Validation of the Arabic Version of the Mini-Depression, Anxiety and Sleep Disturbance Questionnaires in Jordan

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Abstract: **This study aimed to evaluate the reliability and validity of the Arabic version of mini depression, anxiety and sleep disturbance questionnaires from Patient-Reported Outcomes Measurement Information System.**

Background. **No Arabic version of these questionnaires has been validated. Considering the increase in the number of infants admitted to the Neonate Intensive Care Unit in Jordan, therefore imperative and necessary to valid the Arabic version of mini depression, anxiety and sleep disturbance questionnaires from Patient-Reported Outcomes Measurement Information System.**

Design. A cross-sectional descriptive study

Methods. A total of 310 parents with hospitalized infants in the Neonatal Intensive Care Unit at two major hospitals in Jordan. The questionnaire was translated from English to Arabic. Forward and backward translation was performed. Factor structure was determined by confirmatory factor analysis. Composite Reliability to evaluate internal consistency was calculated.

*Results***: The confirmatory factor analysis extracted three constructs with 12 items [anxiety = 4, depression = 5 and sleep disturbance = 3] with good fit indices results [χ^2=1.398; GFI=.963; CFI=.996; IFI=.996; RMSEA=.036]. Average Variance Extracted and Composite Reliability of the three constructs were larger than .50 and .70 respectively, showing good convergence, discriminant validity, and construct reliability for the three constructs.**

*Conclusion***: The mini Arabic version of the three constructs for anxiety, depression and sleep disturbance questionnaires were found to be a reliable and valid measurement to assess depression, anxiety and sleep disturbance symptoms in Jordan.**

Relevance of clinical practice: The result of this study provide Arabic version for Mini depression, anxiety and sleep disturbance questionnaires which help nurses to assess psychological problems for parents with infant in NICU.

Keywords: **anxiety; depression; sleep disturbance, validity, reliability, PROMIS, Arabic, Jordan.**

1. INTRODUCTION

The experience of infant hospitalization was found to be stressful for parents (Heidari *et al.* 2013) .There are many psychological problems associated with stress experienced by parents with hospitalized infants in NICU (Heidari *et al.* 2012) . A review of the related literature revealed that parents with hospitalized infants in NICU complained of stress associated with many psychological problems (Busse *et al.* 2013, Heidari *et al.* 2012) . The most common psychological problems among parents with infant admitted to NICU are depression, anxiety and sleep disturbance (Busse *et al.* 2013,

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Heidari *et al.* 2013, Lee *et al.* 2007, Lee & Kimble 2009). Consequently, in evaluating the impact of stress on parents from hospitalizing their infants in the NICU, it is necessary to assess depression, anxiety and sleep disturbance associated with stress. One of the instruments that has been used to assess depression, anxiety and sleep disturbance symptoms for parents with infants admitted to NICU is Patient Reported Outcomes Measurement Information System (PROMIS) (Busse *et al.* 2013) . PROMIS provides an accurate report of health with a minimum number of questions that were reliable yet easy to use and score (PROMIS).

So far, no Arabic version of these scales has been validated. Considering the increase in the number of infants admitted to the Neonate Intensive Care Unit (NICU) in Jordan (JordainianMinistryofHealth 2013) , there are only a few useful instruments for assessing anxiety, depression and sleep disturbance in the clinical medical field. The introduction of the Arabic version of PROMIS scale is therefore imperative and necessary.

2. LITERATURE REVIEW

The Patient-Reported Outcomes Measurement Information System (PROMIS) was the second instrument used in this study. It was developed by a conglomerate of researchers who employed the instrument at 12 primary research sites across the nation to give an efficient, reliable, and valid measure of self-reported health for utilization by researchers in clinical areas. Instruments utilized by PROMIS are available online or printed as a hard copy, including short-form or computerized adaptive tests. Ranging from 3 to 10 items, the PROMIS short-form instruments cover a wide spectrum of outcomes such as emotional distress, physical function, social function, and cognition (PROMIS, 2009).

An exploratory study conducted by Busse et al. (2013) to assess the relationships between parental stress levels and depression, anxiety, sleep disturbance, and fatigue. This study included 30 parents with hospitalized infants in NICU, who completed the PSS: NICU and PROMIS short-form instruments. Results show that there is a significant correlation between stress and anxiety ($r = .61$; $p < .001$), as well as stress and sleep disturbance ($r = .60$; $p < .001$); a moderate correlation between stress and fatigue ($r = .42$; $p < .001$); and a weak correlation between stress and depression ($r = .36$; $p < .001$).

Aim of the study

This study aimed to evaluate the reliability and validity of the Arabic version of mini depression, anxiety and sleep disturbance questionnaires from Patient-Reported Outcomes Measurement Information System.

3. METHODS

Study Design

A cross-sectional descriptive was conducted in this study.

Instrument:

In this study, the following PROMIS short-form scales were used to quantify health outcomes: depression (8 items), anxiety (8 items), and sleep disturbance (8 items). The scales were rated on a 5-point Likert-type scale ranging from 1 (never) to 5 (always). A rating of 1 means that the experience never caused the parent to feel depression, anxiety, or sleep disturbance, whereas a rating of 5 means that the experience always caused the parent to feel depression, anxiety, and sleep disturbance.

Setting:

The present study was undertaken at two Level-III NICUs at two public hospitals operated by the Jordanian Ministry of Health in Jordan. These two hospitals were selected because they accounted for approximately 70% of neonatal care service in Jordan. Hospital A is a maternity and obstetric teaching hospital in eastern Jordan with a 24-bed NICU. It also has three ventilators and six phototherapy apparatuses. Hospital B is a referral teaching hospital in Northern Jordan with a 30-bed NICU. It also has six ventilators and ten phototherapy apparatuses. Both NICUs at Level III provide similar medical services, including advanced respiratory support and mechanical ventilator support.

Sample:

The convenience sampling technique was used to recruit or select participants. The sample size required for validation was based on the population size Table by Krejcie and Morgan (1970). The population size was based on the total number of infants admitted to hospitals in Jordan last year which was 1600; with CI 95% and $P \pm .05$. The sample size required was determined to be 310 parents with infants admitted to NICU. Parents were recruited if they met the following criteria: they were willing to participate in the study, they could speak and understand Arabic, they were Jordanian, they had had a neonate in the NICU for at least two days, the neonate was the product of a singleton pregnancy, and they had visited their neonate at least once.

Ethical considerations

Ethical approval was obtained   from IRB Approval from Code of Ethical Practice in Human Biomedical Research/MOH on Jordan [no: 73221] and IRB from UMMC/ university of Malaya on Malaysia [MRECID, 20158-1590]. All parents who were invited to participate received the study information sheet and a letter informing them that their participation was voluntary. Participants were assured of the confidentiality of the study. Anonymity was established through the use of codes, rather than participants' names. Informed written consent was obtained from participants after clear and detailed explanations about the objectives of the study.

Data collection

Prior to data collection, permission was obtained from the developer of the instrument. Translation of the English version of PROMIS to Arabic was then performed by experts using the standard 'forward-backward' procedure. Self-administered questionnaires were used to collect the data. Data was collected from June 2014 to November 2014. The researcher distributed questionnaires to 744 (372 mothers and 372 fathers), of which, 40 parents declined to participate and 84 were excluded from participation (six parents could not read and write; two parent was admitted to a psychiatric hospital; six parents had infants needing surgical procedures; 70 parents did not return the questionnaires). The final number of parents included in the study was six hundred and twenty (310 mothers, 310 fathers) participants, who were conveniently recruited from the two hospitals.

Procedure:

Content Validity

A panel was formed, comprising five experts: a professor and head of department at a nursing college, a psychiatrist, a psychologist working in a hospital, an associate professor and head of the department of nursing sciences, and a lecturer in the department of nursing sciences. The expert panel reported that there were no problems with the content of the questionnaires. The questionnaire was then translated.

Translation of Instruments

Prior to data collection, permission to translate the instrument was obtained from the developer of the instrument. Translation of the English version of PROMIS to Arabic was then performed using the standard "forward-backward" procedure (Alumran *et al.* (2013); Abu-Shanab and Pearson (2009); Ahmed (2014); (Dafaalla *et al.* (2016) ; Koller *et al.* (2007); Sperber (2004); Brancato *et al.* (2006).

The translation from English to Arabic involved three independent Jordanian translators (A, B, C) who are proficient and fluent in both languages. Translator A is an assistant professor and head of department at a nursing college; translator B is a qualified translator with no medical background (native translator); and translator C is a psychologist working in a hospital.

The translated English-to-Arabic version was then back translated from Arabic to English by three translators (D, E, F). Translator D is a psychologist and researcher in the hospital; translator E has a master's degree in nursing and a researcher at the university; and translator F is a qualified translator with no medical background.

Data Analysis

Descriptive statistics were used to analyse the parents' sociodemographic characteristics. Confirmatory factor analysis (CFA) was used to test the psychometric properties of the Arabic versions of the (depression = 8 items, anxiety = 8 items and sleep disturbance = 8 items) questionnaires from Patient-Reported Outcomes Measurement Information System

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[PROMIS] questionnaires. This was accomplished via Structural Equation Modeling [Analysis of Moment Structure, AMOS version 21 (IBM Corporation, Armonk, NY, USA)]. CFA was used to finalize and confirm the latent, manifest factor structure of the three questionnaires. The performance of it can be assessed by the following fit indices (Byrne, 2016; Hair, Black, Babin, Anderson, & Tatham, 2006; O'Rourke et al., 2013) ($\chi^2 => .05$; Root Mean Square Error of Approximation (RMSEA) with acceptance level of $< .08$; Goodness of Fit Indices (GFI) with acceptance level of $> .90$; Comparative Fit Indices (CFI) with acceptance level of $> .90$; Normal Fit Indices (NFI) with acceptance level of $> .90$

The factor loading for items were assessed before assessing the model fit indices. The acceptance level of factor loading is $\geq .50$ (Byrne, 2013; Hair, Black, Babin, Anderson, & Tatham, 2006; O'Rourke et al., 2013). If the data does not fit the factor loading for items, it needs to be reevaluated by deleting items from the scale that have factor loadings of less than .50; then, the fit indices will be improved (Byrne, 2013; Hair et al., 2006; O'Rourke et al., 2013).

Modification indices (MI) proposed correlations among variables. The reduction in chi-square values resulted in these correlations being added to the model, which improves model fit (Bowen & Guo, 2011). The Average Variance Extracted (AVE) for Composite Reliability (CR), based on formulas in Microsoft Excel by Fornell and Larcker (1981). The accepted levels of AVE and CR are $> .50$ and $> .70$ respectively (Byrne, 2013).

Discriminant validity was evaluated by ensuring that the correlation between constructs are less than .90 and that the AVE is greater than the squared correlations (Byrne, 2013; Hair et al., 2006; O'Rourke et al., 2013). Finally, convergent validity was evaluated by ensuring that the AVE is greater than .50 (Byrne, 2013; Hair et al., 2006; O'Rourke et al., 2013).

4. RESULTS

Parent Characteristics

The sample consisted of 620 Jordanian parents (310 mothers and 310 fathers). The demographic data of the participants are shown in Table 1. Ages of participants ranged from 17 to 59 years (M±SD = 31.09 ± 7.190). Slightly more than half of the participants 328 (52.9%) had bachelor's degrees, 122 (19.7%) of the participant had diploma level, and 52 (8.4) had postgraduate degrees (Table 1).

Table 1: Participant's characteristics of parents

Variables	Participant characteristics [n=620]
Parent age [M±SD]	31.09 ±7.190
Parent Sex [n %]	
Male	310 [50%]
Female	310 [50%]
Parent Educational Level [n %]	
Primary	8 [1.3%]
Secondary	110 [17.7%]
Diploma	122 [19.7%]
Bcs	328 [52.9%]
Postgraduate	52 [8.4%]
Financial status / per month [n %]	
Low income ≤ 357$	4 [.6%]
Middle income 358-714$	162 [26.1%]
High income > 714$	454 [73.2%]
Type of delivery (for mothers) [n %]	
Normal Delivery [NVD]	194 [31.3%]
Cesarean [CS]	116 [18.7%]
First Baby [n %]	
Yes	310 [50%]
No	310 [50%]

SD : Standard deviation ; M: Mean

Validity of the Arabic Version for Depression, Anxiety and Sleep Disturbance Subscales in PROMIS

Anxiety Subscale in PROMIS

Factor loading for each construct was initially evaluated to test the model fit of anxiety . The modification indices result was subsequently checked and applied if the result was not accepted. Table 2 displays each item's factor loading within the anxiety subscale, which is above .5 with fit indices at $\chi^2 = 8.378$; GFI = .866; CFI = .965; IFI = .965; and RMSEA = .155. These were not accepted. Thus, a series of modification was performed to improve model fit.

Based on the modification indices, items PA2 ("I found it hard to focus on anything other than my anxiety."), PA5 ("I felt nervous."), PA6 ("I felt like I needed help for my anxiety."), and PA8 ("I felt tense.") were deleted from the subscale due to high modification indices results . After deletion and modification, the fit indices resulted in a better model fit ($\chi^2 = 2.246$; GFI = .993; CFI = .998; IFI = .998; RMSEA = .064). The final anxiety questionnaire consists of four items (Figure 1).

Table 2: Factor Loadings for Mini Anxiety Questionnaire

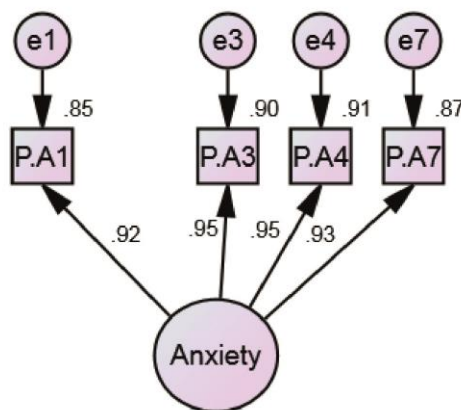| No.	Items	Factor Loading
PA1	I felt fearful.	.92
PA2	I found it hard to focus on anything other than my anxiety.	.94
PA3	My worries overwhelmed me.	.94
PA4	I felt uneasy.	.95
PA5	I felt nervous.	.95
PA6	I felt like I needed help for my anxiety.	.94
PA7	I felt anxious.	.95
PA8	I felt tense.	.93

Figure 1: The Final Mini Anxiety Questionnaire

Depression Subscale in PROMIS

Results for the depression subscale showed that each item had factor loading above .5 (Table 3). However, the fit indices for items in the subscale (χ^2 = 6.300; CFI = .969; GFI = .900; IFI = .969; RMSEA = .131) were not accepted. A series of modifications was performed to improve fit. Based on the modification indices, three items were deleted: PD1 ("I felt worthless."), PD2 ("I felt helpless."), and PD7 ("I felt that I had nothing to look forward to."), leaving five items intact for the depression scale. The result had indices which indicated a better fit (χ^2 = 1.948; GFI = .986; IFI = .997; CFI = .997; RMSEA = .062) (Figure 2).

Table 3: Factor Loadings for Mini Depression Questionnaire

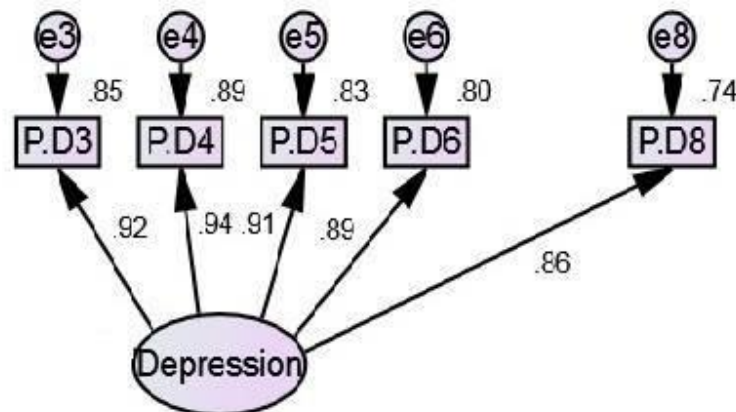| No.	Items	Factor Loading
PD1	I felt worthless.	.94
PD2	I felt helpless.	.93
PD3	I felt depressed.	.93
PD4	I felt hopeless.	.94
PD5	I felt like a failure.	.91
PD6	I felt unhappy.	.89
PD7	I felt that I had nothing to look forward to.	.88
PD8	I felt nothing could cheer me up.	.86

Figure 2: The Final Mini Depression Questionnaire

Sleep Disturbance Subscale in PROMIS

The result for the sleep disturbance scale showed that for all items, factor loading was above .5, except for items PS1 ("My sleep quality was affected") and PS2 ("My sleep was refreshing") (Table 4). These two items were thus deleted from the scale. After deleting these items, the fit indices for sleep disturbance items were still not acceptable (χ^2 = 3.613; GFI = .968; CFI = .990; IFI = .990; RMSEA = .092). After a review of the modification indices, AMOS indicated that three more items needed to be deleted to improve model fit: items PS6 ("I tried hard to get to sleep"), PS7 ("I worried about not

being able to fall asleep"), and PS8 ("I was satisfied with my sleep"). The fit was improved after the additional deletions (χ^2 = 1.526; GFI = .995; CFI = .999; IFI = .999; RMSEA = .041) and the final sleep disturbance scale consisted of three items in total (Figure 3).

Table 4: Factor Loadings for Mini Sleep Disturbance Questionnaire

No.	Items	Factor Loading
PS1	My sleep quality was affected. (Deleted)	**.11**
PS2	My sleep was refreshing. (Deleted)	**.26**
PS3	I had a problem with my sleep.	.93
PS4	I had difficulty falling asleep.	.95
PS5	My sleep was restless.	.94
PS6	I tried hard to get to sleep.	.96
PS7	I worried about not being able to fall asleep.	.93
PS8	I was satisfied with my sleep.	.63

Confirmatory Factor analysis [CFA] for anxiety, depression and sleep disturbance items from PROMIS questionnaire

CFA for each dimension of depression, anxiety and sleep disturbance scales was conducted to evaluate each construct factor loading. As a general rule, the factor loadings of items should be ≥ .50 [16].The CFA result indicates that the factor loadings of all items are accepted. Furthermore, the fit is improved [χ^2 =1.398; GFI=.963; CFI=.996; IFI=.996; RMSEA=.036] [Figure 4].
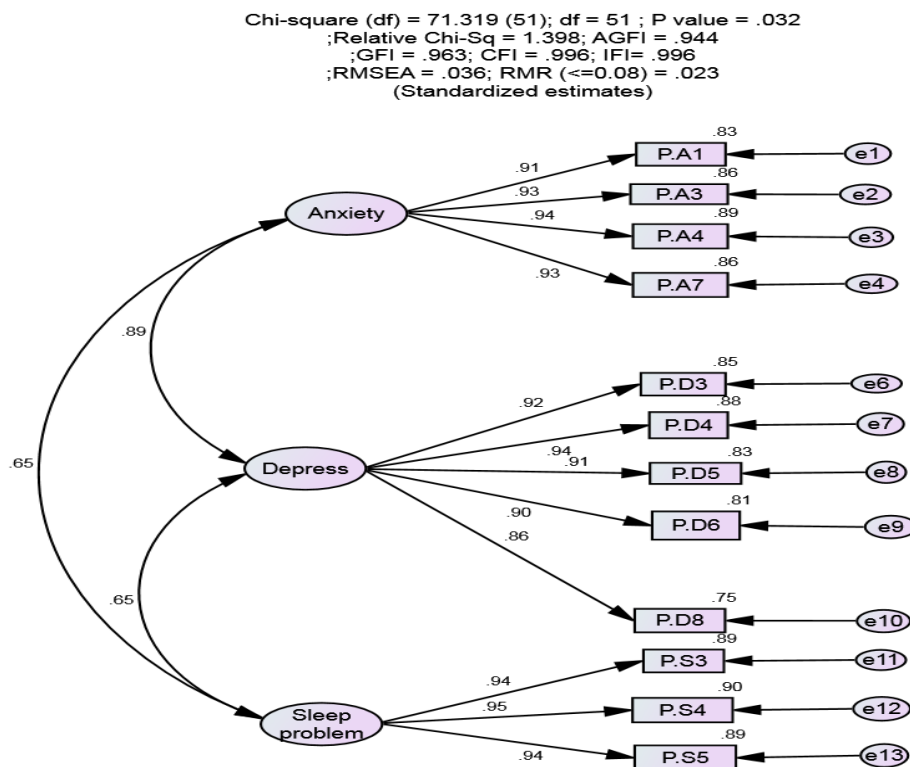

Figure 4: Confirmatory Factor Analyses for Anxiety, Depression and Sleep disturbance Questionnaires

Assessment of measure Validity

Convergent validity [CV]

Convergent validity was evaluated using Average Variance Extracted [AVE]. The result of AVE is greater than .50, indicating high convergent validity for latent variables. Consequently, all items in these scales have a good convergence (Table 5).

Table 5 Composite reliability and Convergent Validity

Latent construct	CR	AVE
Anxiety	.96	.83
Depression	.95	.82
Sleep disturbance	.96	.89

CR: Composite Reliability; AVE: Average Variance Extracted

Discriminant Validity

Discriminant validity is evaluated by comparing the results of AVE for each construct if it is more than the squared correlation coefficient between the construct and all other constructs in the model [16, 18]. To obtain a better discriminative validity, the AVE result for each construct should be more than squared correlations result. The AVE for anxiety [.83] is found to be greater than squared correlations of anxiety with depression [.79], while the AVE for sleep disturbance [.89] is greater than squared correlations of sleep problems and anxiety [.42]. Similarly the AVE for depression [.82] is also found to be greater than squared correlations of depression and sleep problems [.42]. Based on the results, there is adequate discriminate validity between items [Table 6].

Table 6: Estimation of squared correlation Coefficient.

Constructs	Correlation Coefficient	Squared Coefficient	Correlation
Anxiety ↔ Depression	.89	.79	
Depression ↔ Sleep Problems	.65	.42	
Sleep Problems ↔ Anxiety	.65	.42	

Reliability of the Arabic version for Depression, Anxiety and Sleep disturbance Subscale in PROMIS

Composite reliability [CR] is used to assess the internal consistency for latent construct . All items in the scale yielded CR between 0.95 and 0.96, indicating good composite reliability [Table 5] since CR ≥ .70 is considered a better composite reliability.

5. DISCUSSION

The paper presents the face, discriminant and convergent validity as well as internal consistency of the Arabic version of depression, anxiety and sleep distribution subscales of PROMIS by using CFA. To our knowledge, this is the first study that has examined the psychometric properties of mini depression, anxiety and sleep disturbance scales from PROMIS by using CFA. However, very few studies that used PROMIS performed validation before use. Hence comparison with previous studies could not be performed, as factor analysis for the original PROMIS had not been published at the time of this study.

The Arabic translation of the anxiety, depression and sleep disturbance subscale of PROMIS has adequate convergent validity, discriminant validity and reliability among Jordanian parents with infants admitted to NICU. In this study the fit model result for anxiety and depression subscale respectively by using CFA was [χ^2 =2.246; GFI=.993; CFI=.998;

IFI=.998; RMSEA=.064]; [χ^2= 2.177; GFI=.986; IFI=.997; CFI=.997; RMSEA=.062] compared with [17] , who found that the internal consistency of the depression and anxiety subscale was very good. Similarly they also reported Alpha coefficients of 0.95 and .93 for depression and anxiety respectively. The fit model result was [CFI = .99, TLI = .99, RMSEA = .11]; [CFI = .99, TLI = .99, RMSEA = .05] for depression and anxiety respectively.

According to the Center for Epidemiological Studies-Depression, the depression subscale of PROMIS correlation r=0.83 [n=782] and sleep disturbance subscale of PROMIS correlate with the Pittsburgh Sleep Quality Indices, r =0.85 [n= 2252]; while the anxiety subscale of PROMIS correlates with the Mood and Anxiety Symptom Questionnaire, r =0.80 [n=788]. Responses for each PROMIS measure were added to form a raw score and converted to a T score [standardized score] using tables available through the PROMIS website. For all PROMIS instrument T scores, the population mean was 50 and the standard deviation was 10. Thus a T score of 60 indicates a score 1 standard deviation about the population mean Lee & Kimble (2009) found that depression subscale of PROMIS has adequate psychometric properties among men and women with major depressive disorder. They found that the reliability of the depression subscale was .92 and the convergent validity was .72 to .84.

When comparing the Arabic version with English version Busse et al. (2013) conducted a study to examine the relationship of stress to anxiety, depression, and sleep disruption among parents with hospitalized infants in the NICU by using the English version of mini anxiety, depression, fatigue, and sleep disruption questionnaires from PROMIS. They found results for the PROMIS depression test bank items (r = 0.83); PROMIS anxiety test bank items (r = 0.80); and PROMIS sleep disturbance test bank items (r = 0.85). Also they found that the internal consistency reliability of the depression, anxiety, and sleep disturbance scales was tested and found to be acceptable, with alpha coefficients > .70 for all scales. The internal consistencies for the entire scale were .83, .80, and .85 for depression, anxiety, and sleep disturbance respectively (Busse et al., 2013).

Relevance of Clinical Practice

The findings of this study provide Arabic version for Mini depression, anxiety and sleep disturbance questionnaires which will be helped the nurses to do quick assessment for depression, anxiety and sleep disturbance for parents with hospitalized infant in NICU, and subsequently develop ways to support parents during their baby's time in the NICU – such as providing a parenting guide, a NICU guide, and a keepsake booklet for parents. Furthermore, the findings of this study will be add new knowledge to evidence base practice because it used the Confirmatory factors analysis to provide the evidence of the validity of Arabic version of mini depression, anxiety and sleep disturbance questionnaires for parents with hospitalized infant in NICU.

Added to above, most psychological assessment tools are too long and need a long time. Many parents refused apply these tools because they stress and worry about their infants, so the findings of this study help nurses to do quick assessment which will be helped them to identified the high-risk groups of parents, such as those who have a symptoms of anxiety, depression and sleep disturbance and subsequently effective nursing practice program to support parents and help them to deal with situations.

6. CONCLUSION

The original questionnaires were translated into an Arabic version of the 4-item anxiety scale, 5-item depression scale, and 3-item sleep disturbance scale. It has been examined for psychometric qualities, and the results were supported by CFA. In conclusion, the depression, anxiety, and sleep disturbance questionnaires from PROMIS questionnaire constitute an effective instrument to assess symptoms in parents with hospitalized infants in NICU in Jordan.

Conflict of interests

The authors declare that there is no conflict of interest in publishing this paper.

REFERENCES

[1] Abu-Shanab E & Pearson J (2009): Internet banking in Jordan: an Arabic instrument validation process. Int. Arab J. Inf. Technol. 6, 235-244.

[2] Ahmed AE (2014): Validation of Arabic versions of three sleep surveys. Qatar medical journal 2014, 130.

[3] Alumran A, Hou X-Y & Hurst C (2013): Assessing the overuse of antibiotics in children in Saudi Arabia: validation of the parental perception on antibiotics scale (PAPA scale). Health and quality of life outcomes 11, 1.

[4] Bowen, N. K., & Guo, S. (2011). Structural equation modeling: Oxford University Press.

[5] Brancato G, Macchia S, Murgia M, Signore M, Simeoni G, Blanke K, Körner T, Nimmergut A, Lima P & Paulino R (2006): Handbook of recommended practices for questionnaire development and testing in the European statistical system. European Statistical System.

[6] Byrne, B. M. (2016). Structural equation modeling with AMOS: Basic concepts, applications, and programming (third ed.). London Routledge.

[7] Busse M, Stromgren K, Thorngate L & Thomas KA (2013): Parents' responses to stress in the neonatal intensive care unit. Critical care nurse 33, 52-59.

[8] Dafaalla M, Farah A, Bashir S, Khalil A, Abdulhamid R, Mokhtar M, Mahadi M, Omer Z, Suliman A & Elkhalifa M (2016): Validity and reliability of Arabic MOS social support survey. SpringerPlus 5, 1306.

[9] Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). Multivariate data analysis (Vol. 6): Pearson Prentice Hall Upper Saddle River, NJ.

[10] Heidari H, Hasanpour M & Fooladi M (2012): The Iranian parents of premature infants in NICU experience stigma of shame. Med Arh 66, 35-40.

[11] Heidari H, Hasanpour M & Fooladi M (2013): The experiences of parents with infants in Neonatal Intensive Care Unit. Iranian journal of nursing and midwifery research 18, 208.

[12] JordainianMinistryofHealth (2013) Ministry of Health Annual Statistical Book 2013. http://www.moh.gov.jo/ AR/Pages/Periodic-Newsletters.aspx,http://www.moh.gov.jo/AR/Pages/Periodic-Newsletters.aspx(accessedoctuber. 22 2014).

[13] Koller M, Aaronson NK, Blazeby J, Bottomley A, Dewolf L, Fayers P, Johnson C, Ramage J, Scott N & West K (2007): Translation procedures for standardised quality of life questionnaires: The European Organisation for Research and Treatment of Cancer (EORTC) approach. European Journal of Cancer 43, 1810-1820.

[14] Lee S-Y, Lee KA, Rankin SH, Weiss SJ & Alkon A (2007): Sleep disturbance, fatigue, and stress among Chinese-American parents with ICU hospitalized infants. Issues in Mental Health Nursing 28, 593-605.

[15] Lee SY & Kimble LP (2009): Impaired Sleep and Well-Being in Mothers With Low-Birth-Weight Infants. Journal of Obstetric, Gynecologic, & Neonatal Nursing 38, 676-685.

[16] O'Rourke, N., Psych, R., & Hatcher, L. (2013). A step-by-step approach to using SASfor factor analysis and structural equation modeling: Sas Institute

[17] PROMIS PROMIS: Dynamic Tools to Measure Health Outcomes from the Patient Perspective, http://www. nihpromis.org/default#3 (accessed May, 24 2014).

[18] Sperber AD (2004): Translation and validation of study instruments for cross-cultural research. Gastroenterology 126, S124-S128.