AG EDITOR

ORIGINAL

Dimensionality and internal consistency of the Roberts' scale for suicidal ideation among Colombian pregnant women

Dimensionalidad y consistencia interna de la escala de ideación suicida de Roberts en mujeres gestantes colombianas

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ABSTRACT

Introduction: suicidal ideation is an understudied issue during the gestational period, requiring valid and reliable instruments for timely measurement and to provide support in perinatal mental health. However, there are limited scales available to assess suicidal ideation in pregnant women in Colombia.
Objective: to explore the dimensionality and internal consistency of the Roberts' scale for suicidal ideation in pregnant women from Santa Marta, Colombia.
Methods: 172 pregnant women between 18 and 44 years of age (M=24,7; SD=5,49) completed the Roberts suicidal ideation scale. An exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were carried out to determine dimensionality and Cronbach's alpha and McDonald's omega coefficients were calculated to establish internal consistency.
Results: in the CFA the Roberts' scale indicated a unidimensional internal structure explaining 50,5 % of the variance and with adequate goodness-of-fit indicators (X^2=5,85, gl=2, p<0,054; RMSEA=0,104 (CI90 %=0,000-0,210); SRMR=0,025; CFI=0,981; TLI=0,944). Cronbach's alpha coefficient was 0,781 and McDonald's omega coefficient was 0,801, showing acceptable internal consistency.
Conclusions: Roberts' scale is a brief, reliable measure with strong validity evidence for assessing suicidal ideation in pregnant women. Further instrumental studies with a larger sample size are recommended to corroborate the psychometric performance of the instrument in the Colombian population.

Keywords: Suicidal Ideation; Pregnant Women; Validation Study; Reproducibility of Results.

RESUMEN

Introducción: la ideación suicida es una problemática poco estudiada durante el periodo de gestación, que requiere instrumentos válidos y confiables para realizar una medición oportuna y brindar acompañamiento en salud mental perinatal. Sin embargo, son limitadas las escalas para evaluar la ideación suicida en mujeres gestantes colombianas.
Objetivo: explorar la dimensionalidad y consistencia interna de la escala de ideación suicida de Roberts en mujeres gestantes de Santa Marta, Colombia.
Método: 172 mujeres gestantes entre 18 y 44 años (M=24,7; DE=5,49) diligenciaron la escala de ideación suicida de Roberts. Se llevó a cabo un análisis factorial exploratorio (AFE) y confirmatorio (AFC) para determinar la dimensionalidad y se calcularon los coeficientes alfa de Cronbach y omega de McDonald para establecer la consistencia interna.
Resultados: en el AFC la escala de Roberts indicó una estructura interna unidimensional que explicaba el 50,5 % de la varianza y con indicadores adecuados de bondad de ajuste (X^2=5,85, gl=2, p<0,054; RMSEA=0,104

(IC90 %=0,000-0,210); SRMR=0,025; CFI=0,981; TLI=0,944). El coeficiente alfa de Cronbach fue de 0,781 y el coeficiente omega de McDonald de 0,801, evidenciando una consistencia interna aceptable.
Conclusiones: la escala de Roberts es una medida breve, confiable y con evidencias de validez sólidas para evaluar la ideación suicida en mujeres gestantes. Se recomienda realizar otros estudios instrumentales con mayor tamaño muestral para corroborar el desempeño psicométrico del instrumento en población colombiana.

Palabras clave: Ideación Suicida; Mujeres Embarazadas; Estudio de Validación; Reproducibilidad de los Resultados.

INTRODUCTION

Suicide is considered a global public health problem.[1] According to the World Health Organization, an estimated 700000 people die each year from suicide worldwide. It is the fourth leading cause of death among individuals aged 15 to 29 and disproportionately affects low-income countries.[2] In Colombia, for the year 2019, the Pan American Health Organization reported a rate of 3,7 deaths from self-inflicted injuries per 100000 inhabitants[3] and the National Institute of Legal Medicine and Forensic Sciences reported a total of 2984 suicides at the end of 2024.[4]

In this context, attempted suicide represents an epidemiological warning sign and is considered a determining risk factor for its consumption.[5] In Colombia, as of February 2025, there were 4,423 suicide attempts recorded in the country, of which women perpetrated 60,7 %.[6] The risk of suicide tends to be higher in vulnerable populations.[7,8] In pregnant women, a recent meta-analysis reported an overall prevalence of 210 suicide attempts per 100000 inhabitants, based on a sample of approximately 6,5 million women during pregnancy and postpartum.[9] Similarly, since January 2025, 23 suicide attempts have been recorded among pregnant women in Colombia.[6] However, these data only reflect the cases reported by health service providers (IPS), and the actual figures may be higher.[10]

A solid body of evidence indicates that suicide attempts are preceded by suicidal ideation.[10,11,12] Suicidal ideation is a cognitive state in which an individual contemplates taking their own life. This condition can present as recurrent thoughts about death, a persistent feeling of hopelessness, or planning the act of suicide,[13] which is why it is necessary to have valid and reliable instruments to identify the persistence of suicidal thoughts promptly and prevent self-harm.

In this regard, the Roberts scale[14] is a brief instrument for assessing suicidal ideation. It was initially composed of four items that explore ideas about suicide during the last week, extracted from the Center for Epidemiological Studies Depression Scale (CES-D). When translated into Spanish and adapted to the Mexican population, the item "I would kill myself if I could" was replaced by "I couldn't go on."[15]

Various validation studies in adolescent and university student populations have confirmed that the items on the Roberts scale are grouped into a single dimension, reflecting a unifactorial internal structure with adequate indicators of goodness of fit, and have also reported sufficient internal consistency with Cronbach's alpha coefficients between 0,77-0,81, and McDonald's omega between 0,77-0,84.[16,17,18] However, no validation studies of this instrument have been conducted in pregnant women.

Valid and reliable instruments are needed to assess suicidal ideation in pregnant women, given their physical and psychological vulnerability during pregnancy. Early detection of suicidal tendencies is essential for formulating timely interventions that reduce the risk of death and promote women's mental health. In addition, the scale serves as input for studies that contribute to developing public policies and suicide prevention strategies in this population.

Therefore, the objective of this research was to explore the dimensionality and internal consistency of the Roberts suicidal ideation scale in pregnant women in Santa Marta, Colombia.

METHOD

An instrumental study was conducted. This type of design allows for an approximation of the validity and reliability of an instrument through statistical procedures.[19]

The study population was 200 pregnant women over 18 in Santa Marta, Colombia, selected by convenience sampling. The participants registered on a digital platform where they completed several scales to assess perinatal mental health. All items were classified as mandatory to avoid loss of information, and pregnant minors were excluded. The final sample consisted of 172 women. In instrumental studies, a minimum of 10 individuals per item on the scale to be validated is recommended,[20] so the sample size was considered acceptable.

For the present study, the Colombian version of Roberts' suicide ideation scale was applied,[17] consisting of four items that explore the frequency of thoughts related to suicide during the last week. The items are

evaluated according to four Likert-type response options: 0 days (0), 1-2 days (1), 3-4 days (2), and 5-7 days (3), yielding scores between 0 and 12 (table 1).

Table 1. Roberts' suicide ideation scale				
Over the past seven days	**0 days**	**1-2 days**	**3-4 days**	**5-7 days**
1. I felt like I couldn't go on.	0	1	2	3
2. Have you had thoughts about death?	0	1	2	3
3. I felt that my family would be better off if I were dead.	0	1	2	3
4. I've thought about killing myself.	0	1	2	3

Statistical analyses were performed using JASP software version 18,3. In validation studies, items on a scale are considered variables. To explore dimensionality (also referred to as internal structure), exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were performed. In EFA, Bartlett's sphericity test was applied,[21] in which chi-square values lower than $p<0,05$ are expected, and the Kaiser-Meyer-Olkin (KMO) sample adequacy test,[22] which is considered acceptable from 0,70 onwards. Adequate indicators in both tests indicate the presence of one or more latent factors.

In the AFC, the Mardia test[23] did not show multivariate normality of the variables ($p<0,001$), so the weighted least squares method with adjusted mean and variance (WLSMV) recommended for ordinal items was used, based on parallel analysis and Varimax rotation. Items with commonalities greater than 0,30 and minimum factor loadings of 0,50, recommended for samples between 100 and 200 people, were retained.[24] Likewise, the level of discrimination was calculated using corrected item-total correlations, for which values greater than 0,50 are expected.[25]

Robust maximum likelihood (MLR) estimators were used to determine the fit of the factor solution. The indices used were the chi-square test with degrees of freedom (df) and p-value $>0,05$; the root mean square error with 90 % confidence intervals (RMSEA, $\leq0,06$), the standardized residual mean square (SRMR, $\leq0,06$), the comparative fit index (CFI, $>0,90$), and the Tucker-Lewis index (TLI, $>0,90$). The goodness of fit was considered adequate when three of these five indicators reached the desired values.[26]

Finally, to determine the evidence of validity based on internal consistency, Cronbach's alpha coefficients[27] and McDonald's omega coefficients[28] were calculated, for which values between 0,70 and 0,90 are expected.

The research was approved by the ethics committee of the University of Magdalena (Acta 010 of 2021). The ethical guidelines established in Resolution 8430 of 1993 and the Declaration of Helsinki for research involving human subjects were followed. Pregnant women participated voluntarily and provided informed consent. The information was handled confidentially and exclusively for research purposes.[29]

RESULTS

172 pregnant women between 18 and 44 (M=24,7; SD=5,49) participated in the study. Of these, 55,9 % were between 18 and 25, 23,3 % had a low income, 23,8 % lived in a rural area, 40,1 % had attained a maximum secondary education level, 19,8 % were single, and only 24,4 % were employed. Regarding gynecological and obstetric variables, 43,5 % were in their third trimester of pregnancy, 31,5 % were first-time mothers, and 49,4 % were carrying an unplanned pregnancy to term. Women with unplanned pregnancies showed higher levels of suicidal ideation compared to those who had planned their pregnancy (U=3063, p<0,023) (table 2). The other sociodemographic variables did not show significant differences in the scale scores.

Table 2. Demographic characteristics of the sample and differences in medians for the suicide ideation scale				
Variable		**n**	**%**	***p***
Age	Between 18 and 25	96	55,9	0,686[a]
	Between 26 and 44	76	44,1	
Income level	Low	40	23,3	0,968[a]
	High	132	76,7	
Area of residence	Rural	41	23,8	0,963[a]
	Urban	131	76,2	
Level of education	Secondary	69	40,1	0,987[a]
	University	103	59,9	
Marital status	Single	34	19,8	0,112[a]
	In a relationship	138	80,2	

Employment status	Working	42	24,4	0,907[a]
	Not working	130	75,6	
Pregnancy trimester	First	45	26,2	0,565[b]
	Second	52	30,2	
	Third	75	43,6	
First pregnancy	Yes	61	35,5	0,690[a]
	No	111	64,5	
Planned pregnancy	Yes	87	50,6	0,023[a]*
	No	85	49,4	
*Significance at p<0,05. a= Mann-Whitney U test used, b= Kruskal-Wallis test used.				

The Roberts suicidal ideation scale showed scores between 0 and 12 (M=1,06; SD=2,13). In relation to dimensionality, the AFE showed a KMO coefficient of 0,768 and Bartlett's sphericity test was significant ($X2=209,72$; gl=6; p<0,001), indicating the presence of one or more latent factors. Correlations above 0,50, communalities above 0,30, and factor loadings of 0,60 and above were observed (table 3).

Table 3. Correlation between items, communalities, and factor loadings

Item	Corrected item-total correlation	Communal	Factor load
1	0,621	0,491	0,701
2	0,615	0,488	0,698
3	0,688	0,677	0,823
4	0,516	0,365	0,604

When applying AFC, the reagents were grouped into a single factor with an eigenvalue of 2,02, explaining 50,5 % of the variance. This unifactorial solution showed adequate indicators of goodness of fit ($X2=5,85$, gl=2, p<0,054; RMSEA=0,104 (90 % CI=0,000-0,210); SRMR=0,025; CFI=0,981; TLI=0,944).

Regarding evidence of validity based on internal consistency, the Roberts suicidal ideation scale showed a Cronbach's alpha coefficient of 0,781 and a McDonald's omega of 0,801. No item showed values higher than the overall score when removed (table 4).

Table 4. Cronbach's alpha and McDonald's omega coefficients for each item

Item	If the item is discarded	
	Alpha (α)	Omega (ω)
1	0,732	0,761
2	0,717	0,758
3	0,691	0,711
4	0,773	0,787
Total	0,783	0,801

DISCUSSION

The results of this study showed that Roberts' suicide ideation scale has a unidimensional internal structure and adequate internal consistency in a sample of pregnant women in Colombia.

In terms of dimensionality, the factor analysis findings confirmed that the scale has a single-factor internal structure that explained 50,5 % of the variance. Only one validation study has been conducted in Colombia to contrast these results. Suárez-Colorado et al.[17] reported a similar factorial solution in a sample of 1,472 adolescents aged 13 to 17 from public and private institutions in Santa Marta. In Latin America, Baños-Chaparo et al.[18] confirmed the unidimensionality of the scale in 399 Peruvian secondary school students[16], as did Padrós-Blázquez et al.[16] in an instrumental study applied to 1190 Mexican university students. In addition, the AFC showed adequate goodness of fit in four of the five established indicators. Although the RMSEA value was 0,104, the lower confidence interval was less than 0,06 and, theoretically, can be considered acceptable.

The internal consistency of the Roberts scale also obtained adequate indicators in the present study, with an alpha coefficient of 0,781 and McDonald's omega of 0,801. It is advisable to report both measures in validation studies, as McDonald's omega is more suitable for determining internal consistency when the tau equivalence principle, necessary for accurately calculating Cronbach's alpha, is not met.[30]

A relevant finding of this study is that women who did not plan their pregnancy reported higher levels of

suicidal ideation compared to those whose pregnancy was planned. This result is consistent with the literature, as suicide is a multifactorial phenomenon involving various stressors that create a state of psychosocial vulnerability. Thus, the absence of planning can generate feelings of uncertainty, stress, and hopelessness, which could increase suicidal ideation.[9] In addition, structural factors present in Colombian territories, such as economic inequality, social marginalization, and dissatisfaction with basic needs, can increase the risk of suicide during the perinatal and postnatal periods.[31]

The results of this study constitute a significant contribution to the nursing field. Roberts' suicide ideation scale allows professionals to identify at-risk obstetric patients early, screen for suicidal symptoms during prenatal check-ups, and provide timely support during pregnancy. In addition, the findings provide solid evidence of the validity and reliability of the scale in a poorly studied population, opening new lines of research to explore risk and protective factors associated with mental health during pregnancy in the regional and national context.

On the other hand, it is essential to mention some study limitations. Although the sample size was sufficient to carry out the proposed statistical analyses, it may not represent all pregnant women in Colombia, as it was limited to a specific geographical, cultural, and socioeconomic context, affecting the findings' generalizability. Therefore, further instrumental studies with randomized samples are recommended for statistical inference. Furthermore, other factors associated with suicidal ideation during pregnancy, such as access to mental health services, the quality of prenatal care, or the presence of gender-based violence, were not explored. Future research could incorporate a more comprehensive measurement of these contextual variables to more accurately establish the psychometric performance of the Roberts scale in the Colombian pregnant population.

CONCLUSIONS

The Roberts Suicide Ideation Scale is a brief, valid, and reliable measure for assessing suicide ideation in pregnant women in Santa Marta, Colombia. Nursing professionals can use the scale as a tool for cost-effective screening for suicide ideation in obstetric and perinatal care settings. In addition, the instrument has broad utility in epidemiological and public health research.

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CONFLICT OF INTEREST
The authors declare that there is no conflict of interest.

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