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Original Article

Reliability and validity of the Chinese version of the Work-Family-School Role Conflicts Scale among nurses

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ABSTRACT

Objective: To translate and validate the Chinese version of the Work-Family-School Role Conflicts Scale (WFSRCs-S) among nurses with multiple roles.**Methods:** A sample of 233 registered nurses pursuing an advanced degree was recruited from 8 university hospitals in 5 cities in China from March to July 2016. The original scale of WFSRCs-S was translated into Chinese and revised to reflect cultural meaning, using standard translation methodology, and its reliability and validity were assessed.**Results:** The content validity index of the 12-item WFSRCs-S-Chinese was 0.83, and the item level of content validity index ranged from 0.79 to 1.00. The exploratory factor analysis yielded a three-factor solution (work-school-to-family role conflict, family-school-to-work role conflict, and work-family-to-school role conflict) and explained 71.9% of the total variance for WFSRCs-S-Chinese. The Cronbach's α coefficients for the total scale and the three sub-scales were 0.87, 0.79, 0.78, and 0.87. The confirmatory factor analysis revealed that the measurement model was satisfied, and the test-retest reliability of WFSRCs-S-Chinese was 0.85. The WFSRCs-S-Chinese score was positively associated with burnout ($r = 0.36, P < 0.001$) and negatively related to role-related social support ($r = -0.18, P = 0.046$), thereby establishing concurrent validity.**Conclusion:** The reliability and construct validity of the WFSRCs-S-Chinese suggest that this scale could be useful to assess inter-role conflicts among nurses with multiple roles in China.© 2021 The authors. Published by Elsevier B.V. on behalf of the Chinese Nursing Association. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

What is known?

- Registered nurses with multiple roles may experience role conflicts.
- Active engagement with social support may play a useful function for workers attempting to cope with large inter-role conflicts and consequently prevent burnout.

What is new?

- This study translated the Work-Family-School Role Conflicts Scale (WFSRCs-S) into Chinese, and the Chinese-version scale was found reliable and valid.

- Given the adequacy of the psychometric properties and the brevity and ease of administering the scale, the WFSRCs-S-Chinese is a valuable tool for assessing work-family-school role conflicts among nurses pursuing advanced degrees in China.

1. Introduction

Work-family conflict is a form of inter-role conflict, defined as “the role pressures from the work and family domains are mutually incompatible in some aspects” [1]. According to the role strain theory [2], individuals with multiple roles can experience role conflicts because using more time and energy on a single specific role would lead to less time and energy is available for others. Learning new knowledge and pursuing education is essential for one's career development, and higher education level was associated with safety and lower mortality among patients in hospitals [3]. Recently, China experienced a shortage of clinical nurses,

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especially nurses with high education level. The Chinese National Plan for the Development of Nursing Career implemented a policy of improving the education of nurses, leading to an increase in the number of registered nurses (RNs) with secondary nursing degrees participating in Registered Nurses to Bachelor of Science in Nursing (RN-BSN) education and postgraduate degrees programs in mainland China [4]. Registered nurses pursuing advanced nursing education degrees assume a student role that is additional to their roles, facing inter-role conflicts in their work, family, and school. Work-family-school role conflicts were forms of inter-role conflict in which pressures from the work, family, and school domains are mutually incompatible [5].

Previous studies have shown work-family conflicts to have a significant positive correlation with poor health [6–9] and a significant negative correlation with social support [9,10]. Family-to-work conflict and work-to-family conflict were positively related to emotional exhaustion and depression [11]. Active engagement with role-related social support may play a useful function for workers attempting to cope with large inter-role conflicts and consequently prevent burnout [12]. Evaluation of work-family conflicts has been reported a lot in the past, and work-family-school role conflicts, which was defined as “the forms of inter-role conflicts in which pressures from the work, family, and school domains are mutually incompatible” was taken into study in recent years. A study among doctoral students reported that difficulties in balancing work-family-school responsibility were associated with mental health [13]. In a qualitative study of Ph.D. nursing students in the US, it was suggested that multiple time management could be used to balance work, family, and school responsibilities [14]. Xu reported that work-family-school role conflicts were critical influencing factors of psychological well-being among Korean RNs pursuing a further degree [15], and work-family school role conflicts exerted a significant effect on burnout among RNs with multiple roles [16]. RNs with a higher level of psychological distress and burnout were more likely to consider the living nursing profession to strengthen the shortage of nurses [17]. Work-family-school role conflicts were serious problems among RNs pursuing a further degree. To date, there was no previous study evaluating work-family-school role conflicts among nurses in China. An investigation of work-family-school role conflicts among Chinese nurses would be an essential step to implicate interventions to promote their mental health.

A literature review showed that the Work-Family-School Role Conflicts Scale (WFSRCs-S) developed by Xu & Song [5] was the only instrument to assess work-family-school role conflicts among nurses with multiple roles. The WFSRCs-S consisted of 3 subscales of work-school-to-family role conflict (work and study duties limiting performance in family responsibility), family-school-to-work role conflict (family responsibility and study duty making it difficult to perform work duty), and work-family-to-school role conflict (family and study duties making studying difficult). The WFSRCs-S exhibited satisfactory validity and reliability [5] and were found to predict work-related psychological well-being and general psychological well-being among 320 Korean nurses working in 13 hospitals [15]. The purpose of this study was to translate the WFSRCs-S into Chinese with consideration of cultural and linguistic differences and to verify the psychometric properties of the WFSRCs-S-Chinese among Chinese nurses with multiple roles.

2. Materials and methods

2.1. Study design

This study performed a cross-sectional survey to evaluate the psychometrics of the WFSRCs-S-Chinese.

2.2. Setting and sample

A convenience sample of 233 nurses working full time at hospitals and simultaneously participating in education programs for advanced degrees was recruited from 8 university hospitals in Beijing, Nanjing, Tianjin, Dalian, and Yanji from March to July 2016. The inclusion criteria were: 1) female Chinese registered nurses, 2) at least one year of clinical experience, 3) working full time at the hospital, and 4) currently pursuing an advanced degree in nursing. The required sample size is a minimum of 10 participants per scale item for exploring factor analysis (EFA) [18]. Kline [19] considered that more than 200 samples should be used in structural equation modeling. A total of 233 participants were recruited for this study, reasonable for assessing the 12-item WFSRCs-S-Chinese.

2.3. Ethical considerations

The data collection was initiated with approval from the Institutional Review Board of the university (NO. 20150124), with which the principal investigator was affiliated. The researchers contacted the managers or personnel from the research departments of the hospitals and universities to explain the study purpose and to obtain permission to distribute the questionnaire to potential participants. Considering the nature of a multisite study involving eight sites in five cities, the questionnaire's first page provided a detailed description of the study purpose to the potential participants, and informed consent was provided by the participants checking the box on the first page of the questionnaire.

2.4. Instruments

In the present study, the self-administered questionnaire was used to collect data. The demographic characteristic sheet, the WFSRCs-S-Chinese, and Maslach Burnout Inventory (BMI) and Role-related Social Support (RRSS) scale in Chinese were included in the questionnaire.

2.4.1. Work-Family-School Role Conflicts Scale

The 10-item WFSRCs-S-Korean [5] was originally developed with the concepts of three factors of role strain theory: work-school-to-family role conflict (4 items), family-school-to-work role conflict (4 items), and work-family-to-school role conflict (2 items), each sub-scale with two dimensions of conflict (time-based and strain-based). The response alternatives were given on a 5-Likert scale with 1 (strongly disagree) to 5 (strongly agree). The total scores of the scale and subscales were calculated using the average value (total values of all the items divided by the number of items) ranging from 1 to 5. The higher scores indicate a higher level of role conflicts. It has been validated that WFSRCs-S-Korean exhibits satisfactory reliability (Cronbach's α coefficient of 0.83) and construct and concurrent validity [5] in Korean nurses. According to a standard translation methodology, the WFSRCs-S-Korean was translated into Chinese for the present study and revised into a 12-item scale based on a content validity process reflecting cultural and linguistic differences. The revised 12-item WFSRCs-S-Chinese was used to measure work-family-school role conflicts among Chinese nurses.

2.4.2. Maslach Burnout Inventory

The study participants' burnout was measured by the Chinese version of the MBI as evidence of the concurrent validity of WFSRCs-S-Chinese. Chen and colleagues [7] found that burnout was significantly correlated with work-family role conflict. The MBI is a 22-item scale comprising three subscales that measure emotional exhaustion (EE), depersonalization (DE), and reduced

personal accomplishment (RPA) [20]. The response alternatives were given on a 5-Likert scale with 0 (never) to 6 (every day). The higher scores indicated a higher level of burnout. Cronbach's α coefficient for the Chinese version of MBI ranged from 0.80 to 0.93 [7,21] and was 0.81, 0.82, 0.72, and 0.77 total scales, and the EE, DE, and RPA subscales, respectively, in the present study. Permission to utilize MBI in the present study was purchased from the Mind Garden website.

2.4.3. Role-related Social Support Scale

The Chinese version of the RRSS scale [14] was used to measure perceived social support among the study participants with multiple roles as evidence of concurrent validity of WFSRCs-S-Chinese. Supportive work or family environments were found negatively related to work-family role conflict [12]. The RRSS scale consists of 3 subscales: social support from work (3 items), social support from family (3 items), and social support from school (3 items) in a 5-point Likert format (1 'strongly disagree' to 5 'strongly agree'). The higher scores indicate that they perceived more support. The internal consistency and validity of the RRSS scale have been described previously [5]. In the present study, the Cronbach's α coefficient was 0.72 for the full scale of RRSS. Confirmatory factor analysis (CFA) yielded the following parameters for the scale: comparative fit index (CFI) = 0.95, goodness-of-fit index (GFI) = 0.94, root-mean-squared error of approximation (RMSEA) = 0.022, 90% CI of RMSEA = 0.010–0.070, standardized root-mean-squared residual (SRMR) = 0.046, and χ^2 value/degrees of freedom (χ^2/df) = 1.31 (P = 0.089).

2.5. Data collection

The study collected the data using a self-managed paper questionnaire. Before sending the questionnaires to the RNs, a contact person in each hospital was designated to distribute and collect the questionnaires from March to July 2016. Finally, the response rate was 83.2% (233 of 280 eligible RNs).

2.6. Data analysis

Statistical analysis was conducted using SPSSWIN V. 20 and AMOS V. 20, with descriptive statistics for demographic characteristics.

2.6.1. Translation process and content validity

The WFSRCs-S-Korean was translated into Chinese by two bilingual Korean-Chinese nursing researchers while considering the different cultural backgrounds. An expert panel of two nursing professors, two nursing researchers, and two nurses involved in comparing two translated versions with the Korean version for content equivalence. During the process of revising the original WFSRCs-S-Korean, two additional items ('missing studying due to home responsibility' and 'stressed from work responsibility, difficulty in studying') were included based on the Chinese cultural background and the conceptualization of inter-role conflict [22], and the consensus was reached among the expert panel. The Chinese version of the 12-item revised scale was then sent to the other nursing researchers for back-translation and confirmed whether the additional items fit the scale theoretically and/or culturally. The expert panel confirmed the back-translated version, comparing with the original Korean version. The content validity index (CVI) was assessed with the criteria of 0.80 or more as good content validity. Finally, a pilot test was done with 30 nurses exhibiting potential inter-role conflicts to confirm language and content validity.

2.6.2. Construct validity

For testing the construct validity, the data were randomly divided into two parts for a two-step factor analysis. First, a total of 120 samples out of the 233 subjects were selected to conduct the exploratory factor analysis (EFA) to decide the items and the dimensions of factor loading. The Kaiser-Meyer-Olkin test (for index >0.70) and Bartlett's test of sphericity (for significance) were performed [18] before EFA. EFA with an orthogonal varimax rotation in the principal-components analysis was done to determine the scale's underlying dimensions.

The factor loading criterion for items was ≥ 0.50 . As a second step, CFA was used to confirm the EFA results and determine the two instruments' model fit. For cross-validation, a total sample of 233 subjects were used to conduct CFA [23]. The goodness of fit was evaluated using the χ^2/df , GFI, adjusted GFI (AGFI), CFI, SRMR, RMSEA, and 90% confidence interval of RMSEA. An acceptable fit was considered to be present for $\chi^2/df < 3$, GFI, AGFI, and CFI values > 0.90, SRMR and RMSEA values < 0.10, and a 90% confidence interval of RMSEA [24].

2.6.3. Concurrent validity

Pearson's correlation was utilized for the concurrent validity to check the associations of the WFSRCs-S-Chinese scores with role-related social support (RRSS scale score) and burnout (MBI score).

2.6.4. Internal consistency

Cronbach's α coefficient was estimated to test the internal consistencies of the total scale and each subscale of the WFSRCs-S-Chinese.

2.6.5. Test-retest reliability

Test-retest reliability was assessed using intra-class coefficient (ICC), a correlation between two repeated tests with an interval of 7 days among 68 nurses in a single university. The ICC ≥ 0.70 was considered as satisfactory [25].

3. Results

3.1. Characteristics of the participants

The participants were aged 30.25 ± 5.98 years, with an age range of 22–49 years. The participants' clinical experience was 11.00 ± 6.72 years on average, 75.5% were staff nurses, and 70.0% of them were rotating night shifts. About 40.8% of them were married, 32.7% had children, and approximately 70.8% were currently enrolled in an RN-BSN program and 29.2% in a graduate program, which involved attending 9.60 ± 4.61 h of classes per week.

3.2. Psychometric testing of the WFSRCs-S-Chinese

3.2.1. Content validity

The item-level CVI on the WFSRCs-S-Chinese ranged from 0.79 to 1.00, and the scale-level CVI on WFSRCs-S-Chinese was 0.83.

3.2.2. Exploratory factor analysis

The Kaiser-Meyer-Olkin (KMO) index was 0.83 with Bartlett's test of sphericity was significant ($P < 0.001$), and so it was deemed that principal-components analysis could be applied to the data [18]. EFA revealed three factors with eigenvalues >1 that explained 71.9% of the total variance in WFSRCs-S-Chinese (Table 1). Item 11 "I have to miss studying due to the amount of time I must spend on work responsibilities" and Item 12 "Because I am often stressed from family responsibilities, I have a hard time concentrating on the study" which were not included in the original scale, loaded on factor 3 (work-family-to-school role conflict).

3.2.3. Confirmatory factor analysis

Based on the results of EFA on 12-item WFSRCs-S-Chinese, CFA was performed to provide an appropriate model fit ($\chi^2/df = 2.05$, CFI = 0.93, AGFI = 0.89, SRMR = 0.072, RMSEA = 0.078 [0.071–0.084]), while 2 correlations among error covariance (items 1 and 2, and items 5 and 8) were included (Fig. 1). The correlations between the factors ranged from 0.42 to 0.78. All of the observed variables significantly loaded on the four latent variables, with values ranging from 0.54 to 0.88 ($P < 0.05$).

3.2.4. Internal consistency

Cronbach's α coefficient of WFSRCs-S-Chinese was 0.87. The internal consistency estimates for the three subscales of role conflicts ranged from 0.78 to 0.87, indicating acceptable reliability for WFSRCs-S-Chinese.

3.2.5. Test-retest reliability

The ICCs for the total scale and three subscales of the WFSRCs-S-Chinese were 0.85, 0.89, 0.82, and 0.90 between the initial test and the retest ($P < 0.001$ for all) (Table 1).

3.2.6. Concurrent validity

The Pearson correlation analysis indicated that the WFSRCs-S-Chinese score was positively correlated with the MBI score ($r = 0.36$, $P < 0.001$) and negatively correlated with the RRSS scale score ($r = -0.18$, $P = 0.046$), confirming the concurrent validity (Table 2).

4. Discussion

We have demonstrated that the revised WFSRCs-S-Chinese is a valid and reliable measure to assess work-family-school role conflicts in Chinese nurses with multiple roles. The reliability of the scale was satisfactory, as indicated by tests of internal consistency and test-retest reliability. Its validity was also satisfactory by examining the content validity, construct validity, and concurrent validity.

During the revision process of the WFSRCs-S-Chinese, two additional items were developed based on Chinese culture considerations and the conceptualization of inter-role conflicts [22]. Compared with the original scale, the Cronbach's α coefficient of the 12-item WFSRCs-S-Chinese were improved from 0.84 to 0.87 for the total scale and 0.83 to 0.90 for work-family-to-school

conflict, making the instrument more internal consistent [5]. Our theory-based translation procedures of the WFSRCs-S ensure equivalence and that strain- and time-based conflicts were included in WFSRCs-S-Chinese. Test-retest reliability, which was used to test the measurement error, indicates the variation in testing a person under the same situation within a short period. According to Cicchetti [26], the ICC for the subscales of the WFSRCs-S-Chinese version ranged from 0.82 to 0.90, which was higher than 0.60, indicating excellent reliability with small measurement error.

The construct validity of the WFSRCs-S-Chinese was examined by exploratory and confirmatory factor analysis. The EFA results indicated acceptable construct validity. The WFSRCs-S-Chinese consists of 12 items that assess three factors of role conflicts: work-school-to-family, family-school-to-work, and work-family-to-school. The WFSRCs-S-Chinese version revised in this study was easier to administer to the target population. Consisting of 12 items, the results of confirmatory factor analysis indicated that the WFSRCs-S-Chinese version shared the same 3-factor structural model with the original scale, and the model fit with goodness-of-fit indices provided an acceptable model fit to the data. The Chi-square divided by the degrees of freedom was 2.05 smaller than 3, indicating within the recommended value [24]. Moreover, the CFI values > 0.90 and RMSEA of 0.078 ranging from 0.05 to 0.10 suggested an acceptable model fit to the data [24]. Thus, the present study results supported the construct validity of the original WFSRCs-S from a theoretical perspective. A recent study found that a six-item work-family role conflict scale exhibited construct validity [27], and our results suggest that the WFSRCs-S has the potential to be shorter. In a previous study [28], it was indicated that the CFA could confirm the findings of EFA for the dimensions of the WFSRCs-S-Chinese.

Inter-role conflicts have a significant positive impact on burnout [10,12], while social support negatively impacts burnout among nurses [29–31]. Consistent with previous studies, the nurses in the present study pursuing advanced degrees reported higher levels of work-family-school role conflicts, higher scores of burnout, but lower levels of role-related social support, demonstrating the concurrent validity of the WFSRCs-S-Chinese. However, the correlation between work-family-school role conflicts and social support was significant but small ($r = -0.18$, $P = 0.046$), partially due to the small correlation with the subscale of support from school ($r = -0.12$). Further study is warranted to examine if items of the RRSS scale Chinese version, especially for the subscale of support

Table 1
Results of exploratory factor analysis and Cronbach's α coefficient of the Chinese version of the Work-Family-School Role Conflicts Scale ($n = 120$).

Items	WS-F	FS-W	WF-S
1. Miss family activities due to the amount of time working	0.71	0.10	0.23
2. Emotionally drained from work that prevents me from contributing to my family life	0.83	.006	0.11
3. Miss family activities due to the amount of time spent studying	0.83	0.21	0.02
4. Emotionally drained from school that prevents me from contributing to my family life	0.65	0.28	0.25
5. Miss work activities due to the amount of time spent on home responsibilities	0.29	0.69	0.04
6. Stress from family responsibilities makes it difficult to do my job at work	0.19	0.79	0.07
7. Miss work activities due to school-related work	0.05	0.80	0.19
8. Stress from school-related work makes it difficult to do my job at work	0.29	0.61	0.16
9. Miss studying due to the amount of time spent on home responsibilities	0.03	0.35	0.75
10. Stress from family responsibilities makes it difficult to study	0.12	0.29	0.69
11. Miss studying due to the amount of time spent working	0.19	0.11	0.86
12. Stress from work responsibilities makes it difficult to study	0.24	0.07	0.85
Eigenvalue	3.33	2.83	2.48
Variance	27.72	23.55	20.68
Cumulative variance	27.72	51.27	71.95
Cronbach's α coefficient	0.79	0.78	0.87
ICC	0.89	0.82	0.90

Note: WS-F = work-school-to-family role conflict. FS-W = family-school-to-work role conflict. WF-S = work-family-to-school role conflict. ICC = intraclass correlation coefficient.

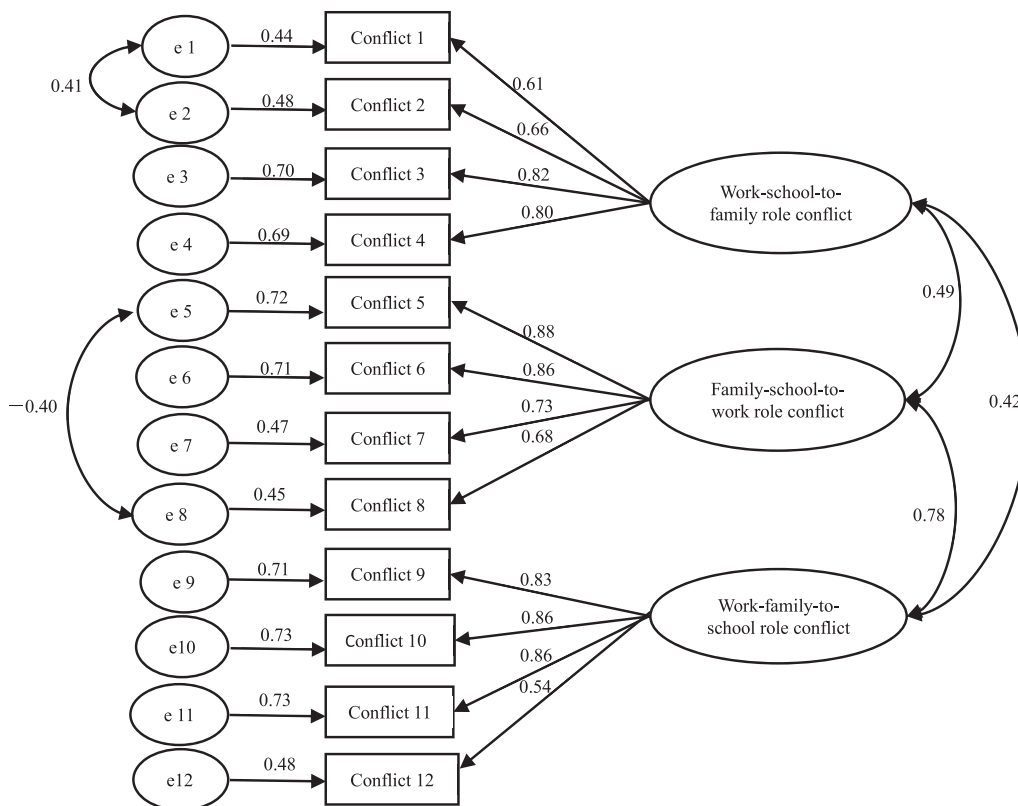


Fig. 1. Flow chart presenting the underlying construct of the Work-Family-School Role Conflicts Scale-Chinese version.

Table 2
 Concurrent validity of the Chinese version of Work-Family-School Role Conflicts Scale with social support and burnout (N = 233).

Dimension	WFSRCs-S	WS-F	FS-W	WF-S
Total burnout	0.36**	0.33**	0.30**	0.39**
EE	0.48**	0.46**	0.35**	0.43**
DE	0.21*	0.25**	0.21*	0.26**
RPA	0.19*	0.16*	0.24*	0.27**
Total social support	-0.18*	-0.16*	-0.16*	-0.15
SS from work	-0.19*	-0.23*	-0.13	-0.17*
SS from family	-0.16*	-0.14*	-0.21*	-0.15*
SS from school	-0.12	-0.15*	-0.14*	-0.10

Note: *P < 0.05; **P < 0.01. WFSRCs-S = Work-Family-School Role Conflicts Scale. WS-F = work-school-to-family role conflict. FS-W = family-school-to-work role conflict. WF-S = work-family-to-school role conflict. EE = emotional exhaustion. DE = depersonalization. RPA = reduced personal accomplishment. SS = social support.

from the school, would reflect the Chinese culture. The study's findings indicated that social support from family was significantly related to all subscales of work-family-school role conflicts. Family support could be important resources to balance their inter-role conflicts from work, family, and school among nurses with multiple roles.

The results have implications for nursing practice. The Chinese version of WFSRCs-S may be useful in measuring work-family-school role conflicts in RNs with multiple roles. The present study indicated that work-family-school role conflicts have a significant relationship with social support and burnout RNs with multiple roles. Nursing managers need to pay more attention to RNs pursuing advanced degrees by helping them cope with their multiple roles and consequently reducing burnout. The WFSRCs-S-Chinese version could assess the status of work-family-school role conflicts

to help the RNs pursuing advanced nursing degrees improve the incompatible situation facing multiple roles. In China, it was believed that women should dedicate their efforts and time to family duties, regardless of their professional works. However, other family members can take more responsibilities for house duty so that the nurses with multiple roles could handle the work-family-school role conflicts more effectively and reduce burnout from doing their professional work. Using the scale of WFSRCs-S-Chinese could help nursing managers and hospital administrators assess the status of role conflicts among RNs with multiple roles.

5. Limitations

The present study was subject to several limitations. First, due to the data collection being performed simultaneously at multiple sites, the test-retest reliability was assessed only in a single university hospital with 68 participants. Second, the participants comprised a convenience sample of nurses pursuing advanced degrees. While they were recruited from six universities and two hospitals in different cities in China to improve their representativeness, selection bias's potential due to our use of convenience sampling should be considered when interpreting the present findings. Third, the sample size was small, with only 120 samples being used to conduct EFA, and the total participants of 233 used for CFA to test the construct validity. Further investigation in a larger population would be needed to examine the scale's psychometrics in nurses with different cultural backgrounds.

6. Conclusion

The reliability and validity of the 12-item WFSRCs-S-Chinese have been established. Given the adequacy of the psychometric

properties and the brevity and ease of administering the scale, the WFSRCs-S-Chinese is a valuable and promising tool for assessing work-family-school role conflicts in nurses pursuing advanced degrees in China. The presence of correlations of role conflicts among nurses with role-related social support and burnout warrant further studies to explore the potential role of social support in reducing burnout and promoting work performance in this population. Nursing managers need to pay more attention to nurses pursuing advanced degrees by providing a supportive environment to help them cope with multiple roles and reduce burnout.

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CRediT authorship contribution statement

Rhayun Song: Conceptualization, Formal analysis, Methodology, Funding acquisition, Writing-original draft, Editing, Revising. **Caifu Li:** Formal analysis, Resources, Supervision, Editing, Revising. **Lei Wang:** Investigation, Software, Editing, Revising. **Xianwen Li:** Investigation, Editing, Revising. **Zanhua Zhou:** Data collection, Funding acquisition, Revising. **Lijuan Xu:** Data curation, Methodology, Project administration, Funding acquisition, Writing-original draft, Editing, Revising.

Declaration of competing interest

No conflict of interest has been declared by the authors.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ijnss.2021.02.001>.

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