

Study on Validity and Reliability of A Turkish Version of the Parental Stress Scale: Neonatal Intensive Care Unit

Yenidoğan Yoğun Bakım Ünitesi
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ABSTRACT

Parents perceive stressful the hospitalization of their children to the Neonatal intensive care unit (NICU). It is important to measure the level of stress and their reactions to that stress in order to provide nursing interventions to help parents continue to function during this stressful time.

This research is planned to translate the Parental Stressor Scale: Neonatal Intensive Care Unit (PSS:NICU) into Turkish and to determine psychometric measures for the Turkish version. The research sample included a total of 123 individuals who were the mothers and fathers (who could be reached) of premature infants receiving care in one of the 4 hospitals' NICUs in Denizli who met the research criteria and agreed to participate in the research. The internal consistency Cronbach Alpha coefficient was found to be 0.89 for the total scale and 0.90 for the two metrics. Using a sample comprised of 19 mothers the test-retest reliability for the PSS: NICU scale's subscales was between 0.44-0.60.

According to the research results it was determined that the tool can be easily used to determine the level of stress of parents of premature infants in an NICU.

Key Words: Parents, stress, neonatal intensive care unit, validity and reliability

ÖZET

Anne babalar Yenidoğan Yoğun Bakım Ünitesi'ne (YYBÜ) bebeklerinin yatmasını stres yaratan bir durum olarak algılamaktadır. Bu dönem süresince anne babaların fonksiyonlarını sürdürmelerinde yardımcı olacak hemşirelik girişimlerinin sağlanması amacıyla, onların yaşadıkları stres düzeyinin ve bu strese karşı reaksiyonlarının belirlenmesi önemlidir. Bu araştırma YYBÜ anne-baba stres ölçeğini Türkçe'ye çevirmek ve Türkçe versiyonunun psikometrik ölçümlerini yapmak amacıyla planlanmıştır. Araştırmanın örneklemine Denizli'de 4 hastanenin YYBÜ'nde tedavi gören, araştırmaya katılmayı kabul eden ve sınırlamalara uyan, prematüre bebek anneleri ve ulaşılabilen babalar olmak üzere toplam 123 kişi alınmıştır. İç tutarlılık güvenilirliği Cronbach Alpha katsayısı; Tüm ölçek için metrik 1 sonucuna göre 0.89, metrik 2 sonucuna göre 0.90 olarak bulunmuştur. 19 anneden oluşan bir örnek kullanılarak test-retest güvenilirliği YYBÜ anne-baba stres ölçeği alt ölçekler için 0.44-0.60 arasında bulunmuştur.

Araştırma sonuçlarına göre, YYBÜ'nde prematüre bebeği yatan anne babaların stres düzeylerinin belirlenmesinde ölçeğin kolaylıkla kullanılabileceği saptanmıştır.

Anahtar Kelimeler: Anne-baba, stres, yenidoğan yoğun bakım ünitesi, geçerlik ve güvenilirlik

Introduction

For the last several years small and ill infants have been cared for in Newborn Intensive Care Units (NICU) with many high tech machines (1). The sight of their ill infants connected to equipment by tubes and wires and surrounded by medical personnel can be very disturbing. Monitors, alarm noises and ventilators can be frightening. In particular tubes and monitors attached to or next to the incubators and infants may increase the stress of families (2).

Parents' emotional reactions to the NICU experience include disappointment, guilt, sadness, depression, hostility, anger, fear, anxiety, grief, helplessness, sense of failure and loss of self-esteem (3,4,5,6,7,8,9,10,11,12). Similar results were reported in studies conducted in Turkey with mothers of infants in NICUs (13,14, 15).

Since the earliest days of neonatal care, nurses have sought to reduce these negative effects by encouraging parents to visit frequently, breastfeed, hold their infants, and interact with them in a developmentally appropriate manner (9). In this critical period it is very important to determine and meet the needs of mothers and fathers. It is widely known that there are many stressors related to the unit directly and the conditions of care for the parents of infants in the NICU. The most frequently reported stressors are the parental role, infants' appearance, behaviors and suffering of pain, and the NICU setting (6,7,9).

The tool, Parental Stressor Scale: Neonatal Intensive Care Unit (PSS:NICU), was developed by Miles, Funk and Carlson (1993) for the purpose of determining the level of physical and psychosocial stressors in the unit that are perceived by parents. Magnusen Stress Theory was the framework for the development of the tool. According to

Magnussen, as described by Miles, Funk and Carlson, observation has two different dimensions from a microlevel to a macrolevel which can be analyzed. This tool, which contains physical elements and interpersonal relationships, is concerned with the microlevel of the environment in the NICU (7).

At this time, there are no tools available in Turkey for evaluation of the stress level of parents with hospitalized infants. Reducing the stress experienced by families during the hospitalization of their children into NICU requires that nurses should be able mediate the level of stress (7).

Methods

Before instruments are used with new populations, it is important to establish their validity and reliability for the new population. The aim of this study was to measure the reliability and validity of the translated version of the PSS:NICU.

Sample and Setting

This research was conducted in NICUs of one university, one state and two private hospitals during six months. Inclusion criteria for recruitment into the study were as follows: parents who had premature infants who were born at a gestational age between 24-36 weeks; had at least 1 major physical problem such as Respiratuar Distress Sendrom, Intracranial hemorrhage, Nekrotizing enterocolitis, Cardiac diseases in addition to prematurity, and who had not been in NICU more than two weeks during data collection period.

Measures

Parental Stressor Scale: Neonatal Intensive Care Unit

PSS:NICU was developed to measure situations that cause stress in the NICU. Eight items were added to the tool as suggested by the authors of the tool (via e-mail). A tool that include 34 item was used for this study. Each item was scored using a likert scale ranging from 1 (not stressful) to 5 (extremely stressful) or 0 (not experienced). They were told to mark only those variables that they had experienced. Two separate scores from the tool were obtained.

Metric 1 is the level of stress experienced by the parents and marked on the tool. For example, if the infant's color changes suddenly and the family marked this as 3 (moderate level of stress) on the tool, 3 points were given for this evaluation. In addition if the infant's color does not change suddenly and the family has not experienced this, then no points are given with this scoring system. To be able to comprehend better the degree of stress for every item that is a result of the NICU environment, these points were used.

Metric 2 was giving 1 point to variables that were not experienced by parents, it was scored assuming that this variable did not cause any kind of stress. For example, if the infant's color changes suddenly and the family marked this as 3 (moderate level of

stress) on the tool then this is given 3 points during the evaluation. In addition if the infant's color does not change suddenly and the family has not experienced this, in this scoring system 1 point is given, assuming that this factor has not caused any stress. These scores were used to determine the level of stress experienced by the parents.

The tool has 3 subscales; Infant's Appearance and Behaviors (17 items), Sights and Sounds (6 items), Parental Role Alteration (11 items)

Miles, Funk, Carlson tested this tool with 115 mothers and 75 fathers of infants in an NICU and found a Cronbach alpha value of 0.94 for metric 1 and of 0.89 for metric 2. The Cronbach alpha values for the subscales varied between 0.73 and 0.92. In the evaluation of the concurrent validity of the tool, a moderate level of significant correlation was determined between the PSS:NICU and the State Anxiety Scale (0.20-0.44), which evaluates the experience of stress (7).

A validity and reliability study of the tool reported in the literature was conducted with 257 parents of infants in an NICU (after the infants had been in the unit for one week) (16). In the factor analysis of the tool in this study it was determined that there are 3 factors (sights and sounds, infant's appearance and behaviors, parental role) and that the entire PSS:NICU tool's alpha value was 0.94.

Spielberger State-Trait Anxiety Inventory: Turkish Version

The State-Trait Anxiety Inventory (STAI) was developed by Spielberger et al. (1970) for this purpose and it was adapted for Turkish by LeCompte (1985) into a 40 item inventory for measuring state anxiety. There are four choices for each statement on the state anxiety tool which are 1 (none), 2 (some), 3 (a lot), 4 (completely). It is possible to receive a score from 20 (feeling positive, no anxiety) to 80 (anxious) from the tool. The internal consistency for the State Anxiety Tool of the STAI is between 0.94-0.96 (17).

Procedures

Permission was obtained from the author of PSS:NICU before tool was translated into Turkish. Then the tool was translated from English into Turkish by one English teacher, as well as by two English instructors at Pamukkale University and one nurse specialist who know both languages well. The researcher evaluated the translations and developed a shared text. Then this text was retranslated back into English by a specialist physician who knows English well and by an American nurse who lives in Turkey. The tool was then translated from English to Turkish and was compared to the original tool, and modifications were made as appropriate.

To determine to content validity of the Turkish form nine individuals (2 Community Health Nursing Instructors, 4 Pediatric Nursing Instructors, 2 Pediatric Nurse Specialists, 1 NICU charge nurse) were given the form and asked to evaluate each item for its ability to discriminate, to be understood, and appropriateness for its purpose. The form was then modified based on their recommendations into the most easily understood format.

Data Collection

Before data collection was initiated, the NICU staff were oriented to the purpose and methods of the study. NICUs, and key contact people at each institution were asked to notify the researcher as soon as possible when an infant was admitted to the unit. The interviews were postponed when the infant's condition was not good and the parents were under a high level of stress. Parents of eligible infants were provided with information about the purpose of the study, and their informed consent was obtained. The parents were given and asked to complete a one page data form containing demographic information, the Turkish version of STAI (Öner & LeCompte, 1985) and the Turkish version of PSS:NICU. Within a week of admission to the unit the data collection on each subject was completed ($M = 5.8$ days; $r = 2-9$ days). It took 20-25 minutes to complete the data collection form. Data were analyzed using the Statistical Package for Social Sciences (SPSS), version 11.0.

Results

Characteristics of Parents

During the approximately seven month period of time for data collection 80 volunteer mothers and 43 fathers (total 123) of premature infants in the NICUs of the four hospitals who met the research criteria were interviewed. The mean age of the mothers was 25.6 ± 6.4 years (18-42), and of the fathers was 29.8 ± 7.2 years (20-59). The education level of the participant was as follows: 62.6% of the mothers completed a primary school; 34.1% of the middle school, and 3.3% of the university level; 46.4% of the fathers completed a primary school; 46.3% of the middle school, and 7.3% of the university levels of education. According to the research results, 86.2% of the mothers were housewives, 95% of the fathers were independently employed businessmen.

Characteristics of Infants

The mean gestation for the infants was 31.3 ± 8.6 weeks (between 26 and 37 weeks). The infant's major health problems were as follows: respiratory (44%), neurologic (23%), gastrointestinal (11%), cardiac (9%) and others. The infants' mean birth weight was 1472.2 ± 522.5 grams.

Validity

Factor Analysis

Factor analysis was used to evaluate the structural validity of the tool (7). Basic components analysis with varimax rotation was done according to the metric 1 results. Items that were experienced by less than one third of the sample were not used for statistical analysis. These items were four items in the subscale, "Infant's Appearance and Behaviors" (my baby crying for a long time, when my baby seems to be scared, seeing my baby's color change suddenly, seeing my baby's breathing stop) and one item from the "Parental Role" subscale (sometimes I can't remember what my baby

looks like). In this way the 34 item tool was decreased to 29 items. In the results 13 items were found for Factor 1, item load was between 0.42 and 0.75, 10 items for Factor 2, item load was between 0.45 and 0.74, and 6 items for Factor 3, item load was between 0.38 and 0.84. The infant's appearance and behaviors subscale was composed of 18.25%with variance Factor 1, the parental role subscale was composed of 14.94%with variance Factor 2, and the sights and sounds subscale was composed of 11.64%with variance Factor 3. All of the items were in the anticipated place in factor and the factor load was higher than 0.40 (sights and sounds item 6: 0.38) (Table 1).

Table I. Principal Components Analysis and Factor Load of the Turkish Version of Parental Stressor Scale: Neonatal Intensive Care Unit

Factor loading (n = 123)			
T-PSS:NICU	Factor 1	Factor 2	Factor3
Infant's Appearance and Behaviors			
Pain	<u>0.75</u>		
Sad	<u>0.74</u>		-0.19
Jerky/Restless	<u>0.66</u>	0.28	0.20
Unusual Color	<u>0.63</u>		0.19
Wrinkled	<u>0.62</u>		
Can't Cry	<u>0.61</u>	0.27	0.12
Limp&Weak	<u>0.60</u>	0.20	0.11
Breathing Pattern	<u>0.59</u>	0.18	0.25
Small Size	<u>0.55</u>	0.31	0.10
Needles/Tubes Put in	<u>0.50</u>	0.25	0.27
Tubes/Equipment	<u>0.49</u>	0.20	0.41
Intravenous/Feed Tube	<u>0.48</u>	0.36	0.34
Bruises/Cuts/Incision	<u>0.42</u>		0.10
Parental Role Alteration			
Can't Hold	0.12	<u>0.74</u>	0.11
Can't Provide Care		<u>0.69</u>	0.20
Can't Feed		0.67	
Helpless/Protect	0.23	<u>0.66</u>	
Not Alone		0.63	
Seperation	0.17	<u>0.60</u>	0.23
Helpless/How to Help	0.32	<u>0.57</u>	0.18
Afraid Touching/Holding	0.22	<u>0.53</u>	
Share my Baby	0.27	<u>0.51</u>	
Staff was Closer		0.45	
Sights and Sounds			
See Monitors/Equip		0.18	<u>0.84</u>
Noise Monitors/Equip			<u>0.84</u>
Sudden Noise/Alarms			<u>0.74</u>
Respirator	0.41		<u>0.51</u>
Other Such Babies	0.33		0.46
Large Number of Staff	0.25	-0.16	<u>0.38</u>
Eigenvalues	5.29	4.33	3.37
Percentage of variance explained	18.25	14.94	11.64
T-PSS:NICU = Turkish version			

Item-to-Subscale Correlations

The item-to-subscale correlation coefficients were analysed to determine the effect of every subscale item. All items in the subscales were within acceptable limits and had significant correlations (0.31-0.69). Finding significant correlation coefficients for item-total subscales shows that there is internal consistency and that all items were in correct dimensions.

Convergent Validity

It was hypothesized that parental stress resulting from the infant's admission to the NICU correlates positively with the state anxiety scores. The Pearson correlations coefficients between both metrics and state anxiety score and its subscales are shown in Table 2.

Table 2. Comparison of Convergent Validity of the Turkish and English Version of the Parental Stressor Scale: Neonatal Intensive Care Unit and the Spielberger State Anxiety Inventory

Sub scales	*Turkish Version (N = 123)		English Version (Miles,Funk,Carlson1993). (N = 190)	
	Metric 1	Metric 2	Metric 1	Metric 2
Sights and Sounds	0.47***	0.50***	0.44***	0.41***
Infant's Appearance and Behaviors	0.55***	0.56***	0.44***	0.40***
Parental Role Alteration	0.42***	0.40***	0.20*	0.20*
T-PSS:NICU	0.59***	0.56***	0.45***	0.45***

*P = 0.000 P <0.001

T-PSS:NICU = Turkish version

Reliability

Internal Consistency

The internal consistency of the Turkish Version of PSS:NICU which was evaluated with Cronbach alpha coefficients was found to be at a high level (>.70). Cronbach alpha reliability coefficient showed that items within the tool were a homogeneous measure. Cronbach alpha coefficient was calculated for every subscale and the total tool. The alpha coefficient for all subscales were within acceptable limits (>.70). The Cronbach alpha coefficient for the total tool was 0.89 for metric 1 and 0.90 for metric 2. The subscale Cronbach alpha values were in the range of 0.78-0.88. (Table 3).

Table 3. Item-Subscale Total Correlations and Cronbach alpha Coefficients for Turkish Version of Parental Stressor Scale: Neonatal Intensive Care Unit

Subscales	Number of Items	Cronbach Alfa Values	
		Metric 1	Metric 2
Sights and Sounds	6	0.78	0.81
Infant's Appearance and Behaviors	13	0.88	0.88
Parental Role Alteration	10	0.84	0.85

Subscale-to-Total Correlations

Evidence for the instrument's reliability was defined as correlations higher than 0.40. Most of the subscales were moderately correlated with one another and strongly correlated with the total score, indicating the homogeneity of the instrument. The correlation values between the PSS:NICU and subscales for metric 1 were between 0.25-0.89 and for metric 2 were 0.26-0.89.

Test-Retest Reliability

Approximately two weeks later 19 mothers, who make up the subsample, from the total sample were given the tool again (18,19, 20). The correlation between every two data were examined using Pearson's Product Moment Correlation Coefficient. According to the Metric 2 results the PPS:NICU test-retest correlation coefficient for the total tool was 0.58 and for the subscales was between 0.44-0.60, which is a moderate correlation value.

Comparison with Previous Research

Comparison of the Turkish version of PSS:NICU with the English version is shown in Table 4. It is seen that the Cronbach alpha values are close to each other for both metrics for both tools.

Table 4: Comparison of Cronbach Alpha Values for the Turkish Version of Parental Stressor Scale: Neonatal Intensive Care Unit

Subscale	English Version (Miles,Funk,Carlson1993). (N = 190)		Turkish Version (N = 123)	
	Metric 1	Metric 2	Metric 1	Metric 2
Sights and Sounds	0.80	0.73	0.78	0.81
Infant's Appearance and Behaviors	0.92	0.83	0.88	0.88
Parental Role Alteration	0.90	0.83	0.84	0.85
Total T-PSS:NICU	0.94	0.89	0.89	0.90

Discussion

The PSS:NICU provides important information for research and clinical practice about how stressful parents find particular NICU situations (Metric 1) and the level of stress they experience from various aspects of the NICU environment (Metric 2). Basic Factor Analysis was used in the structural validity of the Turkish version of Parental Stressor Scale: Neonatal Intensive Care Unit. Three factors were found which support the tool's conceptual dimension in the sample group, which was composed of 123 mothers and fathers of premature infants in an NICU. In the original tool three subscales and a total of 26 items were found (7). In this study the tool was composed of three subscales and 29 items. At the recommendation of the authors and based on statistical analysis, the following three items in the Parental Role subscale were added: 1) I can't show my baby to other family members/friends, 2) I am afraid to touch or hold my baby, 3) I feel like my baby is closer to personnel than me. In a validity and reliability study of the PSS:NICU conducted in England with 257 parents of infants in an NICU, the tool was determined to have three factors (16).

It was hypothesized that there was a positive correlation between the level of environmental stress perceived in the NICU and measured anxiety, and the correlation between the two was examined. Higher correlation values were found in this study than the original tool, particularly with the parental role subscale (7).

The item-to-subscale correlation coefficients were examined to determine the effect of every subscale item. All items in the subscales were within acceptable limits and had significant correlations (0.31-0.69). As the item total correlation number (r) increased the level of effect of the statement increased (22). Finding significant correlation coefficients for item-total subscales shows that there is internal consistency and that all items were in correct dimensions.

The internal consistency and subscale-to-total correlations of the Turkish Version of PSS:NICU for use with Turkish parents are strongly supported by these findings and are consistent with previous research (7). Finding that the results of the study are similar to other study results shows that the tool can be used in Turkey for the same purpose.

The PSS:NICU test-retest correlation coefficient according to metric 2 results for the total tool was 0.58 and for the subscales were 0.44-0.60, which is a moderate degree of correlation. Test-retest reliability shows that a tool will be able to give consistent results from usage to usage and that it will not change over time. In this study the lower scores at the second measurement were in parallel with the parents getting accustomed to the environment over time and improvement in the infants' conditions. This situation is interpreted as, over time the characteristics between the two measurements, such as emotional state and physical state, can change for whatever reason.

Rapid developments in technology for the care of newborn infants today have improved the survival of premature infants. However they also increase the stress in parents who do not have a healthy infant at birth but must admit their infant to an NICU. Monitors, alarm sounds, and ventilators can be frightening. In particular the tubes and monitors that are next to and attached to incubators and infants can

increase the family's stress. Nurses can intervene by determining the parental stress factors in units (23).

Although some satisfactory psychometric properties of the translated instrument were found a major limitation of this study is that larger samples are needed to clarify and strengthen the instrument, and to evaluate its psychometric properties.

Identification of the sources of NICU-related parental stress and quantification of its degree is essential to determine effective strategies to promote optimal parenting in this high risk setting. Finding that the results of the study are similar to other study results shows that the tool can be used in Turkey for the same purpose (7,9,16). Turkish version of the PSS:NICU may be useful for nurses to intervene by determining the parental stress factor in units.

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