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Validity of the Maternal Antenatal Attachment Scale-Spanish Version for Mexican Pregnant Women

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A B S T R A C T

During pregnancy, parents experiment emotions, thoughts, and behaviors related to their unborn child as precursors of attachment in the caretaker-infant dyad. The Maternal Antenatal Attachment Scale (MAAS) is an instrument that has shown adequate psychometric properties to evaluate this construct in developed countries. The aim of this study was to assess the reliability and concurrent validity of the Maternal Antenatal Attachment Scale-Spanish version for Mexican women (MAAS-Spanish version). A sample of 142 women in their third trimester of pregnancy who received care in a tertiary hospital was selected. The full scale of the MAAS-Spanish version obtained a Cronbach alpha of .79. A significant negative correlation was found between the global MAAS-Spanish version score (r = -.23, $p \leq .01$) and the Postpartum Depression Predictors Inventory-Revised and depressive symptoms (r = -.36 , $p \leq .01$). The translated and adapted scale has adequate internal consistency and concurrent validity to measure this construct in this population.

Validez de la Escala de Apego Prenatal Materno: versión en español para mujeres mexicanas embarazadas

Palabras clave:
Apego materno
Embarazo
Representaciones maternas
Validez

R E S U M E N

Durante el embarazo, los padres experimentan emociones, pensamientos e ideas sobre su nonato relevantes en el estudio de precursores del apego en la díada cuidador-infante. La Escala de Apego Prenatal Materno (MAAS) es un instrumento que ha mostrado adecuadas propiedades psicométricas para evaluar este constructo en países desarrollados. El propósito de este estudio fue evaluar la confiabilidad y validez concurrente de dicha escala—versión en español para mujeres mexicanas (MAAS—versión en español). Se seleccionó a una muestra de 142 mujeres en tercer trimestre gestacional, que recibían atención en un hospital de tercer nivel. La escala total obtuvo un alfa de Cronbach de .79. Se evidenció una correlación negativa significativa de la puntuación global de la MAAS de r = -.23, ($p \leq .01$) con la PDPI-R y de r = -.36, ($p \leq .01$) con la sintomatología depresiva (EPDS). La escala traducida cuenta con una consistencia interna y validez concurrente adecuadas para medir este constructo en esta población.

There is evidence that throughout pregnancy mothers and fathers develop mental representations (ideas and emotions) and behaviors related to their unborn child and thus establish the precursors of attachment and relationship (Ilicali & Fisek, 2004). These manifestations develop as pregnancy progresses and increase in the presence of fetal movements, the use of ultrasound, and gestational age (Grace, 1989; Leifer, 1980; Lumley, 1982; Mikhail et al., 1991; Righetti et al., 2005; Trombetta et al., 2021).

Research in this area has focused on different constructs that represent the bond parents begin to establish with the unborn. The term maternal-fetal attachment, proposed by Cranley (1981, p. 282), was defined as "the extent to which women engage in behaviors that represent an affiliation and interaction with their unborn child." Several factors affect maternal-fetal attachment. Among these, depressive symptoms and perceived stress have consistently been associated with lower fetal attachment quality in pregnant women (Condon & Corkindale, 1997; Cranley, 1981; Hart & McMahon, 2006; Nieto et al., 2017; Perry et al., 2011).

The translated Maternal Antenatal Attachment Scale—Spanish version for Mexican women (MAAS-Spanish version) is a self-applied questionnaire that assesses attachment precursors and guides pre- and postnatal interventions aimed at the caregiver-infant dyad. The

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original scale was a proposal to improve the internal consistency of previous instruments, such as Cranley's (1981) Maternal-Fetal Attachment Scale (Condon, 1993).

The MAAS (Condon, 1993) is one of the most widely used instruments that assess maternal antenatal attachment (Della Vedova et al., 2019). Ossa et al. (2011) used a hetero-applied version of the MAAS translated into Spanish. They reported a Cronbach alpha for the global scale of .72 in a sample of 244 Chilean pregnant women. In Mexico, Castro et al. (2015) used a previous translation of the MAAS in a sample of 169 pregnant women. They found a Cronbach alpha of .69 for the Global scale, .77 for the Quality subscale, and .55 for the Intensity subscale. Their results showed a slight decrease in the instrument's internal consistency compared to that reported in the original study by Condon (1993). Another study on Spanish speakers was that of Navarro-Aresti et al. (2016) in Spain, in which the original version of the MAAS (Condon, 1993) was translated and back-translated. An internal consistency of .74 Cronbach alpha was reported for the global scale, .67 for the Intensity subscale, and .63 for the Quality subscale with this version.

The objective of this study was to obtain the psychometric parameters of the internal validity of the Maternal Antenatal Attachment Scale—Spanish version for Mexican women (MAAS—Spanish version) using the version translated and adapted for this population.

Method

Participants

A non-probabilistic sample of 142 women receiving prenatal care was selected. The sample size calculation was carried out according to Nunnally and Bernstein (1995), who considered a minimum of 5 participants and a maximum of 10 per item to conduct a factor analysis. For this study, 7 participants per item, plus 9 additional, were considered, anticipating the possibility of incomplete questionnaires that would have to be eliminated. The inclusion criteria were being at least 18 years old, in the third trimester of pregnancy, and having the necessary reading and writing skills to complete the questionnaires. The only exclusion criterion was significant difficulties in understanding and filling out the questionnaires. No participants met this criterion. The participants were invited to the study while they were in the waiting room of the Gynecology and Obstetrics area of "Dr. Jose Eleuterio Gonzalez" University Hospital, in Monterrey, Mexico. This hospital is a tertiary-care public health service that attends open population, serving mainly low socioeconomic users.

Instruments

Gynecological/Obstetrical Clinical History

Sociodemographic data, such as age, occupation, marital status, religion, and schooling, and obstetric history (the number of pregnancies and if she had any high-risk conditions) were obtained from the format used by the hospital service.

Maternal Antenatal Attachment Scale-Spanish version for Mexican women (MAAS-Spanish version) is a self-applied scale translated and adapted from the original MAAS (Condon, 1993) and composed of nineteen items. The items are rated on a 5-point Likert-type scale which represent different degrees of intensity in response to each specific item. The back-translation of the scale was performed by a research team (Ibarra-Yruegas et al., 2016), as proposed by Brislin (1970) and Tsang et al. (2017). A fifth step of collegiate analysis was added to adapt the instrument and improve its content and construct validity, considering Mexican culture and a theoretical framework of social relationships and attachment theory (Gaxiola-Romero et al., 2011).

Postpartum Depression Predictors Inventory (PDPI-R; Beck et al., 2006)

This self-applied screening questionnaire is administered at two time points, during pregnancy and in the postpartum period. This study used the Spanish version for pregnancy by Genovez and Le (2011). The aim of the inventory is to identify 10 risk factors for postpartum depression present in pregnancy. It includes 32 dichotomous response items that assess risk factors related to marital status, previous history of depression, and lack of social support.

The Edinburgh Perinatal Depression Scale (EPDS; Alvarado-Esquivel et al., 2014; Cox et al., 1987)

The EPDS was used to assess depressive symptoms in the last seven days. This instrument consists of ten items. Each one is rated from 0 to 3 points according to the degree of intensity. It has been validated for detecting depression in pregnant Mexican women, obtaining a global internal consistency of .84 (Juárez et al., 2009).

Procedure

The health staff from the research team invited pregnant women in the waiting room of the obstetrics outpatient area to participate voluntarily. Participants were informed of the purpose of the study, and written informed consent was obtained to participate.

Those who accepted went to a room to answer the instruments in writing. Residents trained in psychology and psychiatry supervised the application and were present to answer questions. The study was approved by the Ethics Committee of the Universidad Autónoma de Nuevo Leon and all participation was subject to the standard procedures of informed consent and good clinical practices.

Data Analysis

Data analysis was carried out with the IBM SPSS statistical package version 20 (IBM Corp., Armonk, NY). Descriptive analyses (medians, standard deviations, frequencies, and percentages) of participants' sociodemographic and obstetric variables and the scale scores were initially performed.

Table 1. Sample Characteristics

Pregnancy Characteristics	%	Marital Status	%
First pregnancy	31.7	Consensual union	55.6
Subsequent	68.3	Married	28.2
Planned pregnancy	69.0	Single/separated	16.2
Desired	94.4	Religion	
High risk	11.2	Catholic	80.3
		Other	10.6
		Christian	9.15
Occupation		Education	
Housewife	88.0	Primary	16.90
Employed	4.9	Secondary	57.6
Other	7.0	Higher education	25.4

The internal consistency of the MAAS-Spanish version was obtained by item analysis using the Nunnally and Bernstein

Table 2. Exploratory analysis of the main components of the Maternal Antenatal Attachment Scale—Spanish Version for Mexican women (MAAS—Spanish Version)

Component		1	2	3	4	5	6
Name		Repsonse to representation	Interaction with the unborn	Desire and search for closeness	Anticipation and desire to know the unborn	Quality of the representation of the unborn as a person	Anticipation and desire of protection
% Variance		25.50	7.52	7.41	7.04	5.99	5.45
Eigenvalue		4.84	1.43	1.40	1.33	1.14	1.03
ITEMS							
3	Positive /negative emotions toward the unborn	.733					
11	Happy/sad emotions toward the unborn	.731					
9	Tender/annoying emotions toward the unborn	.709					
10	Clear/vague image of the unborn	.635					
8	Speak frequently/infrequently with the unborn		.649				
13	Feel emotional closeness/distance with the unborn		.647				
4	Desire to read or learn about the unborn		.625				
2	Intensity of emotions that accompany thoughts about the unborn	.402	.575				
15	Anticipated positive/negative first impression of the unborn		.524		-.443		
18	Frequent/infrequent palpation of the unborn			.753			
19	Sadness/mixed feelings towards the fantasized loss of the unborn.	.471		.581			
1	Frequency of thoughts about the unborn			.476			
17	Frequent/infrequent dreams about the unborn				.583		
14	Frequent/infrequent concern about the mother's diet	.426			.490	-.436	
5	Frequently/infrequently imagining the unborn.	.408			.421		
6	Concept of the unborn as a person or thing					.776	
7	Unborn dependent/non-dependent on the mother						
12	Presence/absence of the desire to hurt or punish the unborn						.813
16	Desire to hold the unborn immediately afterwards.						.639

(1995) technique and by Cronbach alpha coefficient to determine homogeneity between items (Oviedo & Campo-Arias, 2005). Another aspect of the internal consistency of the MAAS-Spanish version was explored through factor analyses: the first exploratory and the second confirmatory with two factors to assess whether the structure proposed by Condon (1993) was replicated in this study population. The method of principal components and Varimax rotation were used in both analyses. Likewise, a Pearson correlation was performed between the two subscales of the instrument as another measure of its internal consistency (Manterola et al., 2018). Concurrent validity was subsequently estimated by searching for a Pearson correlation between the MAAS-Spanish version global score and the PDPI-R and EPDS global scores, and each subscale of the MAAS-Spanish version, Intensity and Quality, respectively. Based on the literature, it was assumed that negative correlations would exist between the compared scales (Condon, 1993).

Results

Sample Characteristics

Table 1 shows sample characteristics. The participants had a mean age of 23.32 years (*SD* = 5.29). Regarding education, the majority had only completed secondary school (57.6%); they were housewives (87.9%) and lived in a consensual union (56%), with 80% practicing the Catholic religion. This pregnancy was the first in 31.7% of these women, with a mean gestation of 36.07 weeks. This pregnancy was reported as planned by 69% of the women, and 94.4% informed it was a wanted pregnancy.

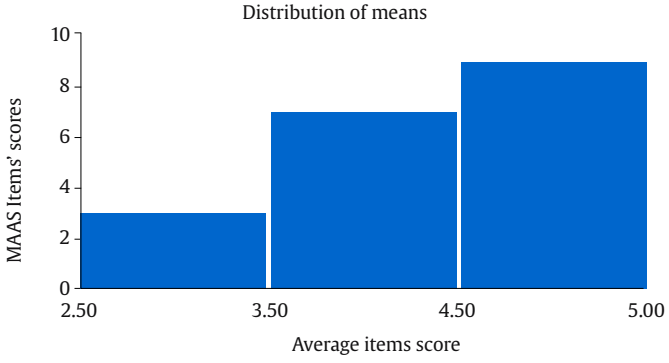

Figure 1. Distribution of Means of the Maternal Antenatal Attachment Scale-Spanish Version for Mexican Women (MAAS-Spanish version).

Distribution of the Means of the Maternal Antenatal Attachment Scale-Spanish Version for Mexican Women (MAAS-Spanish version)

The means of the items ranged between 2.62 and 4.98 (Figure 1). Scores equal to or greater than 4.32 represented 68.5% of the means.

Internal Consistency

A Cronbach alpha of .79 was found in the MAAS-Spanish version global score, while in the Intensity and Quality subscales, it was .69 in each. The scale items obtained Cronbach alphas that ranged between .77 and .79, showing adequate properties according to the criteria of Nunnally and Bernstein (1995).

Factor Analysis

In the exploratory analysis, 6 factors with factorial weights above .40 were observed; these explained 58.95% of the variance. Most of this variance was explained by the first factor (25.5%), which grouped items 3, 11, 9, 10, 2, 19, 14, and 5, while the other factors explained a lower percentage of the variance and consisted of a smaller number of items. The six factors together included almost all the items of the MAAS-Spanish version, except for item 7, "the unborn child depends/does not depend on the mother," whose factorial weight did not sufficiently incline towards any factor, which coincides with previous reports of the MAAS-Spanish version in its original version (Table 2). The names of the factors were designated according to the theme of the items and considering an attachment theoretical framework.

In the two-factor confirmatory factor analysis, the variance explained by both was 32.9% (Table 3). The first factor seems to correspond to the Close Experience with the unborn. In this analysis, the items showed factor loadings between .39 and .74, with six items from the Intensity subscale (1, 2, 4, 8, 14, and 18) and four from the Quality subscale (9, 13, 15, and 19). The second factor, Representation of the Unborn, had factor loadings between .44 and .67. Most of the items belonged to the Quality subscale (3, 6, 7, 10, 11), except for item 5, which comes from the Intensity subscale. Items 12, 16, and 17 showed loads on this factor but less than .40 (.13, .18, and .35, respectively).

Finally, returning to Condon's (1993) original proposal that the MAAS-Spanish version is an instrument with two factors (subscales) that are related, a positive correlation was found between the Close Experience subscale and the Representation of the Unborn (r = .62, $p \leq .001$).

Concurrent Validity

The MAAS-Spanish Version showed a significant negative correlation with the PDPI-R (r = -.23, $p \leq .01$) and the EPDS (r = -.36, $p \leq .01$). The two MAAS-Spanish version subscales, Condon's (1993) original factors, Quality and Intensity, also showed significant negative correlations with the PDPI-R and the EPDS. The Intensity subscale showed a correlation coefficient of .32 ($p < .01$) with the EPDS and of -.17 with the PDPI-R (p = .004). Meanwhile, the Quality subscale showed a correlation coefficient of -.30 for both the PDPI-R and the EPDS ($p < .01$).

Discussion

The aim of this study was to evaluate the consistency and concurrent validity of the Maternal Antenatal Attachment Scale-Spanish Version for Mexican women (MAAS-Spanish version). According to Tsang et al. (2017), the instrument was used with a translation and adaptation process that ensured that the measurement of the constructs was consistent with the original scale, maintained the theoretical perspective of attachment, and considered the cultural context. Like other Latin American contexts, the study sample consisted of women with high psychosocial vulnerability, where 16% were single and 56% were in a consensual union. Also, the maximum degree of education of the majority (75%) was middle school, and 88% were economically dependent and dedicated to housework.

In this socioeconomic environment, the MAAS-Spanish version showed adequate internal consistency for its total score with a Cronbach alpha of .79 according to Nunnally and Bernstein (1995) criteria, similar to that reported by Condon (1993). However,

Table 3. Confirmatory Two-factor Factorial Analysis of the Maternal Antenatal Attachment Scale—Spanish Version for Mexican Women (MAAS—Spanish Version)

Component		1	2
% Variance		25.42%	7.50%
Eigenvalue		4.83	1.43
Item		Experience of closeness to the unborn	Representation of the unborn
1	Frequency of thoughts about the newborn	.44	
2	Intensity of emotions that accompany thoughts about the newborn	.63	
3	Positive/negative emotions about the unborn		.67
4	Desire to read or learn about the unborn	.51	
5	Infrequently/frequently imagining the unborn		.50
6	Concept of the unborn as a person or thing		.59
7	Unborn dependent/not dependent on the mother		.52
8	Talk frequently/infrequently with the unborn	.66	
9	Tender/annoying emotions towards the unborn	.46	.44
10	Clear/vague mental image of the unborn		.60
11	Happy/sad emotions about the unborn	.45	.49
12	Presence/absence of the desire to hurt or punish the unborn		
13	Feeling/emotional distance with the unborn	.73	
14	Frequent/infrequent concern about the mother's diet		
15	Anticipated positive/negative first impression of the unborn	.39	
16	Desire to hold the infant immediately afterwards		
17	Frequent/infrequent dreams about the unborn		
18	Frequent/infrequent palpation of the unborn	.48	
19	Sadness/ mixed feelings towards the fantasized loss of the unborn	.46	

the internal consistency of the subscales was slightly below the recommended level. This finding was expected since, in the MAAS-Spanish version, the two-factor structure proposed by Condon (1993) was not replicated. Thus, both the Intensity and Quality scales obtained a Cronbach alpha of .69. However, Cronbach alphas of the total and two factor scales of the MAAS in Spanish exceeded most of those reported in other populations. In contexts such as Spain, Mexico, and Chile, the global scale has shown Cronbach alphas in a range of .70 to .87; the Intensity scale of .56 to .77, and the Quality scale of .57 to .88 (Mako and Deak, 2014; Mata et al., 2015; Navarro-Aresti et al., 2016; Ossa et al., 2011; Van Bussel et al. al., 2010). Accordingly, the overall internal consistency of the MAAS-Spanish version shows that its items have the desirable homogeneity.

The two-factor confirmatory factor analysis partially replicated the model proposed by Condon (1993) since the first factor contained items from both factors. This finding was consistent with discrepancies reported between other Spanish versions of the MAAS with respect to the original instrument (Navarro Aresti et al., 2016). Thus, the MAAS in this study showed an explained variance of 32.9% in the two-factor confirmatory analysis, 6.1% lower than that of the original model by Condon (1993). In the exploratory factorial analysis and in the confirmatory two-factor analysis, a factor was found that explained most of the variance and had most of the items. Taking this data into account and that the correlation between the subscales was high (higher than that of previous studies), it is suggested that the global score is a significant measure of attachment referents in the prenatal stage (Busonera et al., 2015; Condon and Corkindale, 1997; Van Bussel et al., 2010; Mako and Deak, 2014).

Regarding the concurrent validity of the MAAS-Spanish version, as expected, a significant negative relationship was found between the risk factors for perinatal depression and the low Quality of the maternal representations of the infant. As has been described in the literature, pregnant women with a higher risk of suffering perinatal depression showed representations of the infant of lower Quality and Intensity (Condon & Corkindale, 1997).

This finding is relevant from two perspectives. On the one hand, it shows the concurrent validity of the MAAS-Spanish version and the usefulness of its global score and the two subscales proposed by Condon (1993) in the original instrument. On the other hand, the results corroborate the importance of evaluating and considering the risk factors that interfere with bonding processes to prevent or treat them in the prenatal stage.

The presence of depressive symptoms during pregnancy and its impact on attachment processes is relevant in the Mexican context (Lara et al., 2006; Nieto et al., 2017). It is estimated that between 9% and 14% of pregnant women in Mexico are diagnosed with depression when evaluated with clinical interviews, while between 8% and 31% are diagnosed through self-reports (Ibarra-Yruegas et al., 2016). On the other hand, Ibarra (2015) identified that up to 21% of pregnant women were at risk of postpartum depression in a similar Mexican population. This risk has been associated with various psychosocial factors such as problems in the social and economic support network and anxiety produced by the challenge of parenting (Albuja et al., 2017; Cutrona, 1984; García et al., 1991; Lara et al., 2006). In this study, the presence of depressive symptoms and risk factors for postpartum depression confirmed their association with lower-quality referents of prenatal bonding.

The manifestations of difficulties in bonding processes, identified through prenatal attachment referents and the presence of perinatal depression, have been associated with negative consequences. For example, both reduce adherence to pregnancy check-ups and enjoying motherhood (Bennett et al., 2004). They have also been linked to an increased risk of non-term pregnancies, low birth weight, breastfeeding difficulties, and parental sensitivity to the infant's needs (Kaydirak et al., 2021; Schaffir, 2018; Steer et al., 1992). On the other hand, better quality in prenatal attachment referents has been related to the development of adaptive, emotional, and proximity parental behaviors in the postnatal stage, such as smiling at the baby, hugging, and kissing him, as well as prompt, consistent, and affectionate responses to the baby's call (Lara et al., 2013; Taffazoli et al., 2015).

Motherhood is a complex phenomenon that implies significant challenges in the Latin American context. On the one hand, it is a moment of assuming female identity as a source of value, power, and social prestige. On the other hand, motherhood can diminish labor competition and complicate access to a better socioeconomic position and quality of life (Gajardo, 2021).

Mota et al. (2019) mention that in current Mexican culture, the meaning of motherhood and the attitudes and beliefs about it differ according to specific social groups. The relevance of motherhood in this country and other Latin American countries as a source of personal fulfillment is high in socioeconomically vulnerable groups (Gajardo & Oteíza, 2017; Mota et al., 2019). Concerning this, in the studied sample, it was striking that despite socioeconomic adversity, low educational background, unemployment, and marital status as single and living consensually, most pregnancies were reported as wanted, although a high percentage were unplanned. Factors to consider in this phenomenon include the high proportion of Catholic participants and the impact of the traditional role of Mexican women, associated with qualities of passivity and dependence (Albuja et al., 2017; Lara, 1998; Lara et al., 1994). From this perspective, duty and sacrifice are inherent to the maternal role (Gajardo and Oteíza, 2017). However, in contexts of low social support, this traditional role can act as a risk factor for developing postpartum depression (Albuja et al., 2017).

Latin women still face rigid models of ideals about motherhood that can lead to negative effects on physical and mental health (Gajardo and Oteíza, 2017; Lara, 1998). In addition to this, before 2021, in most of the states of Mexico, voluntary termination of pregnancy was not decriminalized, and there were constitutional reforms that guaranteed protection of the right to live from the moment of conception (Wójtowicz-Wcisło, 2020), which were politically motivated by religious institutions (Blofield 2008). In contrast, sex education in Mexico is very deficient, where 20% of annual pregnancies correspond to teenage mothers (Cancino & Valencia, 2015).

Conclusions

Maternal Antenatal Attachment Scale-Spanish version for Mexican women (MAAS-Spanish version) showed good internal consistency and satisfactory concurrent validity. Thus, it validly and reliably evaluates attachment representational referents in the prenatal stage, in a low- and middle-income country, in groups with psychosocial adversity, and adapts to the characteristics of Mexican culture. On the other hand, according to the factorial structure found in the Mexican context, it is recommendable to explore an abbreviated version of the instrument oriented to a global factor with the items that showed high weights in the Close Experience with the unborn factor. Psychometrically sound instruments to study prenatal maternal attachment in Latin America should stimulate research in this geographic and socioeconomic context.

Limitations

The population of this study was recruited in a tertiary-care hospital that attends a high percentage of individuals from a specific socioeconomic level. Even though a large part of the Mexican population corresponds to this stratum, we must emphasize that the present results mostly represent the Mexican population with low economic resources.

Conflict of Interest

The authors of this article declare no conflict of interest.

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