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Factor Structure and Psychometric Properties of Zung Self-Rating Depression Scale in Women with a Sick Child

Saman Sedighi[1], Mohammad Reza Najarzadegan[2], Hoseyn Ghasemzadeh[3], Mehrdad Khodabandeh[4], Mahshid Khazaei[5], Monirsadat Mirzadeh[6], *Masaudeh Babakhanian[7], Ali Rokni[8], Masumeh Ghazanfarpour[9]

[1]Azad University of Medical Sciences, Tehran, Iran. [2]Research Center for Addiction and Risky Behaviors, Iran University of Medical Sciences, Tehran, Iran. [3]Student Research Committee, Iran University of Medical Sciences, Tehran, Iran. [4]Neuromusculoskeletal Research Center, Department of Physical Medicine and Rehabilitation, Iran University of Medical Sciences, Tehran, Iran. [5]Department of psychiatry, Qazvin University of Medical Sciences, Qazvin, Iran. [6]Assistant Professor Community Medicine, Metabolic Diseases Research Center, Research Institute for Prevention of Non-Communicable Diseases, Qazvin University Of Medical Sciences, Qazvin, Iran. [7]Abnormal Uterine Bleeding Research Center, Semnan University of Medical Sciences, Semnan, Iran. [8]Orthopedic Resident, Department of Orthopedic, Kerman University of Medical Sciences, Kerman, Iran. [9]Student Research Committee, Kerman University of Medical Sciences, Kerman, Iran.

Abstract

Background

Considering the necessity of using a valid and reliable tool to assess depression in women and the lack of similar tools in Iran, the purpose of this study was to investigate the psychometric properties of the Zung Self-Rating Depression Scale (ZSDS) with an emphasis on factor analysis among Iranian women with sick children.

Materials and Methods

In the cross-sectional psychometric study, 102 eligible women were selected by multistage cluster sampling from various environments such as healthcare centers, hospitals, and public and private institutions, who completed the ZSDS. The reliability of the questionnaire was assessed using test-retest and internal consistency, and its validity was tested by confirmatory factor analysis (CFA).

Results

Cronbach's alpha coefficients for the total scale were equal to 0.73, and high test-retest reliability indicated the appropriate reliability of ZSDS. The CFA results indicated a poor fit of the model in determining the factors as initially expressed in ZSDS. After removing six questions with low factor loadings and freeing the covariance error between the two questions, the model was adequately fitted (CMIN/DF= 1.3, CFI= 0.92, TLI= 0.90, GFI= 0.89).

Conclusion

Based on our study, the ZSDS is convenient for identifying clinically significant depressive symptoms among women with sick children.

Key Words: Child, Psychometric, Zung Self-Rating Depression Scale, Women.

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Corresponding Author:

Masaudeh Babakhanian, Abnormal Uterine Bleeding Research Center, Semnan University of Medical Sciences, Semnan, Iran.

Email: babakhanian.m@gmail.com

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1- INTRODUCTION

Depression is one of the ten deadly diseases in the world (1). The prevalence of depression in women is higher than in men in almost all societies. The prevalence of depression in Iranian women varies from 13.1% to 75%, indicating that women are 1.1 to 1.7 times more vulnerable to depression than men (2). The multiplicity of responsibilities in the family and the emergence of changes in the process of each can cause anxiety and stress in individuals, thereby leading to depression (2). Patients experience certain events before the depression, including problems with their spouses, parents, and children, as well as financial concerns and physical illnesses. Research has shown that the presence of a sick or disabled child, as a stressor in the family, has had a significant effect on parental depression rates (3-7).

It has been shown that children with depressed mothers are hospitalized longer than children of healthy mothers have higher mortality rates, and experience higher rates of health problems, such as asthma, allergies, coughs, frequent colds, headaches, and dyspepsia, in comparison to the children of healthy parents (8). Sick children may cause high levels of stress that can potentially impair their parents' mental and physical health (9-11). Also, the prevalence of depression in different communities varies between 10% and 25%. In a study, the prevalence of depression was 16% in mothers of children without chronic disease, 30% in mothers of children with diabetes, and 27% in mothers of children with asthma (8).

Understanding depression in this population group requires valid and reliable tools in this area. However, the appropriate tools are not designed for this purpose in Iran at present. Therefore, the purpose of this study was to investigate the psychometric properties of the Zung Self-Rating Depression Scale (ZSDS) in Iranian women with sick children.

2- MATERIALS AND METHODS

This cross-sectional psychometric study was conducted between 2018 and 2019, and the samples consisted of women with sick children (16-45 years) who were selected by multistage and convenience methods in Damghan and Mashhad, Iran. Approval was obtained from the University Ethics Committee (ID-code: xx), and all participants provided written informed consent before participating in the study. Several methods have been suggested to calculate the required sample size. Munro considers it essential to use large sample sizes in structural equations. At least 100 to 200 subjects are required in the most common method of parameter estimation in SEM, namely ML(12). Finally, 102 eligible women were selected by multistage cluster sampling from various places such as healthcare centers, hospitals, and public and private institutions, who completed the ZSDS. The participants filled all questionnaires at home or the study centers. The returning of questionnaires was supervised by a research assistant, who also instructed to fill questionnaires if needed.

Data collection tools in this study were demographic characteristics and the Zung Self-Rating Depression Scale (ZSDS). The ZSDS contains 20 four-choice questions measuring three domains of general symptoms (items 1 and 2), physical symptoms (items 3 to 10), and psychological symptoms (items 11 to 20) (13); and its design was based on the depression diagnostic criteria. Subjects rated each item about how they have felt during the past several days using a 4-point Likert scale. Each item was scored based on a Likert scale ranging from one to four. The raw sum score of the ZSDS ranged between 20 and 80 [[Normal range (20–44); Mildly depressed (45–59); Moderately depressed (60–69), and Severely depressed (70–100)] (12). The questionnaire was nationalized in 2006 on

the Iranian youth population, and the results showed that this tool has high reliability for implementation (14). Confirmatory factor analysis (CFA) was performed for data analysis to check the fit of the three-factor ZSDS model. Also, Cronbach's alpha coefficient was utilized to assess the reliability of the questionnaire. SPSS software version 24.0 was used for reliability analysis and Amos-21 software for the CFA.

In the CFA, the maximum likelihood (ML) method was used to estimate the pattern, and Chi-square/degree of freedom ($\chi 2$/df) ratio and some other indices were applied to check the model fit. The $\chi 2$/df ratio examines the hypothesis of the model fit to the covariance pattern between the observed variables. Smaller values of this ratio, i.e., below three, indicate fitness (15). If $\chi 2$ were not statistically significant, it would indicate the appropriate fitness of the model. The $\chi 2$ value is highly dependent on the sample size, i.e., this index is usually significant in larger samples and thus is not considered an appropriate index for model fit. Other fitting statistics, such as the Comparative Fit Index (CFI), the Tuker Levis Index (TFI), and the Goodness of Fit Index (GFI), usually range between zero and one, indicating good fit (8). Another measure is the Root Mean Square Error of Approximation (RMSEA), which ranges from zero to one, and the closer values to zero indicate better fitness (16).

3- RESULTS

A total of 102 eligible women participated in this study. The mean age of participants was 21.2 ± 22.3 years. The majority of these were housewives (60%), and the educational levels of most of them were primary and secondary schools (59%). The mean depression score of the subjects was 33.08 ± 7.08 (ranging from 20 to 80), which is within the normal range (17). In this study, the CFA was performed by Amos-21 software and evaluated twice. In the first step, the fitted values indicated no pattern fitting. Subsequent analyzes showed that factor loadings of questions 2, 5, 6, 7, 13, 15, and 19 were low; thus, these questions were omitted. Subsequently, the final model was adopted with 13 items, and freeing a covariance error between the "11 and 12" error items was compared to the previous model (**Table.1, and Figure.1**). Cronbach's alpha coefficients for all questions are 0.73, and Cronbach's alpha for each of the three factors is presented in **Table.2,** separately.

Table-1: Overall indices of final fitting for the three-factor model of "Zung Self-rating Depression Scale" in Iranian women

Overall indices of final fitting	CMIN/DF	P-value	GFI	CFI	TLI
Results of the indices according to the three-factor model in Iran	1.3	0.000	89.0	0.92	0.90

CMIN/DF: $\chi 2$/df, GFI: Goodness of fit index, CFI: Comparative Fit Index, TLI: Tucker-Lewis Index.

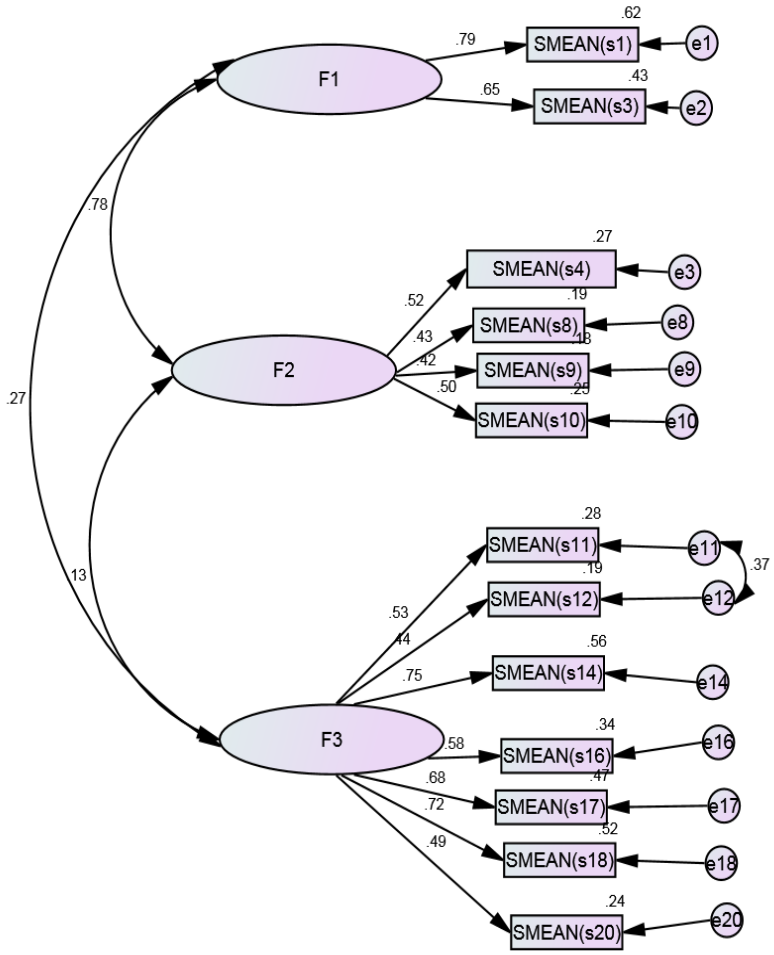

Fig.1: showed CFA of ZSDS model with three factors.

Table-2: Factor loading, Cronbach's alpha, and freed covariance errors for participant women.

Factor	No.	Item	Freed covariance errors	Cronbach's alpha
Factor 1	1	I feel heartbreak and depression.		0.23
	3	I have or feel attacks of crying.		
Factor 2	4	I have trouble sleeping at night.		0.52
	8	I suffer from constipation		
	9	My heart beats faster than usual.		
	10	I get tired for no reason.		
Factor 3	11	My mind gets involved as much as it understands.	11↔12	0.80
	12	I easily understood the habits I was doing.	11↔12	
	14	I feel like I am hopeful for the future.		
	16	I found out that the decision is easy.		
	17	I feel I am useful and necessary.		
	18	I feel like my life is full of beauty.		
	20	I always enjoy the things I am using.		

4- DISCUSSION

The present study was aimed to determine the validity and reliability of the ZSDS questionnaire among Iranian women with sick children. The results of the present study confirmed the validity and reliability of the questionnaire. Cronbach's alpha of reliability was 0.73 for the whole questionnaire. This value is consistent with the value of 0.73, which was reported by Zung in the instrument's self-reliability calculations and the reported through the Cronbach's alpha of 0.68 (13). Many items were omitted in all three factors due to the low factor loadings. Since restlessness, anorexia, bulimia, feelings of worthlessness, and weight loss are the main symptoms of major depression (18), the presence of low factor loading in these items can be justified since our subjects were within the depression range.

Deletion of items 5 (I eat more than necessary) and 7 (I care to lose weight) are consistent with the findings of Mammadova et al. (2012) who reported that the deletion of these two physical symptoms from the questionnaire improved overall performance of the scale (19). Also, to justify the reason for the deletion of some items of psychological factors such as restlessness, agitation, and death wishes for the comfort of others with low factor loadings, it may be acknowledged that since some cognitive symptoms of cognitive aspects of depression may vary in some settings in families or regions and communities, it is best to make a definitive detection based on interviews and clinical decisions (20).

Despite the valuable data obtained, its interpretation is limited due to the small sample size. Therefore, it is necessary to design and plan a more extensive study as a tool for screening depression among the Iranian population. Xiu-qing et al. assessed psychometric properties of the Kessler Psychological Distress Scale (K10) in a sample of Chinese parents of children with cancer and concluded that the Chinese version has acceptable reliability and validity (21). Ruiz-Grosso et al. reported that the Spanish version of ZSDS is a valid tool with 0.84 for the area under the ROC curve and cut-off scores of ≥47 for Zung Self-Rating Depression Scale (ss=85.7%/sp=71.4%/cc=78.9%) (21). Romera et al. performed a factor analysis of the ZSDS on a large sample of patients with major depressive disorder in primary care. They found that the four-factor model was well fitted to the data (GFI=0.9330, AGFI=0.9112, and RMR=0.0843) (22).

5- CONCLUSION

Based on this study, the ZSDS is both reliable and valid and is convenient for identifying clinically significant depressive symptoms among women with sick children. Further investigations in other populations are recommended.

6- CONFLICT OF INTEREST: None.

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