ORIGINAL ARTICLE

Examining psychometric properties of the Turkish version of the Nursing Job Rotation Stress Scale (NJRS)

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Abstract

Purpose: This study was designed to determine the validity and reliability of the Turkish version of the "Nursing Job Rotation Stress Scale (NJRS)".

Design and Methods: This methodological study was carried out with 200 nurses in 2018.

Findings: The content validity index for NJRS is 0.98, the Cronbach's α coefficient of the whole scale is calculated as .92. The internal reliability of the subscales was 0.86, 0.83, and 0.81 respectively. The goodness of fit indexes are 0.054 for root mean square error of approximation (RMSEA), 0.95 for goodness-of-fit index (GFI), 0.98 for comparative fit index (CFI), 0.98 for incremental fit index (IFI), 0.94 for relative fit index (RFI), 0.96 for normed fit index (NFI), and 0.97 for Tucker-Lewis index (TLI).

Practice Implications: The Turkish version of the NJRS was evaluated and it was found to be a valid and reliable measurement tool for Turkish nurses.

KEYWORDS
job rotation, nurse, reliability, stress, validity

1 | INTRODUCTION

Job rotation is a job design approach widely used by many organizations at various levels and departments. Job rotation is a technique followed by organizations to improve employee performance and commitment toward their work. More precisely, job rotation, as a part of a career development program, is a tool used for job orientation and the development of professional skills, the purpose of which is to help new employees acquire adequate competence for the job.[1,2]

Job rotation helps nurses increase their professional knowledge and skills and boost their performance, and it ensures continuous growth by improving the quality of patient care services. Moreover, job rotation is deemed beneficial to employees by providing them with more diversified skills, helping them expand their vision, and increasing their job satisfaction.[2-6]

In addition to its positive impacts, job rotation might also have its disadvantages, some of which may prevent employees from specializing in particular branches. This is especially important for health care institutions dealing with human life, where any misconduct of employees who lack expertize might bring about irredeemable consequences. When health professionals are required to work for departments that they do not deem desirable as a part of their job rotation, staff performance and work quality of those departments might also be negatively influenced. Furthermore, employees subjected to rotation might experience some time loss during the orientation period at their new department. While health professionals recruited at relatively busier and more demanding departments such as emergency rooms, intensive care units, and surgical clinics tend to favor job rotation, those at departments with more regular routines and more stable patients are generally unwilling to be included in the rotation. Such a difference might cause problems in rotation practices as well as some discontent among employees.[6-9]

There is no scale available in Turkey to measure job rotation stress in health care institutions, particularly among nurses. Therefore, the impact of job rotation on nurses in Turkey cannot be measured properly. This study adapted the Nurse Job Rotation Stress Scale (NJRS) developed by Shan Huang et al[10] and evaluated its validity and reliability in the Turkish context.

2 | METHODS

2.1 | Study design, time, and place

This methodological study was carried out between June 2018 and August 2018 at Eskisehir Osmangazi University Health Application and Research Hospital.

2.2 | Study process

The NJRS was translated into Turkish by five professionals who are fluent in both English and Turkish, and who granted their consent to participate in the research. They constructed a common text in Turkish and then translated it back into English. An expert opinion was received on the content validity, and the content validity index was calculated accordingly. The pilot test of the adapted Turkish version was conducted at a hospital other than the actual research field, with the help of 30 nurses working at the Yunus Emre State Hospital in Eskisehir. The pilot scheme helped to test the clarity and comprehensibility of the items and give the scale its final form. Cronbach's α value and item-total correlation were used to test scale reliability. Exploratory and confirmatory factor analyses were administered for construct validity.

2.3 | Sample and participants

The research population was composed of 200 nurses who were currently employed at the Eskisehir Osmangazi Faculty of Medicine and who had experienced job rotation at least once. With new units opened, the number of nurses working in the hospital whose physical conditions were developing was 746. The rotation information of the last 2 years had been reached within the scope of the research. During this period, the number of nurses who underwent job rotation was 228, and the data collection process was completed with 200 nurses.

It is recommended for scale studies that the sample size is 5 to 10 times greater than the number of items in the scale. However, higher rates might also be acceptable.[11] The scale, of which we tested the validity and reliability, is a five-point Likert scale consisting of 10 items and 3 subscales. Based upon this information, the study included 200 nurses who work at Eskisehir Osmangazi University Health Application and Research Hospital and who granted their consent to participate in the research.

The average age of the nurses was 29.76 ± 7.49. A total of 87% of the nurses ($n = 174$) were female, and 57% were married ($n = 114$). Thirty-four percent of the nurses graduated from a high school of health care, 9% had a 2-year degree ($n = 18$), 51.5% had a bachelor's degree ($n = 103$), and 5% ($n = 10$) had a master's degree. Five percent of the nurses ($n = 10$) had nursing experience of less than 1 year, 33.5% ($n = 67$) had 1 to 5 years of experience, 32.5% ($n = 65$) had 6 to 10 years of experience, 15.5% ($n = 31$) had 11 to 15 years of experience, and 13.5% ($n = 27$) had 16 or more years of nursing experience. Sixty-two percent of the nurses ($n = 124$) had been working at the same department for 1 to 5 years, and 45% ($n = 90$) of them had been working at the same hospital for 1 to 5 years. Most of the nurses (84.5%, $n = 169$) were satisfied with working at their department. Of the nurses, 41% of them ($n = 82$) were willing to participate in the rotation, and 69% ($n = 138$) believed that rotation was a necessary practice for their profession.

2.4 | Instrument

The study made use of a sociodemographic information form to identify the sociodemographic characteristics of the nurses, and a scale originally entitled "Nurse Job Rotation Stress Scale (NJRS)" developed by[10] to assess the job rotation stress of the nurses.

Sociodemographic Information Form: This form included 11 questions about age, gender, marital status, work experience, and professional satisfaction of the nurses as well as their willingness to be included in job rotation.

NJRS: This scale was developed by Shan Huang et al[10]. It includes 10 items and three subscales: (i) Emotional Response includes items 1, 2, 3, and 4; (ii) Communication includes items 8, 9 and 10; and (iii) Daily Life includes items 5, 6, and 7.

The 10-item scale had an internal consistency (Cronbach's α) of .87, and the subscales had Cronbach's α scores of .81, .80, and .84.

The responses to the survey used a five-point Likert scale (1 = Strongly disagree, 5 = Strongly agree). The results were measured by a range of scores from 10 to 50, where a high score corresponded to a high job rotation stress level.[10]

2.5 | Statistical analysis

The data analysis used percentages and means for the descriptive statistics. The Shapiro-Wilk normality test was conducted to assess the complicity of the data to a normal distribution. The consistency analysis of the expert opinions were evaluated with a content validity index. A Pearson's correlation analysis was used for the item-total score analysis of the subscales, Cronbach's α coefficients and split-half analysis assessed the internal consistency of the subscales, and explanatory factor analysis was performed to evaluate the item-factor relation. The study used confirmatory factor analysis to determine whether the subscales explained the original structure of the scale. Groups were compared with a t test. The Pearson correlation analysis helped identify the relation between the scale factors. $P < .05$ was considered statistically significant.

2.6 | Ethical considerations

Shan Huang was informed about the study and our intent to use the scale, and his authorization was received through e-mail. Written authorizations were obtained from the ethics committee to begin the study, Eskisehir Osmangazi Faculty of Medicine to collect data, and the nurses for their voluntary informed consent.

3 | RESULTS

3.1 | Validity process

3.1.1 | Language validity

Translation and back-translation were performed to test the language validity of the scale. To this end, the scale was translated by five professionals who were fluent both in English and Turkish and who granted their consent to participate in the research. The scale translated into Turkish was translated back into English by a linguist who is fluent in Turkish and English, and the back-translated scale was compared to the original scale. The expressions that did not seem accurate were revised to ensure language validity.

3.1.2 | Content validity

For content validity purposes, seven experts who specialized in various fields (faculty members from the Department of Nursing, the Department of Psychiatric Nursing, the Department of Obstetrics and Gynecology Nursing, the Department of Fundamentals of Nursing, and the Department of Healthcare Management) were consulted, and they provided their opinions on each item. According to the Davis technique, the Content Validity Index (CVI) was calculated as 0.88 to 1.00, and the mean CVI was calculated as 0.96.[12]

3.1.3 | Structural validity

Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were performed to identify the construct validity of the scale. The Kaiser-Meyer Olkin (KMO) factor was 0.933, and the X^2 value in the Bartlett test was 1186.071 ($P < .001$). The emotional response subscale accounted for 59.507% of the total variance, the communication subscale explained 8.568% of the total variance, and the daily life subscale explained 5.999% of the total variance. These three subscales accounted for 74.073% of the total variance. The factor loadings of the first subscale were between 0.518 and 0.810, those of the second subscale were between 0.545 and 0.800, and those of the third subscale were between 0.667 and 0.820 (Table 1).

The X^2 value of the three-factor model was 48.699, the degrees of freedom were 31, and $P = .023$. X^2/df was calculated as 1.571. Per the goodness of fit indexes, root mean square error of approximation (RMSEA) was 0.054, GFI was 0.95, comparative fit index (CFI) was 0.98, incremental fit index (IFI) was 0.98, relative fit index (RFI) was 0.94, normed fit index (NFI) was 0.96, and Tucker-Lewis index (TLI) was 0.97 (Figure 1). As a result of the CFA, it was observed that factor loadings of the first subscale were between 0.73 and 0.79, factor loadings of the second subscale were between 0.74 and 0.83, and the factor loadings of the third subscale were between 0.72 and 0.88. Hoelter analysis assessed whether the sample was adequate for the CFA and found that a sample of 184 people was adequate (Table 2).

The score of the top 27% was 40.66 ± 3.96, whereas the mean score of the lowest 27% was 18.35 ± 4.19. The difference between

TABLE 1 Exploratory factor analysis result ($n = 200$)

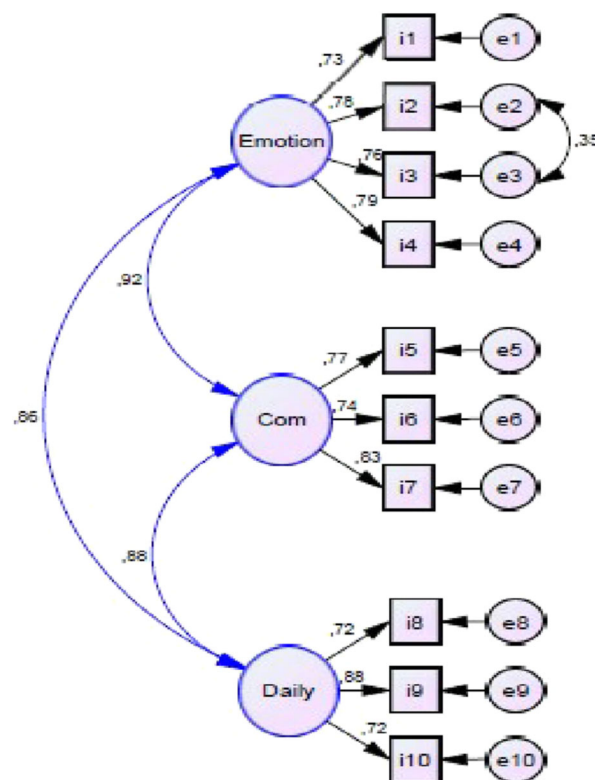| Items	Subscales		
	Emotional response	Communication	Daily life
I1	0.803		
I2	0.819		
I3	0.765		
I4	0.518		
I5		0.768	
I6		0.800	
I7		0.545	
I8			0.820
I9			0.713
I10			0.667
Explained variance (%)	59.507	8.568	5.999
Explained total variance (%)	74.073		
KMO	0.933		
Bartlett X^2(p)	1186.071 (0.000)		

FIGURE 1 Confirmatory factor analysis of the Nurses Job Rotation Stress Scale [Color figure can be viewed at wileyonlinelibrary.com]

TABLE 2 Model fit indeces

	X^2	SD	X^2/SD	RMSEA	GFI	CFI	IFI	RFI	NFI	TLI
Three-factor model	48.699	31	1.571	0.054	0.95	0.98	0.98	0.94	0.96	0.97

Abbreviations: CFI, comparative fit index; GFI, goodness-of-fit index; IFI, incremental fit index; NFI, normed fit index; RFI, relative fit index; RMSEA, root mean square error of approximation; TLI, Tucker-Lewis index.

TABLE 3 Comparison of top and the lowest group scores ($n = 200$)

Group	n	M + SD	t	P
% 27 Top group	54	40.66 ± 3.96	28.4050	.000
% 27 Lowest group	54	18.35 ± 4.19		

TABLE 4 Comparison of Job Rotation Scale Scores of nurses according to their willingness to participate in rotation ($n = 200$)

Willingness for rotation	n	M + SD	t	P
Yes	82	25.37 ± 8.34	5.875	.000
No	118	32.53 ± 8.55		

the average scores of the top 27% and the lowest 27% was statistically significant ($P < .001$) (Table 3).

While the total scale score of the nurses who were in favor of job rotation was 25.37 ± 8.34, the average score of those who were not in favor was 32.53 ± 8.55. The difference between the scores of nurses who were in favor and those who were not was statistically significant ($P < .001$) (Table 4).

3.2 | Reliability process

3.2.1 | Internal consistency

The Cronbach's α coefficient of the overall scale was .92. The α values of the subscales were .86, .83, and .81, respectively. According to the split-half analysis, the Cronbach's α value was .85 for the first half and .86 for the second half, the Spearman-Brown factor was 0.94, the Guttman split-half factor was 0.94, and the correlation factor between the two halves was 0.88.

The floor effect was 5.5%, and the ceiling effect was 3.5% for the first subscale, while the floor effect was 5.5%, and the ceiling effect was 6.0% for the second subscale. The floor effect for the third scale was 6.5%, and the ceiling effect was 3.0%. Tukey's test of additivity assessed the additivity of the scale and concluded that $F = 1.899$ and $P = .169$, and therefore the scale was additive. Response bias in the scale was checked using the Hotelling T^2 test, which was calculated as 143.537, $F = 15.307$ and $P < .01$. No response bias was found in the scale.

The correlations of the scale items with the scale total score were between 0.640 and 0.781, the correlation between the first subscale items and the subscale total score was between 0.655 and 0.775, the correlation between the second subscale items and the subscale total score was between 0.682 and 0.686, and the third subscale items and the subscale (Table 5).

4 | DISCUSSION

There is no scale available in Turkey to measure job rotation stress in health care institutions, particularly among nurses. Therefore, the impact of job rotation on nurses in Turkey cannot be measured properly. This study adapted the NJRS developed by Shan Huang et al[10] and evaluated its validity and reliability in the Turkish version of the scale.

4.1 | Evaluation of scale validity

The most commonly used method to measure the validity of scale tools is content validity analysis. The CVI of the Nurse Job Rotation Stress Scale in this study is 0.98. The CVI in the original study by Huang et al is also 0.96. Thus, both studies show similar results.

For the factor analysis, the Kaiser-Meyer-Olkin (KMO) test was administered, and the sample adequacy was found to be 0.933. According to this value, it was concluded that the study group size is "marvelous".[13] As a result of the Bartlett test, the χ^2 value was 1186.071 and $P < .001$.

Three subscales in this study explained 74.073% of the total variance. The literature emphasizes that the explained variance should be between 40% and 60% and that the higher the total variance, the stronger the construct validity of the scale.[14] This result demonstrates that the scale has a very strong factor constructs. Likewise, in the research conducted by Huang et al, three subscales explained 66.06% of the total variance. These results support the construct validity of the scale. The factor loadings in this study are found to be similar to the factor loadings in the original study (Huang, 2016).

It is necessary to conduct a confirmatory factor analysis during the assessment of the construct validity of the scale to evaluate the good fit of the subscales obtained through the exploratory

TABLE 5 Item scale total score and subscale total score corrected correlations ($n = 200$)

Subscales	Items	Corrected Item-Total Score Correlation (r)*	Corrected Item-Subscale Total Score Correlation (r)*
Emotional	M1	0.661	0.684
	M2	0.734	0.775
	M3	0.726	0.734
	M4	0.744	0.655
Communication	M5	0.709	0.685
	M6	0.676	0.682
	M7	0.781	0.686
Daily life	M8	0.642	0.621
	M9	0.776	0.735
	M10	0.640	0.620

factor analysis. Confirmatory factor analysis is a method based on the evaluation of the goodness of fit indexes between the data and the construct. The acceptable goodness of fit is $\chi^2/df < 5$.[15] The literature maintains that factor item loadings should be more than 0.30 and that the items with smaller values should be omitted from the scale.[13,14] CFA found that the factor loading of the scale is more than 0.30.

Other commonly used goodness of fit statistics tests are RMSEA, SRMR, CFI, NFI, GFI, IFI, and RFI.[13,16] According to the literature, a RMSEA value greater than 0.10, GFI > 0.80 and other good fit indexes greater than 0.85 or 0.90 show that the model has the goodness of fit indexes and that the model is compatible with real-life.[15,16]

In our study, RMSEA = 0.054, GFI = 0.95, CFI = 0.98, IFI = 0.98, RFI = 0.94, NFI = 0.96, and TLI = 0.97, while $X^2/df = 1.571$ (Table 2). In the study of Huang et al, good fit indexes were $X^2/df = 3.750$, RMSEA = 0.01, GFI = 0.92, AGFI = 0.85, NFI = 0.90, and $P < .001$. Hence, both studies showed similar results.

4.2 | Evaluation of scale reliability

To test the reliability of the scale, the correlation of the total test score of the items and Cronbach's α internal reliability coefficient was calculated. Internal consistency was one of the reliability criteria. Cronbach's α reliability coefficient is the most commonly used method to assess internal consistency. Cronbach's α coefficient should be as close to 1 as possible so that an evaluation tool can be considered adequate. A good level of reliability is indicated by a value of 0.7 or higher.[13,16,17]

The Cronbach's α coefficient of the whole scale was .92. The internal reliability of the subscales was 0.86 at the emotional subscale, 0.83 at the communication subscale, and 0.81 at the daily life subscale. In their study, Huang et al found that Cronbach's α coefficient was .87 and α value at the subscales were .81, .80, and .84, respectively.

4.3 | Conclusions

The results of this study suggest that the Nurse Job Rotation Stress Scale is a valid and reliable tool to be used in Turkey. The sample group consisted of nurses who were employed at a hospital in Eskisehir. However, expanding the research scope to include nurses working in other cities and hospitals would provide important insights on the generalizability of the scale.

The present study was carried out in only one hospital. Therefore, the results obtained from this study are applicable only to the participants surveyed.

4.4 | Implications for nursing practice

There is no scale available in Turkey to measure job rotation stress in health care institutions, particularly among nurses. Therefore, the impact of job rotation on nurses in Turkey cannot be measured properly. The findings from this study were consistent with results from the original scale, and the EFA and CFA results confirmed the two-factor structure of the scale. The Cronbach's α internal consistency coefficient, item total correlation and test-retest analysis of the scale showed a high level of reliability. On the basis of these results, the validity and reliability of the Turkish version of the NJRS showed that it had a good fit with the original scale and that it was a valid and reliable tool or the assessment of nurses' job rotation stress.

NURSES JOB ROTATION STRESS SCALE (NJRS) (Original Scale)	HEMŞİRE İŞ ROTASYON STRES ÖLÇEĞİ (Turkish Scale)
1. When I am notified of a job rotation, I frequently feel anxious	1. İş rotasyonundan haberdar edildiğimde sıklıkla endişelenirim
2. When I am notified of a job rotation, I feel it is hard to concentrate during the daytime and hard to sleep at night.	2. İş rotasyonundan haberdar edildiğimde gündüz yaptığım şeye odaklanmakta, gece ise uyumakta zorlanırım
3. I experience loss of appetite when I am notified of a job rotation	3. İş rotasyonundan haberdar edildiğimde iştahsızlık yaşarım
4. I worry about how to get along with my new colleagues.	4. Yeni meslektaşlarımla nasıl anlaşacağım konusunda endişelenirim
5. I worry about whether I will get off work on time.	5. İşten zamanında çıkıp çıkamayacağım konusunda endişelenirim
6. I worry about whether it will be easy to apply for annual leave.	6. Yıllık izin almamın kolay olup olmayacağı konusunda endişelenirim
7. I worry that my daily life will be affected during the job rotation period.	7. İş rotasyon döneminde günlük hayatımın bundan etkileneceğinde endişelenirim
8. As a senior nurse, I worry that I will be criticized for making mistakes.	8. Kıdemli bir hemşire olarak hata yaptığımda eleştirilmekten endişelenirim
9. I worry about whether I will be able to communicate with the physicians in the rotation unit.	9. Rotasyon birimindeki doktorlarla iletişim kurup kuramayacağım konusunda endişelenirim
10. I worry about individual physician's preferences and habits in the rotation unit.	10. Rotasyon birimindeki doktorların bireysel tercih ve alışkanlıkları konusunda endişelenirim

CONFLICT OF INTERESTS

The authors declare that there are no conflict of interests.

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