

Validity and Reliability of Family Burden Interview Schedule in Arabic

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ABSTRACT

Background: The Family Burden Interview Schedule is an extensively used tool to measure burden of care as a result of providing constant care. The tool has been translated and tested for its psychometric properties in previous studies. Assessing perceived burden of care among family caregivers is crucial as it is directly impacted on mental health status, one's wellbeing, coping, emotions, and other personal outcomes.

Purpose: The purpose of the study was to evaluate the psychometric properties of the Arabic version of the FBIS

Methods: A cross-sectional survey with 325 participants. The reliability of each item was calculated using Cronbach's alpha coefficients and Mean Inter-Item Correlation.

Results: The content validity index of items ranged from 0.87 to 1.00, and the CVI of the overall scale was 0.91. The results of EFA revealed that four factors contribute to explaining 74.6% of total variance in the burden scores. The findings of differences between items in the high-score group (the first 50%) and the low-score group (the last 50%) were significant ($p < 0.05$).

Conclusions: The Arabic version of FBIS is valid and reliable for the evaluation of burden of care.

INTRODUCTION

The prevalence of schizophrenia around the globe is 1%, indicating that 50 million have been diagnosed with schizophrenia (WHO, 2005). The existing data emerged from World Health Organization (WHO) mentioned 305 individuals per 100,000 of Jordanian population suffer from mental illness. This means that around 20000 individuals are affected by mental illness and more than half diagnosed with schizophrenia.

Schizophrenia is one of the most severe forms of mental illness, which is chronic, debilitating and complex [1]. Schizophrenia has disastrous impact on various aspects of patients and families live [2]. Several studies reported people diagnosed with schizophrenia generally had low medical compliance [3]. The poor adherence is attributed to lack of understanding of the nature of illness and heavily burden of care on family caregivers. Furthermore, it causes sever burden on families and societies. According to the WHO classifies schizophrenia as eight leading cause of disability "DALY" due to functional limitations [4].

The four instruments mostly widely used to measure knowledge level of schizophrenia in the literature are (a) the 24-item Family Burden Interview Schedule (FBIS) developed by Pai and Kapur (b) the 17-item questionnaire the Family burden scale devised by Caqueo-Urizar A, et al. [5]. (c) Burden Assessment Scale (BAS) was developed b (d) Zarit Burden of Care was established by Chien WT. Norman [6]. Evidence shows that the first two instruments have well established psychometric properties. These scales were heavily used in schizophrenia research to assess the perceived burden of care in English-speaking caregivers. The first tool is more preferred because it is more comprehensive and it captures the impact of schizophrenia on various dimensions of family caregivers, easy to administer, short form which makes participants more engaged in study life. The majority of family caregiver in Jordan and Middle East are primary caregivers who are Arabic native speaker. From the existing literature, there is no systematic

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trans cultural adaptation and validation of burden scale. Therefore, there is a need for testing the psychometric properties of Arabic FBIS scale. The purpose of the study was to test the psychometric properties of Arabic version of FBIS among Arabic family caregivers of diagnosed with schizophrenia.

METHODS

Design

The study was employed cross-sectional survey. A convenience sample was used and total of 325 participants were recruited by the research team in the period between September 2015, and December 2016. The study participants were recruited from the main psychiatric clinics in Amman, including Amman Consultant Clinic; National Centre for Mental Health (NCMH); Al-Hashmi Clinic; AL Bashir mental clinic. The inclusion criteria of the study were family caregivers of PDwS for at least one year, able to read and write Arabic language and willing to participate in study voluntary. Exclusion criteria were family caregivers diagnosed with any form of psychiatric illness, caring for two family relative diagnosed with mental illness and/or substance abuse.

Instruments

Family Burden Interview Schedule designed by Pai and Kapur (1981). The scale has 24 items rated on 3-likert scale 0 (no burden), 1 (moderate burden), and 2 (severe burden). The highest score suggests the highest perceived burden of care. FBIS has six dimensions disruption in family finance, routine, leisure, interactions, physical health, and mental health. The internal reliability of scale is ranged from 0.87 to 0.99 and the CVI is 0.87 as rated by families and 0.79 as rated by professionals.

Transcultural adaptation: Validity and reliability

The FBIS is developed in English language and used to assess the perceived burden of care in Western cultures, which means that instruments were needed to be translated in target language. However, researchers were overlooked in reviewed literature about translation process of outcomes measured to be used in different language and culture context. Following aforementioned discussion about various translation models has been used in the cross-cultural research. Researchers decided to use for this study purpose, a combined technique from principles of Brislin's model principles were combined to translate the scale. The main reason of chosen the model is that it is more accepted and practical model^[6].

Seeking a permission from the original authors prior translation

At the initial stage, the researcher obtained an ethical approval from the developer to use the scale, translate and modify as required.

Forward translation from English into Arabic

This considered a primary step in translation process. The researcher translated the scale from English "source" into Arabic language "target". This process was completed by three independent bilingual translators^[7]. Then the primary research collected the translated version in order synthesize the final version of forwarded scale. In term of translator qualification, one expert bilingual was awarded PhD in adult health nursing from one of the USA universities and had some publications. Second bilingual translator was PhD student in nursing school in the UK.

Back translation from Arabic into English

Other three independent translators translated from Arabic "target" into English language "source", those were not read source version of these outcomes to minimize recalling bias. The, the primary researchers collected back translation version to compile in one version. In term of back translator qualification, one of them was graduated student in the school of science (English language) and second back translator was completed PhD from the USA in mental health nursing and had some publication in that area.

Reviewers to compare between back translated version against original version outcome measures

The main task of this step was to maintain the content equivalence of the translated scale by comparing the back translated version with original version of the scale. A final English version of each measure was then obtained.

Original authors examined performed preliminary analyses

The original researcher compared the back translated version of scale against the original one. There were minor amendments were raised by authors.

Final check by the original authors

After completing some minor changes, research student sent amended version of back translators to original author. They confirmed the final version was comparable and acceptable in term of conceptual meaning. All the authors were satisfied with the final English versions.

Pilot study

30 family caregivers were recruited in the pilot study in order to check the comprehensibility, relevance of translated version of the scale. The pilot study was conducted in one clinic over three weeks and followed the main study inclusion criteria. The response rate was 93%

Ethical Considerations

The study obtained the ethical approval from the Ministry of Health in Jordan. In addition, the consent form was sought from each participant and they had the opportunity to withdraw from the study at any time. The primary researcher conducted brief mental capacity test to ensure the study participants understood the information sheet. Moreover, the identity of the study participants was assured by allocating numbers to participants and they were not asked to write their names at any stage of the study.

Data Analysis

The participant responses were coded and analyzed using Statistical Package for Social Science (SPSS) version 24. The demographic data was analyzed using summary statistics including frequencies, mean and standard deviations. For testing the psychometric properties and cultural adaptation the Arabic version of the survey, the Content Validity Index (CVI) was calculated for each item and for the overall survey by examining the panel members' numerical responses to each item and dividing them on the number of raters. The reliability of the survey was measured using Cronbach Alpha measures for each item and for the overall tool, although Mean Inter-item Correlation (IIC) had to be used to measure the reliability of those subscales with less than 10 items. For Construct validity, Exploratory Factor Analysis (EFA) was used to explore the factor structures of the new proposed survey. The outcome items were then rearranged to build a revised factor solution. Confirmatory Factor Analysis (CFA) using AMOS 21.0 (Chicago, IL, USA) was also carried out to examine how closely the construct validity of the original survey fits into the revised factor solutions using model fit indices and standardized factor loadings. Several indices were used to decide the model fitness to the data where the chi-square statistic divided by the degrees of freedom (χ^2/df) is ≤ 3 , Tucker-Lewis index (TLI) is >0.90 , Comparative Fit Index (CFI) is >0.90 , Incremental Fit Index (IFI) is > 0.90 , Normed Fit Index (NFI) is > 0.85 , Root Mean Square Error of Approximation (RMSEA) of < 0.06 (Hu & Bentler, 1999) and Standardized Root Mean Square Residual (SRMR) is < 0.80 (Hu & Bentler, 1999).

RESULTS

Table 1 shows sample characteristics. The dataset included 325 individual complete responses. The mean age was 37.47 years (*SD* 11.60). Overall, more than half of the participants were males (55.8%), married (30.1%), has a university qualification (6.1%), employed (32.9%), and earned two third of participants were diagnosed with illness for five years or less and 61% of them diagnosed with schizophrenia.

Table 1. Socio-demographic data of the study participants.

Age, years (M, SD)	Frequency	%
	(37.47, 11.6)	
≤30	22	6.76
31-30	120	36.9
41-40	100	30.7
51-50	55	16.9
≥60	30	9.2
Gender		
Male	178	55.8
Female	147	45.2
Education Level		
Primary school or below	158	48.6
Secondary school	147	45.2
College or above	20	6.15
Employment Status		
Employed	107	32.9
Unemployed	201	61.8
Others	17	5.23
Marital Status		
Married	274	84.3
Divorced	45	13.8
Others	6	1.84
Illness Duration in years (M, SD)	11.8 years (7.3)	

≤2		
5-Mar	108	33.2
≥5	148	45.5
	69	21.2
Diagnosis		
Schizophrenia	198	60.9
Schizoaffective	127	39.1
Relationship with Ill Relative		
Parents		
Brother, Sister	80	24.6
Wife, Husband	37	11.3
Son, Daughter	178	54.7
	30	9.2

Table 2. Descriptive statistics and reliability analysis of the 24-item of the instrument.

	Items	Mean	Std. dev.	Corrected item-total correction	Alpha if item deleted
1	The patient losses income	1.75	0.75	0.64	0.910
2	Loss of income of any other family member due to patient's illness	1.68	0.67	0.68	0.912
3	Incurred expenses due to patient illness and treatment	1.98	0.48	0.61	0.923
4	Incurred expenses due to extra-arrangements	1.42	0.61	0.69	0.898
5	Loans taken or savings spent	1.25	0.55	0.59	0.923
6	Any other planned family activity stopped because of the financial pressure of the patient's illness	1.30	0.47	0.57	0.924
7	Patients do not go to job/school/ college	0.89	0.23	0.61	0.902
8	Patients don't help in household work	0.88	0.04	0.63	0.910
9	Disruption other family member activities	0.75	0.34	0.59	0.921
10	Patient's behavior disrupting activities	0.91	0.51	0.55	0.896
11	Neglecting of the rest of the family due to patient's illness	1.29	0.24	0.56	0.887
12	Stopping of normal recreational activities	1.98	0.34	0.62	0.907
13	Patient illness has used other family member holiday and leisure time	1.67	0.41	0.63	0.916
14	Patient's lack of attention to other family members	0.99	0.37	0.57	0.896
15	Has any other recreational activity had to be abandoned owing to the patient's illness or incapacity	1.18	0.29	0.52	0.901
16	Any impact on general atmosphere in the home	1.48	0.37	0.55	0.924
17	Does the family member argue about that	0.79	0.14	0.68	0.911
	Has the patient relative or neighbor stopped or reduced family visiting due to patient behaviors or stigma attached to that illness	1.67	0.43	0.63	0.918
18	Has the family become isolated	1.78	0.27	0.60	0.909
19	The patient illness has impacted on the relationship within family members or between family and relatives or neighbor	0.87	0.37	0.61	0.897
20	Has anyone of family member suffered from physical ill health or injured due patient behaviors	0.88	0.29	0.57	0.896
21	Has there been any other adverse effect on health (e.g. someone losing weight or an existing illness being exacerbated)	0.97	0.11	0.55	0.876
22	Has any other family member sought help for - psychological illness resulted by the patient's behavior	1.87	0.34	0.59	0.904
23	Has any family other member lost sleep or become depressed or weepy, expressed suicidal wishes, become very irritable	1.88	0.51	0.57	0.903
24	Is there any other burden, this is should be assessed by asking the following standard question and scoring the relative's answer	1.76	0.61	0.61	0.905

Content Validity

The CVI for the 25 items of the Arabic version of the Family Burden Interview Schedule Instrument ranged from 0.87 to 1.0. All raters agreed on each item' relevance to the Arabic cultural context. The CVI for the total scale was 0.91 which is considered significantly high, given that there were 9 raters who had to collectively agree to the relevance for each item^[7]. This further ascertains the robustness of the translation process.

Table 2 shows the means and standard deviation (SD) for each item (n = 325). All items mean scores were >1.58, suggesting moderate to severe burden of care. The results of Item-total correlations ranged between 0.52 and 0.69, and it was statistically significant (P<0.01), indicating that all items were consistent with the total scale. The discrimination ability was tested by

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making the scores in descending order, the first 50% were identified as “high-score group”, the last 50% were identified as “low-score group”. Accordingly, there were significant difference between two groups suggesting that the discrimination ability was good and there is no need to delete items.

Reliability

The results of Arabic version of FBIS scale showed that here was good internal consistency, as expressed by Cronbach's alpha for each domain and total scale. For instance, Cronbach's alpha coefficient of total score was 0.91 and for subscales ranged between 0.67 and 0.89. The results of item-total correlation were examined if items deleted and it ranged between 0.33 and 0.69, 0.906 to 0.913, respectively, suggesting no item should be deleted. Moreover, the test-retest reliability was assessed after three weeks with 15 participants. The findings revealed that the intraclass correlation coefficient (ICC) was 0.74 ($P < 0.05$), indicating acceptable stability of the instrument.

Exploratory Factor Analysis

The KMO value was calculated 0.89 on the obtained data (>0.6). The results of chi-square with the Bartlett sphericity test were found to be significant ($\chi^2 = 9116.86$, $P = 0.05$). Therefore, it indicates the suitability of principal component factor analysis for the data. The original six factors extracted exhibited eigenvalues >1.0 and a total explained variance of 68.77%. Additionally, a six-factor solution was determined by eigenvalues $N 1.0$ with orthogonal rotation, which accounted for 65.5% of the total variance. This highlights that all items had acceptable factor loadings, ranging from 0.40 to 0.82, meaning that no item should be deleted. The percent variances for ‘Financial Burden’, ‘Disruption of routine family activities’, ‘Disruption of family leisure’, ‘Disruption family interaction’, ‘Effect on physical health of others, and ‘Effect on mental health of others’ subscales were 31.04%, 7.65%, 8.26%, 4.89%, 6.24%, and 4.25% respectively (Table 3).

Table 3. Factor analysis of 24-item of instrument, extraction principle component, rotation varimax and the reliability analysis of the factors.

#	Items	Factor I	Factor II	Factor III	Factor IV	Factor V	Factor VI	Overall
1	The patient losses income	0.67						
2	Loss of income of any other family member due to patient's illness	0.64						
3	Incurred expenses due to patient illness and treatment	0.59						
4	Incurred expenses due to extra-arrangements	0.66						
5	Loans taken or savings spent	0.61						
6	Any other planned family activity stopped because of the financial pressure of the patient's illness	0.63						
7	Patients do not go to job/school/ college		0.59					
8	Patients don't help in household work		0.61					
9	Disruption other family member activities		0.62					
10	Patient's behavior disrupting activities		0.55					
11	Neglecting of the rest of the family due to patient's illness		0.57					
12	Stopping of normal recreational activities			0.60				
13	Patient illness has used other family member holiday and leisure time			0.63				
14	Patient's lack of attention to other family members			0.59				
15	Has any other recreational activity had to be abandoned owing to the patient's illness or incapacity			0.67				
16	Any impact on general atmosphere in the home				0.57			
17	Does the family member argue about that				0.60			
18	Has the patient relative or neighbor stopped or reduced family visiting due to patient behaviors or stigma attached to that illness				0.62			
19	Has the family become isolated				0.63			
20	The patient illness has impacted on the relationship within family members or between family and relatives or neighbor				0.66			
21	Has anyone of family member suffered from physical ill health or injured due patient behaviors					0.59		
22	Has there been any other adverse effect on health (e.g. someone losing weight or an existing illness being exacerbated)					0.58		
23	Has any other family member sought help for - psychological illness resulted by the patient's behavior						0.60	
24	Has any family other member lost sleep or become depressed or weepy, expressed suicidal wishes, become very irritable						0.62	
24	Is there any other burden, this is should be assessed by asking the following standard question and scoring the relative's answer						0.63	
	Cronbach's α	0.71	0.69	0.61	0.63	0.62	0.58	0.81
	Eigenvalue	7.68	3.57	2.75	5.24	2.35	1.04	
	Percent of total variance explained	31.04	7.65	8.26	4.89	6.24	4.25	
	Cumulative percent	37.32	38.54	48.62	54.35	62.32	65.24	

Confirmatory Factor Analysis

Confirmatory factor analysis was conducted to confirm the six-factor structure based on the results of EFA. The P value was statistically significant ($\chi^2 = 561$, $df = 246$, $P = 0.000$), and the other χ^2/df , GFI, CFI, IFI, NFI, RMSEA and SRMR indices for goodness of fit were 2.28, 0.85, 0.94, 0.94, 0.90, 0.069 and 0.08 respectively, suggesting an acceptable model for family caregivers.

DISCUSSION

Family caregivers of a relative diagnosed with schizophrenia reported enduring a higher burden. To the best of our knowledge, there is no validated Arabic instrument which measures the burden of care among family caregivers. This paper bridges this gap and presents a translated and psychometrically tested instrument on family caregivers that can be used among Arabic-speaking population. We conducted a robust translation and back back translation of the instrument, and the CVI for the translated scale was relatively high (91%). This suggest a broad consensus on the translation and back translation process, given the fact that there were 9 raters who had to agree the translation of all items.

The findings indicated that the overall equivalence of this Arabic version of the FBIS was high, using the weighted kappa and the intra-class correlation coefficient. These findings reflect the consistency of the overall scale and its items in yielding the measurement of the same variable or concept in the population of Arabic family caregivers of patients with schizophrenia as that in the original English version used in Western cultures. The findings also indicate that the items in this scale address the major issues of family caregiving common to many cultures. Thus, the scale has the potential for application to people from different cultural backgrounds [8]. Such a high level of agreement between the two versions supports the cross-cultural relevance of the caregiver burden concept and suggests that some aspects of the burden experience are common across cultures [9].

Further evidence of FBIS validity is provided by them results of the principal component's analysis, which indicate that the structure of the FBIS Arabic version differed slightly from the original English version. Five principal components (family finance, family activities, family interaction, physical health, and mental health), which explained 73.57% of the variance, were identified in the Chinese version, as compared with six domains in the original version. The results also suggested that two domains ("family routine" and "family leisure") could be combined into factor 2 ("family activities"). The high item-total correlations and the satisfactory interactor correlations also indicate that the five factors contain different theoretical components of the caregiver burden, with a high internal coherence [10].

The caregivers burden concept is subject to be change over time as a result of external support received from social environment [11]. In the current study examined scores stability by examining test-retest over three weeks which indicate that the scale has satisfactory reliability. This suggests that the Arabic version of FBIS is less likely to be influenced by external factors from one time to another [12]. Further evidence of FBIS validity is provided by the results of the principal components analysis, which indicate that the structure of the FBIS Arabic version differed slightly from the original English version. Five principal components (family finance, family activities, family interaction, physical health, and mental health), which explained 64.71% of the variance, were identified in the Arabic version, as compared with six domains in the original version. The results also suggested that two domains ("family routine" and "family leisure") could be combined into factor 2 ("family activities"). The high item-total correlations and the satisfactory interactor correlations also indicate that the five factors contain different theoretical components of the caregiver burden, with a high internal coherence [13]. Findings from the CFA demonstrated that six factors structure was best model fit that is gleaned from the EFA. It is generally recommended that CFA is conducted on factor solutions with three or more items [14-20]. They reported that it is possible to retain a two-item factor when conceptual interpretability supported a definitive two-item factor retention criterion. All the four factors solutions which resulted from the EFA in this study were retained as there were interpreted meaningfully concerning the overall theoretical and conceptual framework of examining burden of care level.

LIMITATIONS

The study participants were recruited from the capital of Jordan, Amman, clearly underrepresenting other family caregivers in Jordan. Also, participants have various relationship with ill relative may have different level of burden of care. Such heterogeneous level of burden of care which may implicate the validity of the finding. In this paper, we are proposed a 24-items Arabic version of the FBIS, which showed reliability both adequate properties among Arabic-Speaking family caregivers in Jordan. This tool can now be used by Arabic academic nursing community to examine the level of burden of care among family caregivers. Future research is needed to ascertain the impact of using positively worded items in this scale and its impact on the items loading, and the subsequent reliability and validity of the tool.

CONCLUSION

In this paper, we are proposed a 24-items Arabic version of the FBIS, which showed reliability both adequate properties among Arabic-Speaking family caregivers in Jordan. This tool can now be used by Arabic academic nursing community to examine the level of burden of care among family caregivers. Future research is needed to ascertain the impact of using positively worded items in this scale and its impact on the items loading, and the subsequent reliability and validity of the tool.

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