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Research report

What is the best tool for screening antenatal depression?

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ABSTRACT

Background: Antenatal depression (AD) can have devastating consequences. No existing scales are specifically designed to measure it. Common practice is to adapt scales originally developed for other circumstances. We designed this study to validate and determine the psychometric values for AD screening in Brazil.
Methods: We collected clinical and socio-demographic data in the second gestational trimester. The following instruments were also administered during that period: MINI-PLUS, EPDS, BDI and HAM-D.
Results: At the time of assessment, 17.34% of the patients were depressed, and 31.98% met the diagnostic criteria for lifetime major depression. All instruments showed an area under the curve in a receiver operating characteristic analysis greater than 0.85, with the BDI achieving a 0.90 and being the best-performing screening instrument. A score ≥ 11 on the EPDS (81.58% sensitivity, 73.33% specificity), ≥ 15 on the BDI (82.00% sensitivity, 84.26% specificity) and ≥ 9 on the HAM-D (87.76% sensitivity, 74.60% specificity) revealed great dichotomy between depressed and non-depressed patients. Spearman's rank correlation coefficients (ρ) among the scales had good values (EPDS vs. BDI 0.79; BDI vs. HAM-D 0.70, and EPDS vs. HAM-D 0.67).
Limitations: This study was transversal, assessing only women in the second gestational trimester. Results may be applicable only to the Brazilian population since psychometric properties may vary with the population under study. Major depression can amplify somatic symptomatology, affecting depressive rating scale data.
Conclusion: AD is highly prevalent in Brazil. To address the problem of under-recognition, physicians can use the EPDS, BDI and HAM-D to identify AD.

1. Introduction

Antenatal depression (AD) has been described as a form of clinical depression that affects women during pregnancy and that may increase the risk of postpartum depression if not properly treated (Milgrom et al., 2008; Norhayati et al., 2015).

Moreover, AD is a highly frequent condition, with prevalence estimated as high as 18% of pregnancies (Gavin et al., 2005). The presence of AD can have multiple deleterious effects, not only on women but also on offspring and the entire family. Depressed pregnant women, for example, are more prone to exhibiting high-risk behaviors. They are more likely to use alcohol, tobacco and illicit drugs; to have unhealthy eating habits; to suffer from sleep disturbances; and to attend fewer prenatal follow-up appointments (Bennett et al., 2004a; Field et al., 2008; Hauge et al., 2012; Marcus et al., 2009; Orr et al., 2007; Zuckerman et al., 1989). These behaviors interact with the intrinsic biological mechanisms of depression to create an increased risk of obstetric complications, such as pre-eclampsia, pre-term birth, restricted fetal growth and/or low birth weight (Bonari et al., 2004; Davalos et al., 2012; Diego et al., 2009; Field et al., 2008; Grote et al., 2010). In addition, an increasingly large body of clinical and experimental evidence suggests that both biological markers and the physiology of the offspring of depressed females can be influenced by maternal hypothalamic–pituitary–adrenal (HPA) axis dysfunction, including increased levels of cortisol and cathecolamines (Brummelte and Galea, 2010; Frodl and O'Keane, 2013; Wadhwa et al., 2002). These abnormalities may have life-long implications for the developing brain of the fetus, such as negative consequences for neural circuits, neurotransmitter activities and epigenetic changes (Davis et al., 2011; Field et al., 2006; Frodl and O'Keane, 2013; Oberlander et al., 2008; Weinstock, 2005), rendering the

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offspring more vulnerable to mental health disorders later in life (Halligan et al., 2007; O'Donnel et al. 2014; Pawlby et al., 2009; Pearson et al., 2013, Santos et al., 2014; Talge et al., 2007). Finally, a positive correlation between maternal and paternal depression has been demonstrated, emphasizing that AD is not merely a women's issue but is a problem that affects entire families (Escriba-Àguir and Artazcoz, 2011; Paulson and Bazelmore, 2010).

All of these factors illustrate that AD diagnosis and treatment should be considered a public health issue, and all pregnant women should be screened for signs of AD. Unfortunately, the rate of AD under-diagnosis can be as high as 80% (Kelly et al., 2001a) and is likely higher in areas with deficient healthcare infrastructures. Therefore, studying instruments that could be used in primary care settings by non-doctors and non-specialists is critical to enable broad screening for AD among pregnant women.

The most frequent scales used in the assessment of AD, the Beck Depression Inventory (BDI) (Beck et al., 1961) and the Edinburgh Postnatal Depression Scale (EPDS) (Cox et al., 1987; Bennett et al., 2004a), were developed for general use with major depression across the life span and during the postpartum period, respectively. Because of the sensitivity of these instruments, however, normal symptoms in pregnancy can sometimes be misconstrued as indicators of depression, and although they may resolve as pregnancy nears completion, such symptoms can lead to higher scores on self-report measures (Matthey and Ross-Hamid, 2012). An additional concern pertains to the psychometric characteristics of these scales with regard to cultural population characteristics and their use in populations in which illiteracy remains a problem. Although scholars have debated the extent to which the psychometric properties of those scales are adequate for use in AD, the EPDS and BDI have been utilized extensively in the antenatal period (Areias et al., 1996; Buist et al., 2006; Chung et al., 2001; Da-Silva et al., 1998; Evans et al., 2001; Josefsson et al., 2001; Gotlib et al. 1989; Manikkam and Burns, 2012; Matthey and Ross-Hamid, 2012; Milgrom et al., 2008; Rochat et al., 2011; Seguin et al., 1995). However, questions remain regarding whether there are major differences between the self-fulfillment scales (EPDS and BDI) and those applied by professionals, such as the Hamilton Depression Rating Scale (HAM-D) (Hamilton, 1960).

To the best of our knowledge, none of these three depression screening tools have been validated for use in an antenatal population in Brazil. Our aim was to compare the psychometric characteristics of the EPDS, BDI and HAM-D scales to those of a structured interview (MINI-PLUS) (Amorim, 2000), which is the gold standard for AD diagnosis, in second-trimester pregnant women.

2. Methods

2.1. Research protocol

A total of 247 consecutive women who were in their second trimester of pregnancy and were attending antenatal care at a public hospital were enrolled in the study. After a full explanation of the study purpose, written informed consent was obtained from each participant. As part of the study, the patients were evaluated using the Brazilian validated version of the EPDS (Santos et al., 2007) and the BDI (Gorenstein and Andrade, 1996). A trained psychiatrist blinded to the EPDS and BDI scores then re-evaluated each patient using the HAM-D (17-item version) (Hamilton, 1960) and the Mini-International Neuropsychiatric Interview (MINI-Plus 5.0 version) (Amorim, 2000).

All women who were found to meet the criteria for any psychiatric disorder were referred for treatment. This study was approved by the Research Ethics Committee of the Universidade Federal de Minas Gerais.

2.2. Statistical analysis

Receiver operating characteristic (ROC) analyses were used to measure the accuracy of the EPDS, BDI and HAM-D in diagnosing major depression according to DSM IV-TR criteria. Youden's Index was used to determinate the best cut-off points for screening (Youden, 1950). Spearman's rank correlation coefficient (ρ) was calculated to examine concordance among the psychometric scales tested. Cronbach's alpha (α) was used as an estimate of scale reliability, resulting in a coefficient of internal consistency and allowing for visualization of item homogeneity. Analyses were performed using Stata version 12 based on a 0.05 significance level.

3. Results

3.1. Depression prevalence and risk factors

A major depressive disorder was diagnosed during the second trimester of pregnancy or during the lifetime in 17.34% and 31.98% of the women, respectively. Table 1 contains the sociodemographic and clinical characteristics of these women diagnosed with AD.

Pregnant women with more than one child ($p=0.004$), those who had experienced a previous abortion ($p=0.026$), those who had a history of suffering aggression ($p<0.001$) and those who had not received support from their family or friends during prenatal care ($p=0.05$) had a statically significant risk of developing AD (see Table 1).

3.2. Psychometric properties of the scales

3.2.1. Validity

The areas under the curve (AUC) in a ROC analysis for the scales were 0.85 (SE=0.03; CI95=0.78–0.91), 0.90 (SE=0.02; CI95=0.85–0.94) and 0.86 (SE=0.02; CI95=0.81–0.91) for EPDS, BDI and HAM-D, respectively (Fig. 1).

3.2.2. Cut-offs

The optimal cut-off points for this sample were chosen after applying Youden's Index. This strategy yielded the following cut-off scores: ≥ 11 for the EPDS (sensibility: 0.81; specificity: 0.73; PPV: 0.75), ≥ 15 for the BDI (sensibility: 0.82; specificity: 0.84; PPV: 0.83) and ≥ 9 for the HAM-D (sensibility: 0.87; specificity: 0.74; PPV: 0.77) (Table 2).

3.2.3. Correlation

The strongest correlation between the scales was that between EPDS and BDI (0.7946), followed closely by the correlations between BDI and HAM-D (0.7006) and between EPDS and HAM-D (0.6716) (Fig. 1).

3.2.4. Reliability

Internal consistencies were determined using Cronbach's α. The values obtained were 0.8717, 0.9042 and 0.8179 for the EPDS, BDI and HAM-D instruments, respectively, in the gestational period.

4. Discussion

In our sample, we found an AD prevalence rate of 17.34% in the second trimester based on the structured MINI-Plus interview, which is similar to that obtained by other researchers (Bennett et al., 2004a; Gavin et al., 2005). By contrast, the prevalence rates obtained using the EPDS, BDI and HAM-D were 32.6% (23.7–43.0), 25.0% (17.1–35.0) and 38.0% (28.6–48.5), respectively.