

# Variability of the Edinburgh Postnatal Depression Scale for Antenatal Depression Screening in Spanish: a Cross-Sectional Study.

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## Research article

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# Abstract

**Background** Depression during pregnancy is a prevalent problem with significant potential health effects on women and children. The most widely used screening instrument is the Edinburgh Postnatal Depression Scale (EPDS). Two validations of the EDPS in Spanish have been published. Given the differences in cut-off point, sensibility and specificity among the Spanish EPDS validations, the aim of this study is to provide further information regarding the topic through a validation of the EPDS in Spain with a different sample.

**Methods** Cross-sectional study. 194 women being followed up for normal pregnancy in Primary Healthcare in Spain completed the EPDS and had a semi-structured interview with a clinical psychologist using the DSM-5 manual criteria for diagnosing depression. The ROC curve was calculated to determine the optimal cut-off point, sensitivity and specificity.

**Results** The age range of the participating pregnant women was from 18 to 42 years of age. The optimal cut-off point is 11/12, with a sensitivity of 93.33% and a specificity of 91.62%. The ROC curve has an area of 0.936.

**Discussion** The cut-off point is slightly lower than that of the Spanish version validated in Chile. Likewise, compared to the version validated in Spain, the cut-off point is slightly higher. In our research, sensitivity is notably higher, and specificity slightly lower than in the Spanish version validated in Chile. Compared with the Spanish version validated in Spain, sensibility and specificity were notably higher in our research.

**Conclusions** Given the differences in cut-off point, sensibility and specificity, we propose to continue searching for an optimal cut-off point in the Spanish version of the EPDS. In our opinion, further research is necessary in order to use the EPDS for antenatal depression screening in Spain. A multicentric study including pregnant women from all over the country would be suitable.

## Background

Perinatal depression is a major global public health problem<sup>1</sup>. However, until relatively recently, more importance has been being given to postpartum depression than to depression during pregnancy (also called antenatal or antepartum depression)<sup>2</sup>. It was not until its last edition that the DSM-5 manual specifically addressed pregnancy, as opposed to just postpartum as one of the specifiers for depressive disorders<sup>3</sup>.

Depression during pregnancy affects 7% of women in high income countries<sup>4</sup>, and an even higher percentage in low- and middle-income countries; about 25%<sup>5</sup>. Its negative effects include increased risk of postnatal depression and post-traumatic stress syndrome in women<sup>6</sup>, premature delivery, and failure to start breastfeeding<sup>7</sup>, as well as increased risk of behavioral problems and antisocial behavior in children<sup>8</sup>.

As this is a prevalent problem with significant potential health effects on women and children, the screening of pregnant women is recommended<sup>9,10</sup>. The most widely used instrument is the Edinburgh Postnatal Depression Scale (EPDS)<sup>4</sup>. According to the review by Kozinsky & Dudas<sup>11</sup>, this scale has been validated in various countries for the screening of antenatal depression, with cut-off points between 4/5 and 13/14, sensitivity values between 64 and 87%, specificity values between 73 and 96%, positive predictive values between 22% and 75%, and negative predictive values between 92% and 100%. There is a validated version in Spanish in Chile<sup>12</sup>, with a cut-off point of 12/13, sensitivity of 76.3%, specificity of 93.2%, positive predictive value of 85.3%, and negative predictive value of 88.3%.

However, given the variability in the cut-off points and in the values of sensitivity, specificity and predictive values, which can be related to cultural aspects, it is recommended that the instrument is validated in all countries in which it is to be used, regardless of whether it is validated in the same language or not<sup>11</sup>.

A recent Spanish validation of the EPDS in Spain has been published<sup>13</sup>. The cut-off point in this case was 10, with a sensitivity of 72.4%, specificity of 79.3%, PPV of 18.2%, NPV of 97.8%.

Given the differences in cut-off point, sensibility and specificity among the Spanish EPDS validations, the aim of this study is to provide further information regarding the topic through a validation of the EPDS in Spain with a different sample.

## Methods

### Design, population and sample

Cross-sectional study. The target population was all pregnant women in the province of Segovia (Spain). The inclusion criteria were that the date of the subject's last menstrual period (LMP) was between July 15, 2016 and June 15, 2017, and that she was also being attended to for the follow-up of her pregnancy in any of the public primary healthcare centers in Segovia; where follow-up is free of charge for all women who request it. The exclusion criteria were the language barrier to communication between women and health workers, and the inability to read or write in Spanish.

The recruitment period was from January 25 to July 28, 2017. Participants were recruited through the midwives' consultations in the following primary healthcare centers: Segovia I, Segovia II, Cuellar, El Espinar, Villacastín, Carbonero, Riaza, La Sierra, Sepúlveda, Cantalejo, Sacramenia and Nava de la Asunción. In the Segovia III and Segovia Rural primary healthcare centers, recruitment took place in the medical and/or nursing practices.

After giving their consent, the women completed a self-administered questionnaire with socio-demographic data (age, country of birth, level of education, and employment status). They were then given appointments to attend the primary healthcare center within seven days. On the day of their

appointments, they completed the Edinburgh Postnatal Depression Scale (EPDS), and subsequently met with a clinical psychologist.

## Measurements

Age was recorded as official age in years.

The level of education was classified into primary (9 years of educational training), secondary (12 years of educational training) and university (university degree).

The employment status was classified as working, unemployed (people who are looking for work), students and housewives.

The Edinburgh Postnatal Depression Scale (EPDS) is a 10-item self-report questionnaire. Each question is scored 0–3 (resulting range 0–30) and completion takes around 5 min<sup>14</sup>. As previously explained, it has been validated for antenatal depression screening in several countries and languages<sup>11</sup>. A translated version in Spanish is available and validated for postnatal depression<sup>15</sup>.

As the gold standard for diagnosing depression during pregnancy, a clinical psychologist conducted a semi-structured face-to-face interview with each woman using the DSM-5 manual criteria<sup>3</sup>. The interview was single-blind (the psychologist did not know the outcome of the Edinburgh Postnatal Depression Scale) and lasted approximately 30 minutes. Based on the interview, the clinical psychologist classified the women participants into two categories: “Depressed” and “Not depressed”. The category depressed included any type of depression according to the DSM-5 manual, and not just major depression.

## Statistical analysis

The socio-demographic data are expressed as absolute and relative frequencies in the case of the qualitative variables country of origin, level of education and employment status, and as mean (standard deviation) in the case of the quantitative variable age.

Little’s test was conducted to determine whether the women who filled in the sociodemographic data and subsequently did not complete the Edinburgh Postnatal Depression Scale or attend the interview with the clinical psychologist had different characteristics or were randomly distributed.

The ROC curve was calculated to determine the optimal cut-off point, in the Edinburgh Postnatal Depression Scale (EPDS), for diagnosing antenatal depression. Using the data from the interview with the psychologist and the Edinburgh Postnatal Depression Scale (EPDS) scores, we calculated the sensitivity and specificity of the test with its 95% confidence intervals. In addition, the positive (PPV) and negative (NPV) predictive values were calculated.

Data analyses were performed using the IBM SPSS Statistics 23.0 for Windows (IBM, Armonk, New York).

## Results

Of the 219 women who completed the sociodemographic data, 25 (11.4%) did not complete the EPDS or the interview with the clinical psychologist. Little's test had a value of 0.659, indicating that there was randomly lost data.

194 women completed the EPDS and the interview with the clinical psychologist. Table 1 describes the socio-demographic characteristics of these women. The age range of the participating pregnant women was from 18 to 42 years of age. Of the women who were not born in Spain, the majority are European (Bulgaria, Romania, France, Italy and Switzerland), and the rest are from South America (Colombia, Honduras, Ecuador, Peru, Venezuela, Dominican Republic, Bolivia and Brazil). Most of the participants have university studies and work.

Table 1  
Characteristics of the participant women (n = 194)

<b>Socio-demographic variables</b>	
<b>Age [mean (SD)]</b>	32.5 (4.7)
<b>Country of origin (%)</b>	
Spain	81.4
Other	18.6
<b>Level of education (%)</b>	
Primary	14.9
Secondary	39.2
University	45.9
<b>Employment status (%)</b>	
Worker	13.8
Unemployed	0.6
Student	5.3
Housewife	

In the interview with the psychologist, 7.7% of the women were detected as having antenatal depression.

Figure 1 shows the COR curve calculated from the results of the interview with the clinical psychologist and the results of the Edinburgh Postnatal Depression Scale for each participant.

Figure 1. ROC curve [Insert Fig. 1 about here]

The COR curve has an area of 0.936 (95% CI: 0.87-1.00).

Table 2 shows the sensitivity and 1-specificity for the different scale scores.

Table 2  
Sensitivity / 1-specificity report

	<b>Sensitivity</b>	<b>1-specificity</b>
0.5	1.000	0.911
1.5	1.000	0.827
2.5	1.000	0.687
3.5	1.000	0.570
4.5	0.933	0.464
5.5	0.933	0.391
6.5	0.933	0.318
7.5	0.933	0.263
8.5	0.933	0.218
9.5	0.933	0.162
10.5	0.933	0.128
11.5	0.933	0.084
12.5	0.800	0.067
13.5	0.667	0.039
14.5	0.467	0.028
15.5	0.333	0.022
16.5	0.267	0.017
17.5	0.200	0.011
18.5	0.200	0.006
20.5	0.067	0.000

The optimal cut-off point in the Edinburgh Postnatal Depression Scale for the screening of antenatal depression is 11/12, with a sensitivity of 93.33% (95% CI: 70.18% - 98.81%) and a specificity of 91.62% (95% CI: 86.64% - 94.86%). The positive predictive value (PPV) is 48,16% and the negative predictive value (NPV) is 99,40%

## Discussion

This cut-off point falls within the upper range of those found in the review for antenatal depression<sup>11</sup>, ranging from 4/5 to 13/14. It is slightly lower (11/12 vs. 12/13) than that of the Spanish version validated in Chile<sup>12</sup>, confirming the differences between countries despite sharing a common language<sup>11</sup>. Likewise, compared to the Spanish version validated in Spain<sup>13</sup>, the cut-off point is slightly higher (11/12 vs 10). In our research, sensitivity is notably higher (93.3% vs. 76.3%), and specificity slightly lower (91.62% vs. 93.2%) than in the Spanish version validated in Chile<sup>12</sup>. Compared with the Spanish version validated in Spain<sup>13</sup>, sensibility and specificity were notably higher in our research (93.33% vs 72.4% and 91.62% vs a 79.3%).

These predictive values are within the ranges of Kozinszky and Dudas's review<sup>11</sup>, which ranges from 22 to 75% for the positive predictive value, and from 92 to 100% for the negative predictive value. Comparing this again with the validation study carried out in Chile<sup>12</sup>, the positive predictive value is notably lower (45.53 to 60.23 vs. 85.3%), and the negative predictive value is higher (99.01 to 99.45% vs. 88.3%). These differences in predictive values are consistent with the different prevalence of antenatal depression in both countries. In our study, the prevalence was 7.7%, while in Chile it was 34.2%. As the prevalence increases, with equal sensitivity and specificity of the test, the positive predictive value decreases and the negative predictive value increases<sup>16</sup>. Compared to the Spanish version validated in Spain<sup>13</sup>, the positive predictive value (PPV) is notably higher (48.16% vs 18.2%), and the negative predictive value (NPV) is slightly higher (99.40% vs 97.8%). These differences are consistent with the different prevalence of antenatal depression (7.7% vs 5.6%), sensibility and specificity (93.33% vs 72.4% and 91.62% vs a 79.3%) in both studies.

In search of an explanation for these differences between the Spanish versions of the EPDS in Spain, we find that all the women studied in the published validation<sup>13</sup> were from one location (Orense hospital) using DSM-IV, while in our research, all the women were from another location (Segovia, primary care centers) using DSM-5.

## Conclusion

Differences in cut-off point, sensibility, specificity and predictive values among the three Spanish EPDS validations (Chile and two in Spain), as well as between the two Spanish EPDS validations in Spain (Orense and Segovia) were found.

Given the differences we propose to continue searching for an optimal cut-off point in the Spanish version of the EPDS. In our opinion, further research is necessary in order to use the EPDS for antenatal depression screening with Spanish-speaking pregnant women, even within Spain. A multicentric study including pregnant women from all over the country would be suitable.

## Abbreviations

DSM: Diagnostic and Statistical Manual of Mental Disorders.

EPDS: Edinburg Postnatal Depression Scale.

NPV: Negative predictive value.

ROC: Receiver operating characteristic.

PPV: Positive predictive value.

## **Declarations**

### **Ethics approval and consent to participate**

The study was developed in accordance with the international ethical recommendations for human research and clinical trials of the Declaration of Helsinki. This research obtained a favorable report from the Ethics Committee of the Commission of Research of the Health Management of Segovia as part of the process to obtain the research grant, file GRS 1287/B16. Written informed consent was obtained from all individual participants included in the study. All women who met the criteria for depression in the interview with the clinical psychologist were referred to their doctor for assessment and treatment.

### **Consent for publication**

Not applicable.

### **Availability of data and materials**

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

### **Competing interests**

The authors declare that they have no competing interests.

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The funder provided the funds to carry on the research as it was designed. The funder of the study had no role in study design, data collection, data analysis, data interpretation, or writing of the report

### **Authors' contributions**

JGP, EMM and LEG designed the study. EMM, BML, AGL and ATG got the research grant. EMM, BML, AGL and ATG coordinated the recruitment the sample and the collection of the data. EMM, JGP and LED

conducted the statistical analysis. JGP and EMM redacted the first version of the manuscript. The other authors provided significant suggestions. All authors read and approved the final manuscript.

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## Figures

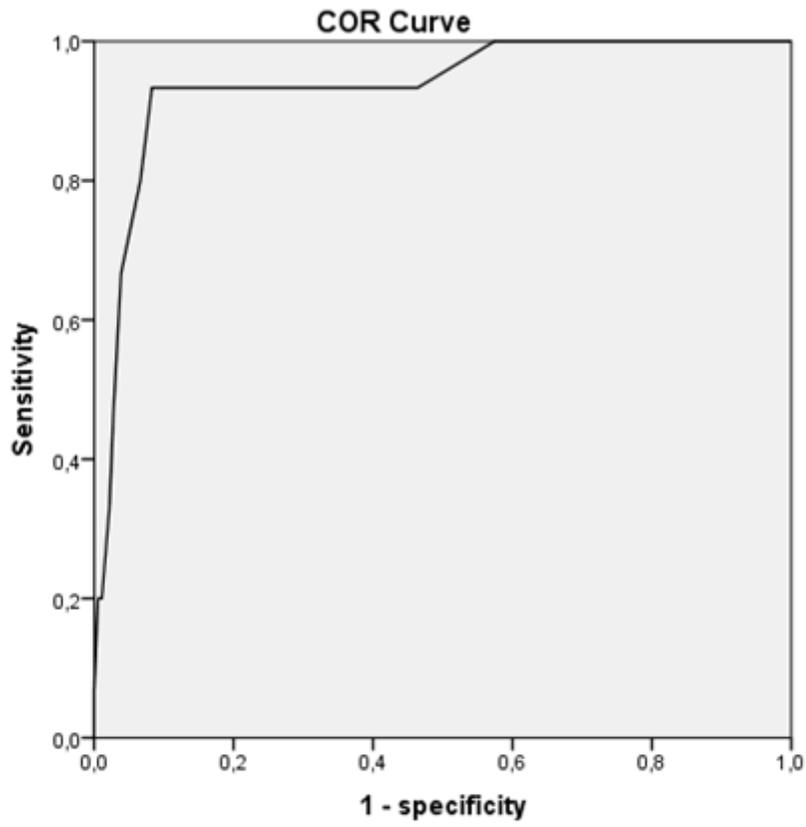


Figure 1  
ROC curve