

# Detection of mental disorders other than depression with the Edinburgh Postnatal Depression Scale in a sample of pregnant women in northern Mexico

Cosme Alvarado-Esquivel,<sup>1</sup>  
Antonio Sifuentes-Alvarez,<sup>1,2</sup>  
Carlos Salas-Martinez<sup>1,2</sup>

<sup>1</sup>Biomedical Research Laboratory, Faculty of Medicine and Nutrition, Juárez University of Durango State; <sup>2</sup>Mothers and Children's Hospital, Durango, Mexico

## Abstract

We sought to evaluate the capacity of the Edinburgh Postnatal Depression Scale (EPDS) in discriminating mental disorders other than depression in pregnant women in northern Mexico. Three hundred pregnant women attending prenatal consultations in a public hospital in Durango City, Mexico submitted a validated EPDS and were examined for mental disorders other than depression using the Diagnostic and Statistical Manual of Mental Disorders - 4<sup>th</sup> Ed. (DSM-IV) criteria. Sensitivity and specificity of cut-off points of the EPDS, and positive and negative predictive values were calculated. Of the 300 pregnant women studied, 21 had mental disorders other than depression by the DSM-IV criteria. The best EPDS score for screening mental disorders other than depression was 8/9. This threshold showed a sensitivity of 52.4%, a specificity of 67.0%, a positive predictive value of 11.5%, a negative predictive value of 95.4%, and an area under the curve of 0.643 (95% confidence interval: 0.52-0.76). The EPDS can be considered for screening mental disorders other than depression in Mexican pregnant women whenever a cut-off score of 8/9 is used. However, the tool showed small power to separate pregnant women with and without mental disorders other than depression.

## Introduction

Mental disorders during pregnancy represent an important issue for gynecologists and psychiatrists.<sup>1</sup> In addition, a clinical challenge for gynecologists is magnified when a pregnant woman suffering from a major mental disorder presents in labor.<sup>2</sup> A number of mental disorders, other than depression, during pregnancy has been reported. In a recent systematic review, a high anxiety disorder prevalence in pregnancy was

found.<sup>3</sup> Other mental disorders that may occur in pregnancy include eating disorders,<sup>4,5</sup> schizophrenia,<sup>6,7</sup> bipolar disorder,<sup>8</sup> personality disorders,<sup>9</sup> psychosis,<sup>10,11</sup> substance use disorders,<sup>12,13</sup> and adjustment disorders.<sup>14</sup>

The Edinburgh Postnatal Depression Scale (EPDS) has been used for screening depression in women during pregnancy and postnatally.<sup>15,16</sup> However, very little is known about the performance of the EPDS for identifying mental disorders other than depression in pregnant women. In a recent study, pregnant women who scored higher than 11 in the EPDS were interviewed for psychiatric diagnosis and researchers found a number of mental disorders other than depression including bipolar disorder, anxiety disorders, obsessive-compulsive disorder, current substance abuse and other disorders.<sup>17</sup> In a study of Vietnamese women in perinatal period, researchers validated the EPDS in detecting common mental disorders and found an optimal EPDS cut-off point of 3-4.<sup>18</sup> The EPDS does not exclusively measure depression but it may also measure anxiety.<sup>19</sup> In a study of prenatal depression in Australia, some women with positive EPDS were found to suffer from mental disorders other than depression including adjustment disorder, posttraumatic stress disorder, and borderline personality disorder.<sup>20</sup>

The aim of the present study was to determine the validity of the EPDS in detecting mental disorders other than depression in a sample of pregnant women in the northern Mexican City of Durango, Mexico.

## Materials and Methods

### Pregnant women studied

Pregnant women attended a public hospital (Mothers and Children's Hospital of the Secretary of Health) in Durango City, Mexico were studied from January to December 2013. As a strategy to enroll participants, pregnant women were invited to participate in the study when attending their prenatal consultations. A simple random sampling was used for the selection of participants. Inclusion criteria for enrollment of participant in the study were: i) pregnant women within their 1-9 month of pregnancy; ii) of any occupation; iii) who voluntarily accepted to participate. Age and socioeconomic status were not restrictive criteria for enrollment. In total, 300 women were enrolled in the study. The mean age of participants was 23.39±8.0 years old (range 13-45 years). Participants were evaluated once within their 2-9 months (median: 7 months) of pregnancy. Of the 300 pregnant women studied, 126 (42.0%) were in their first pregnancy and 174 (58.0%) were in their 2-8 pregnancy.

### Edinburgh Postnatal Depression Scale version used

We used the Spanish translated EPDS version

Correspondence: Cosme Alvarado-Esquivel, Biomedical Research Laboratory, Faculty of Medicine and Nutrition, Juárez University of Durango State, Avenida Universidad S/N, 34000 Durango, Mexico.  
E-mail: alvaradocosme@yahoo.com

Key words: Mental disorders; pregnancy; validation study; epidemiology; Mexico.

Contributions: CAE, developed the original idea and the study design, performed the data analysis, and wrote the manuscript; ASA, obtained the data of the subjects and reviewed the manuscript; CSM, performed the psychiatric interviews and reviewed the manuscript.

Conflict of interest: the authors declare no potential conflict of interest.

Funding: The study was supported by Juárez University of Durango State, Mexico.

Received for publication: 17 May 2015.

Revision received: 1 March 2016.

Accepted for publication: 15 March 2016.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License (CC BY-NC 4.0).

©Copyright C. Alvarado-Esquivel et al., 2016

Licensee PAGEPress, Italy

Mental Illness 2016; 8:6021

doi:10.4081/mi.2016.6021

previously validated in pregnant women in Mexico.<sup>21,22</sup> To assess the presence of mental disorders other than depression, all participants completed the self-administered EPDS and were interviewed by a psychiatrist. Diagnosis of mental disorders was based on the Diagnostic and Statistical Manual of Mental Disorders - 4<sup>th</sup> Ed. (DSM-IV) criteria.<sup>23</sup> Participants submitted the EPDS and had the psychiatric interview in the same day. EPDS scores obtained by the pregnant women were not revealed to the psychiatrist who interviewed them. In addition, the gynecologist who submitted the EPDS and the psychiatrist who interviewed the pregnant women did not perform the data analysis in this study.

### Statistical analysis

Analysis of data was performed with software SPSS version 15.0. Sensitivity, specificity, and positive and negative predictive values of the EPDS were calculated. The optimal cut-off score of the EPDS for detecting mental disorders in pregnant women was obtained by drawing a receiver operating characteristic curve.

### Ethical aspects

This study was approved by the institutional

ethical committee of the Mothers and Children's Hospital of the Secretary of Health in Durango City, Mexico. The aims and procedures of the study were explained to all participants, and a written informed consent was obtained from all of them.

## Results

Of the 300 pregnant women studied, 21 (7.0%) had mental disorders other than depression according to the DSM-IV criteria. The psychiatric diagnosis in these 21 pregnant women were: adjustment disorder in 14, grief disorder in three, anxiety in two, obsessive-compulsive disorder in one, and personality disorder in one. Table 1 shows the results of sensitivity and specificity for different EPDS scores found in the 300 pregnant women.

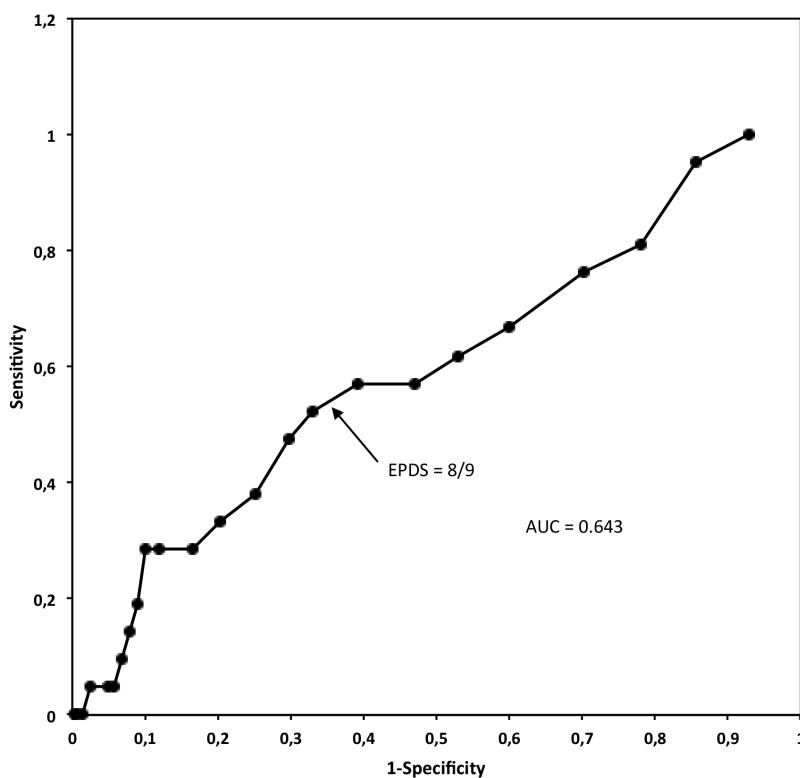
Receiver operating characteristic curve showed that an EPDS cut-off of 8/9 had the best sensitivity and specificity in the pregnant women studied (Figure 1). This cut-off means that an EPDS score of 8 or greater would be more appropriate for identifying women with mental disorders other than depression. At this threshold, we found a sensitivity of 52.4% and a specificity of 67.0%. The area under the curve was 0.643 (95% confidence interval: 0.52-0.76). Increasing the threshold to 9/10 the sensitivity was reduced to 47.7% but the specificity increased to 70.3%. Whereas lowering the threshold to 7/8 the sensitivity increased to 57.1% but the specificity was reduced to 60.9%. Of the 21 women with mental disorders other than depression by the DSM-IV criteria, 12 were positive and nine negative in the EPDS. While of the 279 women without mental disorders other than depression by the DSM-IV criteria, 187 were negative and 92 positive in the EPDS. Therefore, a positive predictive value of 11.5% and a negative predictive value of 95.4% for the EPDS were obtained. Women with mental disorders other than depression were treated with psychotherapy.

## Discussion

Very little is known about the capacity of the EPDS to detect mental disorders other than depression in general and in pregnant women in particular. Women with high EPDS do not always have depression. It is not clear whether EPDS scores correlate with mental disorders other than depression in pregnant women in Mexico. Therefore, the present study was aimed to determine the validity of the EPDS for detecting pregnant women with mental disorders other than depression in Durango City, Mexico. This assessment is an important ini-

**Table 1. Sensitivity and specificity of the Edinburgh Postnatal Depression Scale (EPDS) at different thresholds as compared with *Diagnostic and Statistical Manual of Mental Disorders-4th ed.* results for mental disorders other than depression in pregnant women.**

EPDS score	Sensitivity, %	Specificity, %
0-1	100	7.2
1-2	95.2	14.3
2-3	81	21.9
3-4	76.2	29.7
4-5	66.7	40.1
5-6	61.9	47
6-7	57.1	53
7-8	57.1	60.9
8-9	52.4	67
9-10	47.7	70.3
10-11	38.1	74.9
11-12	33.3	79.6
12-13	28.6	83.5
13-14	28.6	88.2
14-15	28.6	90
15-16	19	91
16-17	14.3	92.1
17-18	9.5	93.2
18-19	4.8	94.3
19-20	4.8	95
20-21	4.8	97.5
21-22	0	98.6
22-23	0	99.3
23-24	0	99.6



**Figure 1. Receiver operating characteristic curve for mental disorders in pregnant women as measured by the Edinburgh Postnatal Depression Scale (EPDS). Optimal performance of the EPDS in these women was found at 8/9 cut-off point.**

tial step towards the possible use of the EPDS for screening mental disorders other than depression. A validated EPDS can be useful for detecting women with mental disorders other than depression who need further examination by a psychiatrist. In this study, the EPDS showed a poor accuracy to separate women into those with and without mental disorders other than depression. The 0.643 area under the receiver operating characteristic curve found indicates a poor accuracy of the test. The more appropriated cut-off score to separate women with and without mental disorders other than depression was 8/9. This cut-off had low sensitivity (52.4%) and specificity (67.0%). In addition, the screening tool evaluated had a low positive predictive value (11.5%). In contrast, the EPDS had good negative predictive value (95.4%). Altogether, results suggest that the EPDS may identify only a small fraction of pregnant women suffering from mental disorders other than depression. The low (52.4%) sensitivity of the instrument found indicates that the screening tool does not detect almost half of the women suffering from mental disorders other than depression. On the other hand, the 67.0% specificity of the instrument found indicates that two thirds of the women considered as not having mental disorders other than depression are correctly identified as true negative cases. In this study, every possible mental disorder other than depression was studied. We found cases of adjustment disorder, grief disorder, anxiety, obsessive-compulsive disorder, and personality disorder. However, these mental illnesses were the only disorders present in the sample of women examined during the study period. It is unclear whether other mental illnesses not found in this study could be identified by the EPDS in pregnant women in Mexico. In a recent study in Iceland, researchers found that the use of the EPDS in the second trimester of pregnancy identified an important number of women with mental disorders other than depression including eating disorders, obsessive-compulsive disorder, and bipolar disorder.<sup>17</sup> In the Icelandic study, only women who scored above 11 in the EPDS were further examined by a psychiatric diagnostic interview. The findings in the Icelandic study points toward the importance of further clinical examination of women with high EPDS scores for the likelihood of having mental disorders other than depression. In a similar study of pregnant women with positive scores on the EPDS in Australia, researchers also found women with mental disorders other than depression including adjustment disorder, posttraumatic stress disorder and borderline personality disorder.<sup>20</sup> In contrast, in the present validation study pregnant women with both high and low EPDS scores were studied. We found that women suffering from mental

disorders other than depression might have high or low EPDS scores. Even with the use of the more appropriated EPDS cut-off point (8/9) found in the study, nearly half of the women with mental disorders other than depression scored below the cut-off threshold. In a study of women in the perinatal period in Vietnam, the EPDS was found suitable for screening common mental disorders when a 3/4 cut-off point was used.<sup>18</sup> This cut-off point is rather low and certainly contributes in the sensibility of the test. In the present study, a 3/4 cut-off point would improve the sensitivity to 76.2% but the specificity would fall down to 29.7%. However, this low cut-off point means that most of the women tested would result positive for the screening. Difference in the EPDS cut-off points, obtained among the studies, indicates that the same cut-off score of this tool cannot be generalizable worldwide. Results also stress the need to validate the EPDS instrument in the countries where this tool is intended to be used. Differences in cultures and frequencies of certain mental illnesses among countries might influence the scores of the EPDS. The EPDS is known to identify anxiety too.<sup>19,24,25</sup> In our study, there was a limited number of pregnant women with anxiety. The small number of women with mental disorders other than depression in the present study might have contributed for a small discrimination power of the EPDS. Further studies with a larger sample size to assess the discrimination power of the EPDS are needed. The instrument validated in this study may help to identify current mental illnesses other than depression in pregnant women. However, it is unclear whether these mental disorders can persist or disappear during pregnancy. Only repeat testing of the EPDS during pregnancy may help to differentiate between a transient and enduring disease as shown in a recent study.<sup>26</sup>

## Conclusions

We conclude that an 8/9 cut-off score of the EPDS was the more appropriated to screen mental disorders other than depression in pregnant women in Durango, Mexico. However, this tool had a small power to discriminate pregnant women with and without mental disorders other than depression. Our results points towards a need for further researches to elucidate the capacity of the EPDS in the detection of mental disorders other than depression in pregnant women.

## References

1. Müldner-Nieckowski Ł, Cyranka K,

- Smiatek-Mazgaj B, et al. Psychotherapy for pregnant women with psychiatric disorders. *Psychiatr Pol* 2015;49:49-56.
2. Babbitt KE, Bailey KJ, Coverdale JH, et al. Professionally responsible intrapartum management of patients with major mental disorders. *Am J Obstet Gynecol* 2014; 210:27-31.
3. Goodman JH, Chenausky KL, Freeman MP. Anxiety disorders during pregnancy: a systematic review. *J Clin Psychiatry* 2014;75: e1153-84.
4. Kolstad E, Gilhus NE, Veiby G, et al. Epilepsy and eating disorders during pregnancy: Prevalence, complications and birth outcome. *Seizure* 2015;28:81-4.
5. Watson HJ, Von Holle A, Knoph C, et al. Psychosocial factors associated with bulimia nervosa during pregnancy: an internal validation study. *Int J Eat Disord* 2015;48:654-62.
6. Robinson GE. Treatment of schizophrenia in pregnancy and postpartum. *J Popul Ther Clin Pharmacol* 2012;19:e380-6.
7. Solari H, Dickson KE, Miller L. Understanding and treating women with schizophrenia during pregnancy and postpartum: Motherisk update 2008. *Can J Clin Pharmacol* 2009;16:e23-32.
8. Krüger S. [Bipolar disorder, pregnancy and the postpartum: risks and possibilities of pharmacotherapy]. *Ther Umsch* 2009;66:475-84. [Article in German]
9. Hauck Y, Rock D, Jackiewicz T, et al. Healthy babies for mothers with serious mental illness: a case management framework for mental health clinicians. *Int J Ment Health Nurs* 2008;17:383-91.
10. Wewerinke A, Honig A, Heres MH, et al. [Psychiatric disorders in pregnant and puerperal women]. *Ned Tijdschr Geneesk* 2006;150:294-8. [Article in Dutch]
11. McCauley-Elsom K, Gurchich C, Elsom SJ, et al. Antipsychotics in pregnancy. *J Psychiatr Ment Health Nurs* 2010;17:97-104.
12. Haug NA, Duffy M, McCaul ME. Substance abuse treatment services for pregnant women: psychosocial and behavioral approaches. *Obstet Gynecol Clin North Am* 2014;41:267-96.
13. Rayburn WF, Bogenschutz MP. Pharmacotherapy for pregnant women with addictions. *Am J Obstet Gynecol* 2004;191:1885-97.
14. Olsson CA, Horwill E, Moore E, et al. Social and emotional adjustment following early pregnancy in young Australian women: a comparison of those who terminate, miscarry, or complete pregnancy. *J Adolesc Health* 2014;54:698-703.
15. Kozinszky Z, Dudas RB. Validation studies of the Edinburgh Postnatal Depression Scale for the antenatal period. *J Affect*

- Disord 2015;176:95-105.
16. ScharDOSim JM, Heldt E. Postpartum depression screening scales: a systematic review. *Rev Gaucha Enferm* 2011;32:159-66.
  17. Lydsdottir LB, Howard LM, Olafsdottir H, et al. The mental health characteristics of pregnant women with depressive symptoms identified by the Edinburgh Postnatal Depression Scale. *J Clin Psychiatry* 2014;75:393-8.
  18. Tran TD, Tran T, La B, et al. Screening for perinatal common mental disorders in women in the north of Vietnam: a comparison of three psychometric instruments. *J Affect Disord* 2011;133:281-93.
  19. Brouwers EP, van Baar AL, Pop VJ. Does the Edinburgh Postnatal Depression Scale measure anxiety? *J Psychosom Res* 2001;51:659-63.
  20. Harvey ST, Pun PK. Analysis of positive Edinburgh depression scale referrals to a consultation liaison psychiatry service in a two-year period. *Int J Ment Health Nurs* 2007;16:161-7.
  21. Alvarado-Esquivel C, Sifuentes-Alvarez A, Salas-Martinez C. The use of the Edinburgh postpartum depression scale in a population of teenager pregnant women in Mexico: a validation study. *Clin Pract Epidemiol Ment Health* 2014;10:129-32.
  22. Alvarado-Esquivel C, Sifuentes-Alvarez A, Salas-Martinez C. Validation of the Edinburgh postpartum depression scale in a population of adult pregnant women in Mexico. *J Clin Med Res* 2014;6:374-8.
  23. American Psychiatric Association. Diagnostic and statistical manual of mental disorders: DSM-IV-TR. 4th ed. Washington DC: American Psychiatric Association; 2000.
  24. Rowe HJ, Fisher JR, Loh WM. The Edinburgh Postnatal Depression Scale detects but does not distinguish anxiety disorders from depression in mothers of infants. *Arch Womens Ment Health* 2008;11:103-8.
  25. Matthey S, Fisher J, Rowe H. Using the Edinburgh postnatal depression scale to screen for anxiety disorders: conceptual and methodological considerations. *J Affect Disord* 2013;146:224-30.
  26. Matthey S, Ross-Hamid C. Repeat testing on the Edinburgh Depression Scale and the HADS-A in pregnancy: differentiating between transient and enduring distress. *J Affect Disord*. 2012;141:213-21.