtained from the relevant local committees for collection of data. Women were recruited from antenatal clinics between 18 January 2016 and 23 September 2016. All women, except non-English-speaking women, were eligible for inclusion in the study. Researchers approached women in the antenatal clinic waiting room and discussed the study and its aims. Confidentiality was ensured as no identifying details were collected. Data was collected on maternal age, gestational age, gravidity, parity, and highest level of education attained.

Screening instrument

The Edinburgh Postnatal Depression Scale (EPDS) is a commonly used screening tool for depression during pregnancy, despite its wide range of sensitivity and specificity found in different studies (Gibson et al. 2009). Although some studies have found it to be a good indicator of probable depression at scores > 12 (Rubertsson et al. 2011), others have found it to be an inadequate tool to screen for depressive illness because of low sensitivity (Pawlby et al. 2008). Nevertheless, it remains the most widely used tool for screening for antenatal depression. For this reason, and because of the ease of use in busy antenatal clinics, the EPDS was selected as the screening tool for probable depressive illness in this study.

The EPDS is a self-report scale that requires women to answer ten questions on affective and cognitive features of depression in the preceding 7 days (Cox et al. 1987). This scale excludes somatic features of depression such as weight, appetite, and energy changes as they are considered to be common during pregnancy regardless of mood status. Each item is scored on a 4-point scale of 0 to 3, with a total score of 30. Most women complete the scale without difficulty within an approximate time period of 5 min. Although initially developed as a screening tool for postnatal depression, the EPDS has since been validated for use in pregnancy, with scores > 12

¹ Since this study was undertaken, the Irish public health services management body, the Health Service Executive, has allocated €2,000,000 in funding to develop perinatal mental health services in Ireland (National Mental Health Division: Health Service Executive 2017).

predicting probable clinical depression (Rubertsson et al. 2011; Murray and Cox 1990).

Statistical analysis

Data was analysed using SPSS, version 24 (IBM Corp 2016). A descriptive analysis of the sociodemographic and obstetric data was undertaken. Participants aged under 18 years were analysed separately as there is a high rate of mental health difficulties in pregnant adolescents, requiring specialised obstetric and psychiatric care, compared to adults. Categorical data is presented as frequencies and percentages (%), and continuous data as means and standard deviations (SD). Mean EPDS scores were calculated for all responders. The percentage of women scoring above the cut-off point of 12 was calculated for participants over 18, and within each of the three trimesters. A one-way analysis of variance (ANOVA) was used where appropriate to examine the effects of sociodemographic factors on EPDS scores. Spearman's correlation coefficients were generated to examine the relationship between EPDS scores and sociodemographic and obstetric factors.

Results

Sociodemographic and obstetric characteristics

Of the 5007 women that returned completed EPDS questionnaires, 778 were excluded from the analysis. These 778 participants comprised of 388 women who returned incomplete forms, and 93 participants who were under the age of 18. A further 297 women who had completed the form previously for the purposes of this study were also excluded in order to avoid data duplication. Of the remaining 4229 participants, 14.9% ($n = 632$) were in the first trimester, 21.4% ($n = 903$) in the second trimester, and 60.9% ($n = 2576$) in the third trimester of pregnancy, while 2.8% ($n = 118$) did not respond to this question (Table 1).

Descriptive analysis of all data (Table 1) showed that participants ranged in age from 14 to 49 years. Gestational age varied from four to 42 weeks. Primigravids constituted 31.8% of this sample, with multigravidity going up as high as 12 previous pregnancies with a mean of 2.35 pregnancies. The rate of nulliparity was 39.7% ($n = 1679$) in this sample, with multiparas having up to seven children. The majority of women in the sample (57.2%) were educated to the level of undergraduate degree or higher, and 33.5% had attained education levels below university degrees, indicating that this was a population skewed towards higher socioeconomic status. Pregnancy loss was high in this population, with 70.2% ($n = 2968$) having lost at least one pregnancy.

Table 1 Sociodemographic variables

| | Mean (SD) | <i>n</i> (%) |
|---------------------------------------|----------------------|--------------|
| Age | 31.34 (5.38) | |
| < 18 | | 93 (2.1%) |
| 18 and over | | 4213 (97.5%) |
| Not answered | | 16 (0.4%) |
| Gestation (weeks) | 27.53 (10.34) | |
| 1st trimester | | 632 (14.9%) |
| 2nd trimester | | 903 (21.4%) |
| 3rd trimester | | 2576 (60.9%) |
| Not answered | | 118 (2.8%) |
| Gravidity | 2.35 (1.53) | |
| Primigravid | | 1345 (31.8%) |
| Multigravid | | 2884 (68.2%) |
| Not answered | | 0 |
| Parity | 0.96 (1.06) | |
| Nulliparous | | 1679 (39.7%) |
| 1 | | 1414 (33.4%) |
| > 1 | | 1108 (26.2%) |
| Not answered | | 28 (0.7%) |
| Pregnancy loss (numbers) | 1.40 (1.02) | |
| 0 | | 31 (0.7%) |
| 1 | | 2968 (70.2%) |
| 2 | | 679 (16.1%) |
| 3 | | 243 (5.7%) |
| > 4 | | 135 (3.2%) |
| Not answered | | 173 (4.1%) |
| Level of education | | |
| Below Leaving Certificate (2nd Level) | | 109 (2.6%) |
| Leaving Certificate Level | | 592 (14.0%) |
| Diploma/Certificate | | 713 (16.9%) |
| Undergraduate degree | | 1681 (39.7%) |
| Higher/professional qualification | | 738 (17.5%) |
| Not answered | | 396 (9.3%) |

5007 forms returned with 778 excluded (93 aged < 18, 388 incomplete forms, 297 completed forms previously for purposes of this study). Percentages depict the proportion with respect to the entire sample taken into consideration ($n = 4229$), with the exception of "Age," where the < 18 group has also been included for enhanced data visualisation ($n = 4322$).

Prevalence of depression during pregnancy

In the final sample of 4229 pregnant women, we found that overall 15.8% ($n = 671$) of women had EPDS scores > 12, indicating a high likelihood of being diagnosed with depression during pregnancy. Rates of EPDS scores > 12 increased steadily with gestation, with highest rates in the third trimester at 17.2% ($n = 442$), and rates of 12.9% ($n = 81$) and 13.8% ($n = 124$) in the first and second trimesters respectively

Table 2 Prevalence rates of depression during pregnancy by trimester and age

| | Frequency of EPDS scores > 12 (<i>n</i>) |
|------------------|--|
| Trimester | |
| 1st | 12.9% (81) |
| 2nd | 13.8% (124) |
| 3rd | 17.2% (442) |
| Age | |
| Under 18 | 21.7% (20) |
| 18 and over | 15.8% (671) |

(Table 2). Almost 22% ($n = 20$) of participants aged under 18 years had EPDS scores of > 12.

Correlates of depression during pregnancy

Weak, but highly significant, correlations were found between EPDS scores and various sociodemographic and obstetric variables in this sample (Table 3). EPDS scores increased with advancing gestational week of pregnancy ($r = 0.074$, $p = 0.000$). Scores were higher in women with higher gravidity ($r = 0.062$, $p = 0.000$) and parity ($r = 0.056$, $p = 0.000$). Negative correlations were found between EPDS scores and age, with younger women having higher scores in this sample ($r = -0.074$, $p = 0.000$). A one-way ANOVA was conducted to examine the effect of level of educational attainment on EPDS scores and showed that women who had obtained higher degrees had significantly lower EPDS scores compared to those who had been educated to the level of diploma/certificate ($p = 0.013$); those who had been educated to second level ($p < 0.005$); or those who had not completed education to the second level ($p = 0.022$).

Discussion

The prevalence rate of probable depression in this sample is 15.8%, somewhat higher than the rates found in similar studies in developed countries using EPDS as a screening tool. This high rate cannot be attributed to socioeconomic deprivation alone given the over-representation of highly educated women in the sample, with 57.2% having at least an

undergraduate degree. This finding draws attention to the importance of screening for antenatal depression in Ireland, and for increased perinatal mental health services.

Literature reviews of antenatal depression studies using both self-report and diagnostic methods found overall prevalence rates of 7–22% in developed countries (Bennett et al. 2004; Gavin et al. 2005, Fisher et al. 2012). A consistent finding across studies worldwide is increased prevalence rates of antenatal depression in countries and groups that are relatively disadvantaged socioeconomically, with one UK study reporting rates of 29% in this demographic (Bolton et al. 1998). The ALSPAC study (Evans et al. 2001) had a sample size of > 13,000 and reported rates of 11.8% in the second trimester and 13.5% in the third, using the same threshold of EPDS scores of > 12 as our study. In comparison, we found rates of 13.8% in the second trimester, and 17.2% in the third trimester. France, the only EU state with a higher fertility rate than Ireland, had estimated antenatal depression rates of 11.2% in the second trimester, using an EPDS cut-off point of 15 (Dayan et al. 2002). In another French study just 5% of women had an EPDS threshold of > 12 (Verdoux et al. 2002).

Our findings on correlates for antenatal depression in this study replicate known data. Although weak, the correlations may be true predictors, with the high significance explained by the large sample size. Findings in the present study are in line with current evidence, with higher EPDS scores found in women with a higher number of previous pregnancies and those with more children (Melville et al. 2010; Rubertsson et al. 2003), women with lower levels of educational attainment (Marcus et al. 2003), and younger women (Melville et al. 2010). Depressive symptomatology increased with increasing gestation in the current study, with highest prevalence in the third trimester, as reported previously (Lee et al. 2007). A recently published systematic review identified unwanted and unintended pregnancies as one of the most relevant factors leading to antenatal depression (Biaggi et al. 2016). It is possible that the absence of abortion services in Ireland may contribute to increased rates of unwanted pregnancy and, therefore, higher rates of antenatal depression. However, in view of the lack of research in this area, this is only speculative.

In addition to affecting women's mental health, antenatal depression also has implications for obstetric health. Women who suffer from depression during pregnancy have an

Table 3 Correlation between total EPDS scores and obstetric characteristics

| | Spearman's correlation coefficient (<i>r</i>) | Significance (<i>p</i>) |
|-------------------------|---|---------------------------|
| Age (years) | -0.074 | < 0.005* |
| Gestation (weeks) | 0.074 | < 0.005* |
| Gravidity (number) | 0.062 | < 0.005* |
| Parity (number) | 0.056 | < 0.005* |
| Pregnancy loss (number) | 0.037 | 0.018* |

**p* values for correlations, threshold for significance set at $p < 0.05$

increased risk of pre-eclampsia (Qiu et al. 2009; Cripe et al. 2011), Caesarean section and epidural during labour (Andersson et al. 2004), preterm delivery and low neonatal birth weight (Cripe et al. 2011; Li et al. 2009; Yonkers et al. 2014; Grote et al. 2010). There is increasing evidence that maternal depression during pregnancy, through its effects on maternal and foetal hypothalamic-pituitary-adrenal axis, and possible epigenetic and placental factors, may compromise the physical and mental health of the infant (O'Keane et al. 2011; Oberlander et al. 2008; Janssen et al. 2016). It is widely accepted that the foetus, while adapting to stressors in the intrauterine environment to overcome any immediate risks, becomes programmed to respond to stress in a certain way (Barker 1995). These adaptations are carried into the postpartum environment and may have long-lasting neurodevelopmental, behavioural, and psychiatric effects in childhood and adolescence (Pawlby et al. 2009; Talge et al. 2007; Plant et al. 2015), in addition to cardiovascular, metabolic, and mental health effects in adult life (Pearson et al. 2013; Seckl and Meaney 2004).

Currently, perinatal mental health services are substantially under-resourced in Ireland with only three part-time consultant psychiatrists and few other perinatal mental health professionals for an annual birth rate of approximately 70,000/year (Central Statistics Office 2014). High rates of antenatal depression are perhaps not surprising given the absence of screening for depression during pregnancy. A report on screening for antenatal and postnatal depressive illness by the United States Preventative Services Task Force indicated that screening led to better outcomes for women in terms of depressive symptoms and in the overall prevalence of depression during pregnancy (O'Connor et al. 2016). NICE (National Institute for Health and Care Excellence 2014) UK guidelines recommend that two questions be asked on mood and anhedonia as an initial screening measure; women answering affirmatively to either of these questions are then given the EPDS or the Patient Health Questionnaire to complete. The findings of the current study highlight the need for antenatal depression screening in Ireland. This would ideally be provided as part of an integrated obstetric and perinatal mental health pathway, encompassing primary, secondary, and tertiary care services. Further training and education of obstetric and mental health staff is warranted, in addition to increased funding, in order to provide women with timely access to perinatal mental health services.

Limitations

The most important limitation of this study is that there was no clinical diagnosis of depression, with only the self-report EPDS screening tool being used to detect probable depressive illness. Non-English-speaking women, whose inclusion

would give a more representative prevalence rate, were excluded from this study. Given that women with higher levels of educational attainment are over-represented in this study, the prevalence rates of depression during pregnancy may be underestimated.

Conclusions and recommendations

This is the first study to evaluate the prevalence of antenatal depression in Ireland, and findings suggest that rates of antenatal depression may be higher in Ireland than in comparable jurisdictions in the EU. Our finding of a high prevalence of antenatal depression which increased as pregnancy progressed could not be explained by socioeconomic disadvantage alone given the over-representation of highly educated women in our sample. The absence of screening programmes for depression during pregnancy in Ireland is likely to have contributed towards the high prevalence rates of antenatal depression, and perhaps the constitutional ban on almost all therapeutic abortion services. The findings from the present study provide evidence for further funding for antenatal perinatal psychiatry services working within a system of holistic reproductive health services for women.

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Compliance with ethical standards

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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