Original Article

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Psychometric Properties of Persian Version of the Short-Form Workplace Social Capital Questionnaire for Female Health Workers

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Abstract

Background: The workplace social capital is one of the important features of clinical work environment that improves the productivity and quality of services and safety through trust and social participation. Evaluation of workplace social capital requires a valid and reliable scale. The short-form workplace social capital questionnaire developed by Kouvonen has long been used to evaluate the workplace social capital.

Objective: To evaluate the psychometric properties of the Persian version of the questionnaire among a group of female Iranian health care workers.

Methods: The Persian version of the short-form questionnaire of workplace social capital was finalized after translation and back-translation. 500 female health care workers completed the questionnaire. Then, the content validity and the construct validity of the questionnaire were assessed. The reliability of the questionnaire was assessed by Cronbach's α, θ, and McDonald's Ω. The construct reliability and ICC were also evaluated.

Results: Based on the maximum likelihood exploratory factor analysis (n=250) and confirmatory factor analysis (n=250), two factors were identified. The factors could explain 65% of the total variance observed. The model had an acceptable fit: GFI=0.953, CFI=0.973, IFI=0.974, NFI=0.953, PNFI=0.522, RAMSEA=0.090, CMIN/DF=2.751, RMR=0.042. Convergent and divergent validity as well as internal consistency and construct reliability of the questionnaire were confirmed.

Conclusion: The Persian version of Kouvonen workplace social capital has acceptable validity and reliability. The questionnaire can thus be used in future studies to assess the workplace social capital in Iranian health care workers.

Keywords: Workplace; Social capital; Factor analysis, statistical; Surveys and questionnaires; Iran

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Introduction

Although several definitions of "social capital," as one of the important determinants of individual and community health have been presented,[1] Robert Putnam's definition is the most commonly used definition in health studies. He has defined social capital as a feature of social organization, such as trust, norms, and networking that facilitate coordination and improve collective action.[2]

The concept of social capital has two structural and cognitive dimensions. The structural social capital is related to the visible social interaction, whereas the cognitive social capital includes the norms, values, and beliefs of individuals that affect their social participation.[3] The social capital is divided into three levels—bonding social capital, *ie*, communication between individuals with similar personal and social characteristics such as members of a family, friends or people with similar job status; bridging social capital, *ie*, communications and interactions between individuals that are different in some social and individual aspects such as ethnic or occupational differences; and linking social capital, *ie*, relationships between people at different levels of power such as the relationship between employees and employers.[4]

The fact that many interactions occur in the workplace has been less considered. Most studies on social capital have been carried out in large communities.[5] The workplace is considered a major social context where working-age adults devote a growing fraction of their waking time and a great number of face-to-face communications occur between officials and their subordinates. It is not only the quantity but also the quality of these communications that matters. Undoubtedly, the workplace is a social organization and a huge source of all three levels of social capital can be found.[6] Considerable efforts have been devoted in recent years to understanding the role of workplace social capital as a determinant of workers' health.[7] A high level of workplace social capital in health organizations is beneficial to nurses, patients, and the organization through improved communication, teamwork, and access to greater information, support, and resources. High levels of social capital have been associated with nurses' well-being, retention, cooperation, and patient safety, improved nursing cares, and positive outcomes for the organization, which will be finally associated with increased job satisfaction and organizational commitment.[8,9]

In various studies, social capital has been measured with different scales,[10,11] the psychometric properties of some of which are unconfirmed.[6,12] This led to heterogeneous results.[13] On the other hand, the scales used in social capital studies on neighborhoods or communities are not suitable for being used in the workplace.[5] Few studies have so far been conducted on the psychometric aspects of the standard scales of social capital of workplace in nurses with different perspectives.[14,15] Several studies have been conducted in Finland with the objective of investigating the relationship between workplace social capital and employees' health using a short questionnaire of eight questions developed by Kouvonen, *et al,* which covers various dimensions of social capital at the workplace.[6,16-18] One of the main advantages of this questionnaire is that it contains the most important dimensions of social capital in just a few statements. The questionnaire covers the core axes of social capital in the labor context regardless of other cultural, occupational and geographical aspects.[19]

A standard questionnaire for assessing the social capital of the workplace with acceptable validity and reliability based on the cultural structure in Iranian society

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is necessary. We therefore, conducted the present study to evaluate the social capital scale of the Persian version of the Kouvonen, *et al*,[6] questionnaire among a group of Iranian nurses.

Materials and Methods

From October 2016 to March 2017, we used a stratified random sampling of 10 hospitals and health care centers in Babol, northern Iran. Although there is no general agreement on the sample size in the psychometric studies, the minimum sample size for conducting factor analysis is equal to 5–10 times the number of the items of the instrument to be tested. Using 100–200 participants was also considered appropriate.[20] We therefore decided to choose a sample size of 250 participants for each of exploratory and confirmatory factor analyses—a total of 500 participants.

The inclusion criteria included female nurses working in health centers affiliated to Babol University of Medical Sciences who had at least one year of work experience and had a willingness to participate in the study. The data were collected using the Kouvonen social capital questionnaire.[6] The questions are answered based on a 5-point Likert scale, from one to five ("totally disagree" to "totally agree"). Higher scores indicate higher levels of social capital. By this scale, the social capital is measured at the individual level and in the work unit.

At first, the questionnaire was prepared and, after obtaining permission from Professor Kouvonen, the questionnaire was translated from English into Persian language by two translators in accordance with the World Health Organization (WHO) protocol.[21] An expert panel consisting of the study investigators and two translators assessed and unified the two translations and produced a single Persian translation of the questionnaire. Thereafter, a translator was asked to translate the Persian version of the questionnaire back into English. This English version was sent to Professor Kouvonen who confirmed it was correct. The next step was to determine the psychometric properties of the questionnaire.

Validity

Content, construct, convergent and discriminant validity were studied in this study. The content validity of the questionnaire was also assessed both qualitatively and quantitatively.

Content Validity

For qualitative content validity, the Persian version of the questionnaire was given to 10 experts—two with PhD degree in social sciences, three with nursing doctorates, two with health education doctorates, one with occupational health doctorate, and two reproductive health doctorates. The experts were asked to assess and comment on wording, item allocation, and scaling of the items.[22] Guided by this input, we subsequently revised the questionnaire.

The quantitative content validity of the scale was assessed through calculating content validity index (CVI) for the items. The CVI can be calculated for each item of a scale (item-level or I-CVI) and for the overall scale (Scale-level or S-CVI). Accordingly, the above-mentioned 10 experts were asked to rate the relevance each of the questionnaire items on a 4-point Likert scale. The four points for rating the relevance of the items were "not relevant," "somewhat relevant," "quite relevant," and "highly relevant," which were scored as '1,' '2,' '3,' and '4,' respectively. The I-CVI for each item was calculated by dividing the number of panelists who had rated that item as '3' or '4' by the total number of the panelists. According to Lawshe,[23] when the number of panelists is equal to 10, an ICV

of ≥0.79 is considered "appropriate."[24]

Construct Validity

To examine the construct validity of the questionnaire, we performed both exploratory factor analysis (EFA, n=250), confirmatory factor analysis (CFA, n=250), convergent validity, and discriminant validity.[25] We applied the maximum likelihood EFA followed by a promax rotation with SPSS® ver 21 (SPSS Inc, Chicago, IL, USA).

The Kaiser-Meyer-Olkin (KMO) test and the Bartlett's test of sphericity were used to check the appropriateness of the study sample and the factor analysis model. The number of factors was determined based on eigenvalues and scree plot. Items with absolute loading values of ≥0.3 were regarded as appropriate. Eigenvalues >1, which satisfied the scree plot requirements of factor loadings >0.5, were the criteria used to select factors.[26-28]

Next, the results obtained from the maximum likelihood EFA were confirmed by performing CFA with AMOS® ver 21. Given the CFA output consisting of χ^2 test, χ^2/df (normalized χ^2 CMIN/df) <5, goodness-of-fit index (GFI) >0.90, comparative fit index (CFI) >0.90, incremental fit index (IFI) >0.90, normed fit index (NFI) >0.90, parsimonious normed-fit index(PNFI) >0.5, and RAMSEA <0.08 were used for CFA.[29,30]

Convergent and Discriminant Validity

The convergent validity was assessed by estimating the average variance extracted (AVE) and variance (MSV). To establish convergent validity, the AVE of constructs should exceed 0.50. To establish discriminant validity, AVE should be greater than MSV.[31,32]

Reliability

The reliability of the questionnaire was first assessed through evaluating its internal consistency and calculating the Cronbach's α, θ, and McDonald Ω for absolute agreement for the individual items and domains.[33] A reliability of ≥0.7 was considered satisfactory internal consistency.[34] Intra-class correlation coefficients (ICCs) was used to assess the test-retest reliability of the questionnaire in 30 of participants over an interval of two weeks using two-way mixed ICC for absolute agreement at the level of individual items. ICC values of 0–0.2 was considered "low reliability," 0.21–0.40 "fair," 0.41–0.60 "moderate," 0.61–0.80 "substantial," and "0.81–1.0" was considered "almost perfect reliability."[35] We also used standard error of measurement (SEM) and minimal detectable changes as percentage (MDC%) for estimated absolute reliability. An MDC% of <30 is considered "acceptable;" an MDC% of <10 was considered "excellent."[36] Next, the construct reliability (CR) of the factors was assessed; CR >0.7 was interpreted as "good reliability."[37]

Multivariate Normality and Outliers

Univariate distributions were examined for outliers, skewness, and kurtosis. Multivariate distributions were evaluated for normality and multivariate outliers. Multivariate normality was evaluated through the use of the Mardia's coefficient of multivariate kurtosis; a value >8 was interpreted as deviation from normal distribution.[38] Multivariate outliers were evaluated through evaluation of Mahalanobis distance;[39] items with Mahalanobis distance with $p<0.001$ were considered multivariate outliers.[40]

Ethics

The study protocol was approved by the Ethics Committee of Babol University of Medical Sciences, Babol, Iran. All participants were informed of the study objectives and procedures and ensured that their participation was voluntary. The con-

Table 1: The items and content validity index in workplace social capital scale

Items	I-CVI
Q1: People keep each other informed about work-related issues in the work unit	0.9
Q2: We have a 'we are together' attitude.	1.0
Q3: People feel understood and accepted by each other	0.9
Q4: People in the work unit cooperate in order to help develop and apply new ideas	0.9
Q5: Members of the work unit build on each other's ideas in order to achieve the best possible outcome?	0.9
Q6: Our supervisor treats us with kindness and consideration.	0.9
Q7: Our supervisor shows concern for our rights as an employee	0.9
Q8: We can trust our supervisor	1.0

fidentiality of participants' information was guaranteed. Informed written consent was obtained from all participants.

Results

From the 500 distributed questionnaires, 440 (88%) were collected. All the participants were women, with a mean age of 35.9 (SD 8.4) years. They had a median job tenure of 10 (IQR 4 to 17) years; 65% were shift workers, 76.4% were married, and 77.3% had a bachelor degree. The economic state of 73.2% was "moderate" and 53.7% had a self-expressed good health.

The I-ICV of all items was >0.79; none of the items was thus excluded (Table 1). A KMO of 0.839 and a significant ($p<0.001$) Bartlett's test of sphericity indicated that the sampling was adequate (Table 2). Using a scree plot and considering factors with eigenvalue >1, EFA extracted two factors (Fig 1); the first factor consisting of five items (4, 2, 5, 3, and 1); the second factor consisting of three items (7, 8 and 6). These two factors after promax rotation yielded eigenvalues of 3.712 and 3.155, respectively, and together could explain 65% of the variance observed.

In CFA, the results indicated that the final model had a good fit (Fig 2). The internal consistency rate revealed good reliability and internal consistency for all factors. Cronbach's α, θ, and McDonald's Ω for factors 1 and 2 were 0.8 and 0.9, 0.89 and 0.90, and 0.79 and 0.90, respectively. The construct reliability for the two factors was 0.76 and 0.81, respectively. The average measure ICC was 0.71 (95% CI 0.39 to 0.85) ($p<0.001$). The absolute reliability with estimated SEM of 2.67 and MDC% of 28% approved the reliability of the questionnaire. Furthermore, because the AVE of both factors exceeded 0.5 and the con-

TAKE-HOME MESSAGE

- The workplace social capital is one of the important features of the clinical work environment that improves the productivity and quality of services and safety through trust and social participation.
- There is a need for a standard scale for assessing the social capital of the workplace with good validity and reliability based on the cultural structure in Iranian society.
- A high level workplace social capital in health organizations is beneficial to nurses, patients, and the organization through improved communication, teamwork, and access to greater information, support, and resources.
- The Persian version of the workplace questionnaire is reliable and valid for being used in female health care workers.

Table 2: The results of performing exploratory factor analysis on the workplace social capital scale

Factor Name	Item	Loading	Communalities (extraction)	Eigen-value	Variance
Factor 1: Group coher-ence	Q4: Members of the work unit build on each other's ideas in order to achieve the best possible outcome	0.857	0.674	3.712	46.67
	Q2: We have a 'we are together' attitude	0.790	0.632		
	Q5: People in the work unit cooperate in order to help	0.789	0.670		
	Q3: People feel understood and accepted by each other	0.778	0.688		
	Q1: People keep each other informed about work-related issues in the work unit	0.604	0.349		
Factor 2: Committed management	Q7: Our supervisor shows concern for our rights as an employee	0.987	0.874	3.155	19.43
	Q8: We can trust our supervisor	0.825	0.694		
	Q6: Our supervisor treats us with kindness and consideration	0.711	0.639		

struct reliability was more than the AVE, the questionnaire had an acceptable convergent validity. AVE was also more than the MSV that indicated acceptable discriminant validity (Table 3).

Discussion

The social capital is a culture-dependent variable and needs to be evaluated and studied separately in each context. There is no specific scale to measure workplace social capital in Iran. Regarding the validity of the translation process, the workplace social capital questionnaire was translated based on the gold standard recommended in guidelines (in accordance with the WHO guidelines), and the translation was approved by the owner and was confirmed in the panel of experts. The cross-cultural adaptation of a self-administered questionnaire for use in a new cultural context does not end here and further investiga-

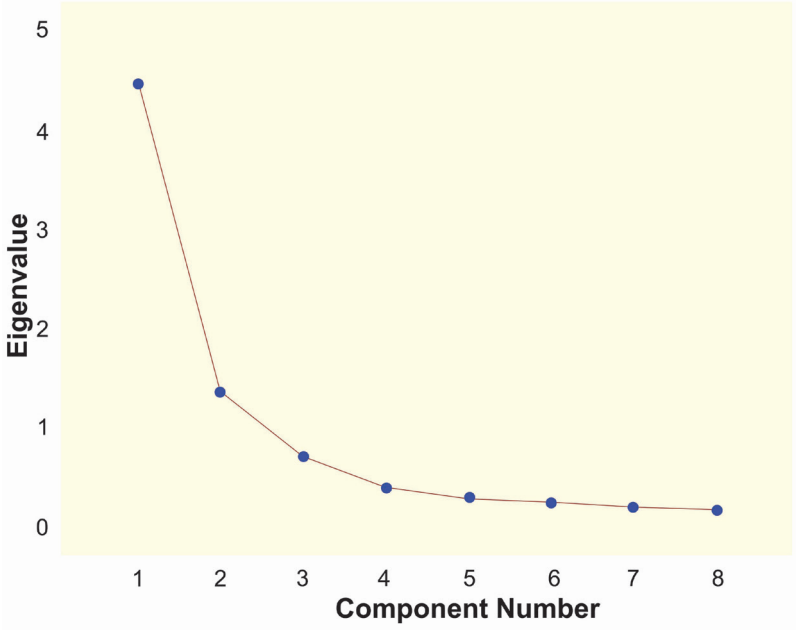

Figure 1: Scree plot for the exploratory factor analysis of the workplace social capital scale

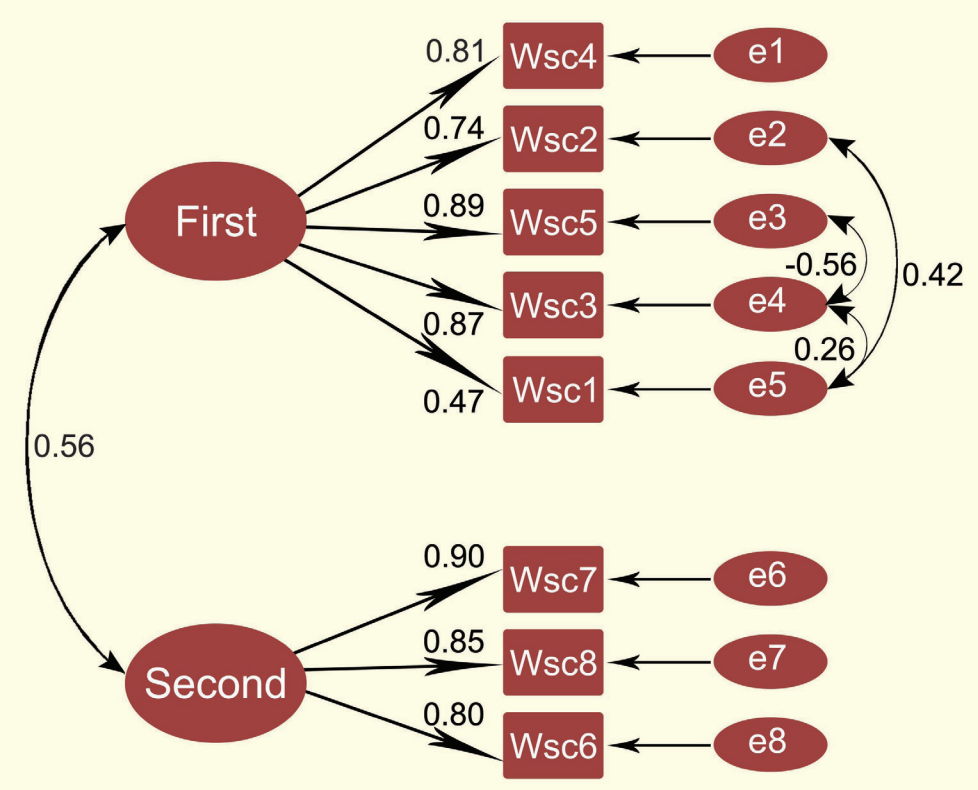

Figure 2: Confirmatory factor analysis of the Persian version of workplace social capital scale. $\chi^2(16, n=220)=44.018$, $p<0.001$; $\chi^2/df=2.751$, CMIN/df=2.751, GFI=0.953, CFI=0.973, IFI=0.974, NFI=0.953, PNFI=0.522, RAMSEA=0.090

For Persian version of the questionnaire see the online version of the article.

tions should be conducted on psychometric properties of the adapted measure.[41]

In the EFA of the Persian version of the scale, two factors were identified; the so-called "group cohesion" and "committed management." In the Kouvonen, *et al*, study, the questionnaire had also two dimensions of trust and participation.[6] Hair, *et al*, suggest that in studies on the psychological and human sciences when the value of variance explained is between 50% and 60%, the extraction of factors is appropriate. In this study, the value of variance explained was about 65%, indicating the suitability of the extracted factors.[42]

Nurses do a teamwork; most nurses are engaged in medical and clinical interventions. This requires participation, exchange of information, trust and support, which are the main dimensions of social capital.[43] As far as the first factor, "group coherence," is concerned, the highest factor loading was associated with the group collaboration and participation option.

The second factor was termed "committed management." Decision-making, resolving work conflicts and problems, division of labor, and performance evaluation of nurses are the tasks of nursing management.[44] In clinical systems, management refers to a set of activities that improve the safety and health care and anything associated with it. Therefore, nursing management often emphasizes the active leadership style, especially task-oriented leadership such as structure, coordination, identification of personnel roles, and monitoring of activities in order to improve the quality of care. [45]

In this study, the questions related to

Table 3: Construct validity and reliability results of the Persian version of workplace social capital scale

Index	α	Ω	θ	AVE	MSV	CR
Factor 1	0.80	0.79	0.89	0.75	0.58	0.76
Factor 2	0.90	0.90	0.90	0.85	0.58	0.81

the managers (6, 7 and 8) were assigned to one group and questions related to the colleagues were assigned to another group. It seems that the difference between the two studies was due to the management style in health systems in Iran, which is often task-oriented and the performance of individuals is less likely to be considered. Therefore, communication between managers and employees is weaker. It seems to be an organizational separation between managers and employees. However, successful value-based organizations are led by managers who value strong job performance and encourage employees to do their best. These managers have an important role in creating credibility and trust, positive relationships among employees and a positive working environment. They establish trust themes within the groups by improving collaboration expectation through partnership, coordination and respect, which will strengthen the social capital, productivity and financial capital of the organization.[45]

In this study, there was a correlation between measurement errors 2, 5 and 3, 4 and 4, 5 (Fig 2). A measurement error occurs when statements are not correctly identified or directly measured. It can also occur when two sentences or words are conceptually similar in positive and negative modes.[35] Regarding the opinions of the participants in the present study, the considered sentences indicated a meaning and concept, and therefore, the correlation between their measurement errors can be justified.

We could not compare our findings with the results of other similar studies, as there were no similar studies conducted in the same cultural context. Conduction of similar studies in other occupational groups is therefore warranted to confirm the stability of the tool. In addition, we only studied women and generalizing the results to men should be done with caution. However, this should not be considered a serious limitation as in health care systems most of the nursing staff are women.[46]

In conclusion, the results of the exploratory and confirmatory factor analysis of the workplace social capital questionnaire confirmed two distinct factors of group cohesion and trustworthy management. The structure of these two factors has an appropriate validity and reliability and the Persian version of the questionnaire can thus be used to assess the social capital of the workplace in Iran.

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Conflicts of Interest: None declared.

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