Perceived Family Function and Associated Predictors in Nurses: a Cross-sectional Study

Wen Zeng
Guizhou Provincial People's Hospital

Qian Fang
Guizhou Provincial People's Hospital

Shan He
Guizhou Provincial People's Hospital

Qiping An
Guizhou Provincial People's Hospital

Juan Li（✉ juanli0920@126.com）
Guizhou Provincial People's Hospital

Yuanrong Yao
Guizhou Provincial People's Hospital

Abstract

Background: Evidence of family function in clinical nurses remains limited even though nurses play a core role in health care system. The current study was to evaluate the family function of the Chinese clinical nurses, and to explore associated predicting factors.

Methods: A multi-center cross-sectional anonymous online survey was carried out. Chinese Family Function Scale were used in the study. Participants were asked to finish the questionnaire as well as demographic information. Spearman's rank correlation analysis, Mann-Whitney U test or Kruskal-Wallis H test was performed in the univariate analysis. Pairwise comparison method was used to determine whether the difference was significant between pair groups. Categorical regression (optimal scaling regression) was the main method to analysis factors which had been confirmed to be statistically significant in the univariate analysis.

Results: 19422 nurses completed the online questionnaires. The median of the nurse's perceived family function score was 3 (Inter-quartile Range: IQR 2-5). The univariate analysis suggested age (P=0.004), highest education level (P<0.001), hospital level (P<0.001), working years (P=0.031), rotation shift status (P<0.001), working department (P<0.001), marital status (P<0.001), number of children (P<0.001), and monthly income per family member (P<0.001) were related to the nurses' perceived family function. However, the multivariate analysis showed that highest education level (P<0.001), hospital level (P<0.001), rotation shift status (P<0.001), working department (P<0.001), number of children (P<0.001), monthly income per family member (P<0.001) were significantly associated with family function. Moreover, the importance of the factors was number of children (49.1%), monthly income per family member (20.7%), rotation shift status (12.4%), highest education level (8.0%), hospital level (7.6%) and working department (2.4%) in turn.

Conclusions: Most of the nurses participated in the study demonstrated appropriate family function. Highest education level, hospital level, rotation shift status, working department, number of children and monthly income per family member were significant associated with nurses' perceived family function. The importance of those predictors was, in turn, number of children, monthly income per family member, rotation shift status, highest education level, hospital level, and working department.

1. Background

Family, as the basic social characteristics, provides material and spiritual support for family members. Therefore, family plays a core role for individual physical and mental health. Family function (FF) , which was proposed by researchers in 1970s[1], was originally studied in children. As the research goes on, different theories about FF have been developed. The definition differs depending on various theories. According to previous studies, FF was defined as "the ability of families to coordinate and adapt the changes throughout life, resolve the conflict, cooperate between members and success in disciplinary patterns, respect the boundaries between individuals and respect the rules and principles which help the

family to protect the entire family system"[2]. From this perspective, FF is a concept with multiple dimensions encompassing family roles, duties as well as functions[3]. Particularly, FF involves the whole process of communicating, solving problems, labor dividing, managing conflict and attaching emotions between family members[4].

In recent years, FF has received an increased attention in both psychological and medical research area. A growing number of studies have focused on FF in different subjects, for instance, male cancer patients[5], groups with or without diabetic women[3], patients with traumatic brain injury[6], children with asthma[7], adolescents[8], children with chronic conditions[9], first-episode psychosis[10], pediatric obsessive compulsive and related disorders[11], school-aged children with Sickle Cell Disease[12], adolescents left behind by migrating parents[13], patients with stroke[14-16], elderly patients with hypertension[17], or patients with blood diseases[18]. Based on demonstrable evidence of FF, quit a lot of those studies indicate that FF was largely associated with individuals' health conditions. For example, a meta-analysis carried out by Leeman et al[9] demonstrated that good FF was deemed relevant with positive outcomes such as better quality of life, competence, adherence, physical health. Another study revealed that adolescents with higher level of FF got higher scores in perceived subjective well-being[8]. In the study of Bennich et al[19], there was a correlation between healthy FF and less burden of diabetes and better quality of life. Conversely, family dysfunction or adverse FF was linked with some psychological disorders or unfavorable health outcomes. For instance, Murphy and Flessner[11] conducted a literature review on FF in pediatric obsessive compulsive and related disorders and found that poor FF might be a potential or maintaining factor in such a group. Some scholars applied structural equation modeling to demonstrate that mental disability was directly affected by FF in patients with schizophrenia[20].

In health care system, nurses play a core role and encompass the main workforce in any health care organization. According to the statistics of World Health Organization (WHO), there are 43.5 million heath workers worldwide, while nurses are more than 20 million[21]. Notably, more than 4 million registered nurses are in China[22]. In other words, Chinese nurses count for nearly one fifth of global nurses. Nurses delivery diverse healthcare services in different settings as health care providers, protectors, communicators, coordinators, decision-makers and teachers[23]. In fact, nurses are usually the first responders to different health-related conditions to promote health and rehabilitation and prevent disease[23].

Nurses, as a special professional group, play a vital role in health care system. However, the job of nurse is perceived as one challenging and stressful profession with high and complicated physical and psychological demands[24]. In fact, nurses experience high level of stress due to various dimensions of stressors such as death and dying stressor, discrimination, excessive workload especially frequent rotation shift working, conflict with physician, patient and workmates, which might significantly impact the quality of life of nurses, even worse, that might lead to negative quality of care[24]. Family is one of the most important social support resources for nurses to cope with such stressors. Therefore, the level of FF is of great concern. Appropriate FF plays a vital role in ensuring and promoting nurses to deal with

occupational stress, which may promote the job efficiency and the quality of care. On the contrary, dysfunction of family may increase the stress for nurses so that nurses could hardly deal with conflict from family and work.

Despite there has been major advances in studies on FF, to the best of our knowledge, research on FF as well as its predictors in nurses has been quite limited to date. Only a few studies evaluating nurses' FF were based on surveys with small sample sizes or in specific settings. In the study of Sun et al[25], researchers investigated 124 ICU nurses working at a military hospital in Beijing, China, and they found that 56.45% of the investigated nurses were in family with good function. However, nearly 40% nurses lived in a family with moderate dysfunction, even 4% with severe dysfunction. Similarly, Deng et al[26] assessed 184 registered nurses who worked at a surgical department. According to their survey, 67.4% of the participants had healthy FF, while 25.5% had mild family dysfunction and even 7.1% had severe family dysfunction. Besides, evidence about factors associated with nurses' FF is quite rare. To our best knowledge, only one recent study [27] tested factors that might be related to FF, and the result indicated that there was a significant relationship between education background, work unit, family income with FF among pregnancy nurses with second-children. However, it is difficult to generalize the conclusion to nurses' FF because of limited reports with small sample size or one single center study. In response to those limitations of previous empirical studies, there is a growing need to conduct a study with a large sample size to get better understanding the perceived FF in nurses, particularly in China, and to identify relative predictors.

The main purpose of the current study was to gain an insight into the FF among Chinese nurses. The following research questions would be answered: (1) What level of FF was among nurses in China? (2) Which of the observed factors was related with nurses' FF?

2. Methods

2.1 Design, setting and participants

A multi-center cross-sectional survey was carried out from January 8th 2020 to January 30th 2020 in 42 hospitals from 26 cities, 16 provinces in China. The hospitals involved were located in the west, southwest, south, central, east, north of China. In addition, these hospitals, which were representative of different levels of healthcare services, were including primary, secondary and tertiary institutions. Registered nurses who were working as staff nurses in the selected hospital were included. Nursing students and retired nurses were excluded.

The investigation was completed online. Firstly, researchers imported the informed consent agreement and two questionnaires, namely Chinese Family Function Scale (CFFS)[28] and Health-Promoting Life Styles (HPLS)[29], on an online survey plat, Chinese Questionnaire Star(https://www.wjx.cn/), then freely created a QR code. Researchers released the QR code through a social media application Wechat.

Participants could scan the QR to read and submit the informed consent agreement and questionnaires. Each participant was only allowed to submit once in order to avoid double submission.

2.2 Variables and measurements

Independent variables in the study were some sociodemographic characteristics including gender, age, basic education background, highest education background, hospital level, working years, rotation shift status, working department, marital status, number of children, living with parents, monthly income per family member.

In terms of the primary outcome, CFFS was used since our main purpose was to assess FF in the current study. CFFS was developed by Zhang and Yuan[28]. The scale was composed of 18 items. Participants could choose "yes" or "no" to answer each item. In items of 1, 2, 3, 4, 6, 12, 13, 14 and 18, "yes" =1, "no" =0. However, in the other items, "yes" =0, "no" =1. Thus, the total score of the 18 items ranged from 0 to 18. The higher scores, the severer family dysfunction. The Cronbach's$\alpha$was 0.873.

2.3 Data collection

Two researchers who didn't know the study design collected the data. Before the data collection, those two researchers received training courses about how to collect the data, check the data, input and code the data into IBM SPSS 25.0. After the training courses, they took part in an exam related to the data collection. Only if they passed through the exam could they involved in collecting data.

2.4 Data analysis

All data was imported into IBM SPSS 25.0. In terms of continuous data, test for normality and homogeneity of variances must be performed first. Mean ± standard deviation (M±SD) was used to describe if the continuous data were normally distributed, However, median and IQR was used to describe the non-normally distributed continuous variables. Categorical variables were presented as frequency (N) and percentages. In order to test the potential factors associated with FF, univariate analysis was conducted first. At this stage, we used Spearman's rank correlation analysis to test the correlation between two continuous variables, and Mann-Whitney U test or Kruskal-Wallis H test was performed to assess the difference of FF scores in different demographic pairs. If the results showed statistical significance of FF score in demographic pairs, pairwise comparison method was used to determine whether they were significantly different from each other. After that, categorical regression (optimal scaling regression) was the main method to analysis factors which had been confirmed to be statistically significant in the univariate analysis. In the current study, p value was two-tailed and we inferred statistical significance if $\alpha$was less than 0.05.

3. Results

3.1 demographic characteristics of the participants

19522 nurses completed the questionnaires. However, 100 questionnaire answers were removed from analysis because of following reasons: (1) Responders' age was logically incorrect; (2) Participants' working years were more than their age. Therefore, effective respond rate was 99.49%.

As shown in Table 1, female nurses dominated the main responders (95.66%). Participants' age ranged from 18 to 62 years old and the median age was 29-year old (IQR:26-33). Most (55.11%) of the included nurses originally graduated from higher vocational school (HVS), while only 4531 nurses (23.33%) originally graduated from college or university and got bachelor degree. However, 54.91% of the included nurses finally got bachelor degree after receiving continuous education. 10487 nurses were working at a secondary level of hospital and 8619 nurses were at tertiary hospital. In the current study, working years of nurses ranged from 1 to 41 years and the median of working years was 6. Nurses who worked rotation shift were more than 55%. Besides, nurses on the schedule of rotation shift working were younger, less working age, mainly never married, less educated than those without rotation shift. And more than 70% of the respondents worked at the Inpatient general department. 68.02% of the nurses were married and 28.71% were never married. Only 36.75% of the nurses reported without any child. Nearly 80% of the respondents reported monthly income per family member more than 2000 RMB (≥2000).

Nurses' perceived FF scores ranged from 0 to 18, and the median was 3 (IQR 2-5). As explained before, the less score of FF scale, the higher level of FF. In the current study, 1145 nurses got 0 score. More than 55% (10848) of nurses got less 4 score, and about 96.69% nurses got FF scores less than 11, while 838 (3.31%) nurses got that score greater than or equal to 11. Whereas only 12 nurses (0.06%) reported with 18 score.

3.2 Univariate analysis

The outcome of univariate analysis of FF score and pairwise comparison in different demographic pairs was namely presented in Table 1 and Table 2. Results in the Table 1 showed that age (R=0.021, P=0.004) and working years (R=0.016, P=0.031) might be related to FF scores. The results in the Table 1 didn't show significance of the distribution of FF score in nurses with different gender (P=0.624), basic education background (P=0.673) and in nurses whether they lived with their parents (P=0.990). However, data analysis highlighted that highest education level, hospital level, rotation shift working, working department, marital status, number of children, monthly income per family member might be factors associating with difference of FF score distribution in nurses (P≤0.05) (Seen in Table 1).

Table 2 revealed the outcome of pairwise comparison if there was significance in the distribution of FF score among 3 groups of the demographic variables. There was difference in the FF score in nurses with diploma of HVS and with bachelor degree, and the difference was statistically significant (Adjusted P≤ 0.001). However, we did not detect any significance of the FF score in nurses when conducting pairwise comparison between other two different highest education levels (Table 2). In addition, the level of FF score was significantly different between nurses working in tertiary and secondary level of hospital (Adjusted P≤0.001), tertiary and primary/community hospital (Adjusted P=0.010). In terms of rotation shift working, we found that the mean rank of FF score in nurses working rotation shift was 9987.72,

while it was 9362.17 in nurses who were not working rotation shift, and the difference was statistically significant (*P*⫸0.001). In addition, the FF score in nurses working rotation shift was higher than those not working rotation shift. Results in Table 2 indicated that there was significance in the level of FF score in nurses who worked at outpatient vs inpatient general ward (*P*=0.036), outpatient vs ICU (*P*⫸0.001), inpatient general ward vs ICU (*P*⫸0.001). Compared with nurses with children, nurses without children had less FF score, and the difference of that was also detected in pairwise comparison (Table 2). In the current study, we also found that FF score varied in nurses with different monthly income per family member, the higher monthly income per family member, the less FF score, especially when nurses' family got monthly income per family member more than ⫸3000, and the difference was significant (Table 2).

3.3 Multivariate analysis

We included all the independent variables, which were significant in univariate analysis, into the multivariate analysis. The result of multivariate analysis, presented in Table 3, showed that highest education level, hospital level, rotation shift working, working department, number of children nurses had and monthly income per family member were included into a regression model, and the model was significant (*P*⫸0.001). However, the regression model did not include age (P=0.050), working years (*P*=0.898) and marital status (*P*=0.051) although they were significantly associated with FF score when conducting univariate analysis. The outcome of importance was summarized in Table 4. Notably, the result pointed to the importance of highest education level, hospital level, rotation shift working, working department, number of children and monthly income per family member in predicting nurses' perceived FF score in such a regression model. In particular, number of children was the dominant factor in predicting FF score (49.1%). Monthly income per family member was another important factor to predict FF score (20.7%). The importance of other independent variables in predicting FF score, in turn, was rotation shift working status (12.4%), highest education level (8%), hospital level (7.6%) and working department (2.4%).

4. Discussions

The current study provided empirical evidence for FF in registered nurses. Our study examined the FF of nurses and identified some relative factors which might predict nurses' perceived FF score. We recruited 19522 registered nurses in this descriptive cross-sectional study. 19422 nurses finally completed the online questionnaires. The results showed most of the nurses participated in the study demonstrated appropriate FF. The result was in accordance with the study conducted by Guo[30].

The present study explored factors that might be predictors of nurses' perceived FF. The final results showed that highest education level, hospital level, rotation shift status, working department, number of children and monthly income per family member were associated with FF scores.

Interestingly, our study highlights the importance of number of children. The result indicated that number of children was the most important factor with the importance ratio of 49.1% in predicting nurses' FF. Compared to nurses without any children, FF score was higher in nurses having children, which indicated

less level of FF. In addition, our study showed that the more children nurse had, the less level of FF. On one hand, Chinese nurses experience higher level of over workload than nurses in developed countries. According to WHO's World Health Statistics 2020[31], density of nursing and midwifery personnel (per 10,000) was 26.6 in China, while that was 81.7 in United Kingdom, 99.4 in Canada, 145.5 in United States of America. On the other hand, nurses, especially female nurses, are still the main forces of taking responsibilities for caring and educating children in their family in China[32]. Reasons above make it sense that higher level of work-family conflict was reported in subjects who had dependent care responsibilities for child/children because of inflexible commitments at home or less level of control over work when arranging childcare and caring for sick child/children[33]. Compared to nurses having one child, nurses having more than one child would face with higher level of challenge for balancing work and family demands. As a result, they might involve in lower level of satisfaction of work-family responsibilities and less level of FF[34].

One of our key findings was that a significant relationship between monthly income and nurses' perceived FF. There are some ongoing debates on the relationship between monthly income and FF. Some scholars believed that monthly income was one of the influence factors of FF[1, 35]. One possible reason might be that work interference with family occurs less in families with greater monthly income[34]. However, some authors argued that monthly income was not associated with work-family conflict[36]. Our study offered an insight into the relationship between monthly income and FF in nurses. In the current study, we analyzed that whether monthly family income, especially monthly income per family member, would be a predictor of nurses' perceived FF. Similarly, our results showed that monthly income per family member, with the importance ration of 20.7%, was the one of the most important factors predicting nurses' FF. The result is consistent with Dai and Wang's study[1, 35]. Additionally, the results also indicated that nurses with higher level of monthly income per family member showed higher level of perceived FF.

In the present study, 55.84% participants were working rotation shift. According to the results of our study, shift working was found as an important factor associating with nurses' perceived FF score. Compared to dayshift nurses, rotation shift or evening shift nurses got higher FF score in the study, which implied less level of FF. Our finding corroborate with the result of Tai et al[37]. They did a survey in 1438 registered nurses and found that the FF was poor in nurses who were on rotation shift than those on dayshift (OR=1.38, 95%CI: 1.01-1.88). Several studies have been done to explore whether there is relationship between shift working and work-family conflict in nurses[34, 38-40]. There is an ongoing debate in the shift working and the work-family conflict. Some authors[40] highlighted that, for night shift nurses, the effect of night shift on the conflict between work and childcare was not significant. Some other authors argued that irregular work schedule was one of the main contributes to work-family conflict. To our knowledge, nurses provide health services for clients and such a job is perceived as a high demand job. In other words, nursing is a job with overtime, intensity, irregular work schedule, inflexible work[39]. In particular, nurses have to work shift in order to ensure continuous health care for patients[41]. Additionally, nurses usually experience irregular sleeping time. Besides, nurses rarely take normal break on holidays. Thus, nurses spend less time being together with family or communicating with their

relatives, which may increase the risk of disruption for social and family interactive life[37], which may lead to a less level of FF.

The association between education level and FF is also demonstrated in this study. Interestingly, we did not find any relationship between basic education level and FF. Whereas, there was significant relationship between highest education level. Comparatively, nurses with Master degree or PHD got higher FF score. In other words, nurses with higher education background might experience poor FF. In China, nurses' basic education was classified into three levels: secondary vocational school, higher vocational school and bachelor degree. Nurses could gain higher education level through continue education. With greater nursing education level, nurses might face with more frequent family interference with work[34]. Yu revealed that, in clinical settings, nurses with higher education level worked with many different roles. They had to complete the clinical work as a caregiver, communicator, educator et al. they may also be under high pressure with scientific research. Hence, they could not make good balance between work and family, on one hand, resulting in poor feeling in their family roles [27]. On the other hand, that made it difficult to satisfy family-related responsibilities[34].

Based on the results of the study, hospital level might also play an important role in influencing nurses' FF. In China, China's Ministry of Health classified hospital level into Primary (level 1), Secondary (level 2) and Tertiary (level 3) hospital based on the beds number of a hospital[42]. Yu's study also addressed the relationship between hospital level and FF. They found that nurses working in the Tertiary hospital faced with higher level of family-work conflict because of higher job related pressure, leading to inappropriate FF[27]. However, our study indicated that the FF of nurses working in higher level of hospital was better. We supposed that, in China, the average income of nurses working in higher level of hospital was much better than whom working in less level of hospital. As above data showed that there was significant association between monthly income and FF. Hence, the FF of nurses working in the Tertiary hospital was better than others in Secondary and Primary hospital in our study.

The relationship between working department and FF was also tested in this study. The result verified the significant association of these two variables. Specifically, it is notable that nurses working in the ICU got the highest FF score, followed by those working in Emergency, inpatient general ward and outpatient department in turn. Specifically, previous research documented that ICU was a place where nursing staff were stressful and challenging because of staff shortage, the complex nature of patients' conditions, frequent rescue, overload working, high expectation from administrators, sophisticated technology systems, ethical dilemmas in dealing with death, as well as inadequate income[43]. Nurses in the ICU environment may fell higher level of stress and work-family conflict than nurses working in other units. Therefore, they may experience higher level of family dysfunction. Comparatively, outpatient nurses gained higher level of FF, which might be explained by that they don't need to work rotation shift. Additionally, patients in the outpatient department usually are with chronic illness or in less critical conditions. Thus, outpatient nurses are under less stress so that they could handle work-family conflict much better than nurses working in other units.

In previous study, scholars found that FF decreased in nurses who worked for longer years[30]. They supposed that nurses with longer working years lived with some degree of social status and a stable living environment. They faced with much less sense of crisis so that they might took negative coping strategies when dealing with family related conflicts. In the current study, the relationship between working years and FF was not significant according to the result of the regression, even thought that was significant in the univariate analysis.

Limitations and Recommendations for future studies

There are several limitations that need to be acknowledge in the study. First and foremost, due to the nature of the cross-sectional design, we could not gain more and further data, especially about nurses' feeling or experience on FF because of lacking of qualitative evidence in this study. Mixed methodology could be used in future studies to take deeper insight of nurses' FF. Second, the study is conducted only in China, there are reasons to believed that the results may be different in other countries due to culture diversity and difference. Future studies could collect data from nurses in different countries to explore cultural-related factors in predicting FF.

5. Conclusions

The current cross-sectional study explored Chinese nurses' perceived FF level and the associated predictors. The result showed that most of the nurses participated in the study demonstrated appropriate FF. Moreover, the study also demonstrated that highest education level, hospital level, rotation shift status, working department, number of children and monthly income per family member were significant associated with nurses' perceived FF. The importance of those predictors was, in turn, number of children, monthly income per family member, rotation shift status, highest education level, hospital level, and working department.

According to the results of the study, FF was associated multiple factors, which hints that managers, leaders and government could make strategies to improve nurses' FF in order to lead nurses to make balance family and work. In that way, nurses could make it realized to achieve the success of both nursing career and personal family.

Abbreviations

Interquartile Range: IQR

Family Function: FF

World Health Organization: WHO

Chinese Family Function Scale: CFFS

Health-Promoting Life Styles: HPLS

Mean ± standard deviation: M±SD

Higher Vocational School: HVS

Secondary Vocational School: SVS

Standardized Coefficients: SC

Standardized error: SE

Degree of Freedom: df

Partial correlation: PC

Before transformation: BT

After transformation: AT

National Natural Science Foundation: NNSF

Declarations

Ethical Approval and Consent to Participate

Under the guidance of principles of World Medical Association Declaration of Helsinki[44], it was taken into the first consideration to respect participants' right and to protect their health and rights. The investigation was an anonymous survey. Informed consent was delivered in verbal when participants were included and accessed online. Since the current study was a cross-sectional study in which the only risk was about participants' privacy. Therefore, when conducting the survey, the participants would be informed about the purpose of the study, the way and the time of conducting the survey, their rights to refuse the survey and how their information was stored, protected and used in an academic way. The study was approved by the Ethical Committee of the corresponding institution, Guizhou Provincial People's Hospital (reference 2018072).

Consent for publication

Not applicable

Availability of data and materials

All the data supporting the study findings are within the manuscript. Additional detailed information and raw data are available from the corresponding author on reasonable request.

Competing Interest

None declared.

References

1. Dai L, Wang L. Review of family functioning[J]. Open J Soc Sci. 2015;3(12):134.

2. Sanayi B, Alaeghaband S, Hooman H. Family and marital scales[M]. 1st ed. Tehran: Besat; 2001.

3. Azmoude E, Tafazoli M, Parnan A. Assessment of Family Functioning and Its Relationship to Quality of Life in Diabetic and Non-Diabetic Women[J]. J Caring Sci. 2016;5(3):231-239.

4. Knafl K, Leeman J, Havill N, et al. Delimiting family in syntheses of research on childhood chronic conditions and family life[J]. Fam Process. 2015;54(1):173-184.

5. Barzanjeh Atri S, Rahmani A, Sheikhnejhad L. Access family functioning and related factors from the viewpoints of male cancer patients[J]. J Caring Sci. 2014;3(2):113-119.

6. Thompson HJ. A critical analysis of measures of caregiver and family functioning following traumatic brain injury[J]. J Neurosci Nurs. 2009;41(3):148-158.

7. Yeh HY, Ma WF, Huang JL, et al. Evaluating the effectiveness of a family empowerment program on family function and pulmonary function of children with asthma: A randomized control trial[J]. Int J Nurs Stud. 2016;60:133-144.

8. Sari EP, Dahlia W. Family function and subjective well-being among adolescents[J]. Malaysian Online Journal of Counseling. 2018;5(1):43-51.

9. Leeman J, Crandell JL, Lee A, et al. Family Functioning and the Well-Being of Children With Chronic Conditions: A Meta-Analysis[J]. Res Nurs Health. 2016;39(4):229-243.

10. Koutra K, Vgontzas AN, Lionis C, et al. Family functioning in first-episode psychosis: a systematic review of the literature[J]. Soc Psychiatry Psychiatr Epidemiol. 2014;49(7):1023-1036.

11. Murphy YE, Flessner CA. Family functioning in paediatric obsessive compulsive and related disorders[J]. Br J Clin Psychol. 2015;54(4):414-434.

12. Psihogios AM, Daniel LC, Tarazi R, et al. Family Functioning, Medical Self-Management, and Health Outcomes Among School-Aged Children With Sickle Cell Disease: A Mediation Model[J]. J Pediatr Psychol. 2018;43(4):423-433.

13. Jia Z, Fang H, Jing W, et al. Subjective Well-being and Family Functioning among Adolescents Left Behind by Migrating Parents in Jiangxi Province, China[J]. Biomed Environ Sci. 2018;31(5):382-388.

14. Shu M, Hong X, XU J, et al. The impact of family function on self-management behavior and recurrence in stroke patients [J]. J Nurs Sci. 2019;34(02):75-78.

15. Liu H, Zhao Q, Wang K, et al. Study on mediating role of family function between activity of daily living and post-stroke depression among stroke patients[J]. Chin Nur Res. 2019;33(19):3350-3355.

16. Jiang S, Shen L, Ran H, et al. Family function and health behaviors of stroke survivors[J]. Chin J Nur. 2014;49(07):849-853.

17. Liu T, Du Q, Li S, et al. Relationship between family function and self-care ability in elderly patients with hypertension in community[J]. J Pract Med. 2014;30(04):641-643.

18. Wang Y. Relationship between family function, social support and resilience in patients with hematopathy[J]. Chin Gen Pract Nurs. 2019;17(25):3088-3091.

19. Bennich BB, Munch L, Egerod I, et al. Patient Assessment of Family Function, Glycemic Control and Quality of Life in Adult Patients With Type 2 Diabetes and Incipient Complications[J]. Can J Diabetes. 2019;43(3):193-200.

20. Sun Y, Wang M, Zhou Y, et al. The mediating effect of family function and medication adherence between symptoms and mental disability among Chinese patients with schizophrenia: a cross-sectional study[J]. Psychol Health Med. 2019;24(5):559-569.

21. World Health Organization. Nursing and midwifery 2020 [cited 2020 March 4th]. Available from: https://www.who.int/hrh/nursing_midwifery/en/.

22. Zhang L. Vice premier stresses quality nursing services[N]. People's Daily. 2019.

23. World Health Organization. Global strategic directions for strengthening nursing and midwifery 2016–2020[J]. Geneva: WHO. 2017.

24. Sarafis P, Rousaki E, Tsounis A, et al. The impact of occupational stress on nurses' caring behaviors and their health related quality of life[J]. BMC Nurs. 2016;15(1):56.

25. Sun C, Wang Z, Chen L, et al. Research on relationship among subjective well-being，job stressors and family function of ICU nurses in military hospitals[J]. J Nurs Adm. 2013;13(12):853-855.

26. Deng J, Peng Y, Zhu H. Investigation and analysis of job burnout and family function of surgical nurses[J]. J Qilu Nurs. 2017;23(18):39-42.

27. Yu S. The correlation of the occupational stress and family function among clinical second-child pregnant nurses[D] [Master]: Nanchang University; 2019.

28. Zhang M, Yuan Y. Preparation of the Chinese Family Function Scale and Reliability and Validity Study[J]. Psychological Communication. 2019;2(02):101-108.

29. Suhjen S, Juimei H, Lihying L. Health-Promoting Life Styles and Its Related Factors among Clinical Nurses and Student Nurses[J]. Rong Zong Nursing. 2001;18(2):147-158.

30. Guo X. Investigation of the Family Function and Marital Quality of Nursing Staff [D] [Master]: Huabei Coal Medical College; 2009.

31. World Heath Orgnization. World health statistics 2020: Monitoring health for the SDGs, sustainable development goals[R]. 2020.

32. Xu L, Siegrist J, Cao W, et al. Measuring job stress and family stress in Chinese working women: a validation study focusing on blood pressure and psychosomatic symptoms[J]. Women & health. 2004;39(2):31-46.

33. Ahmad A. Job, family and individual factors as predictors of work-family conflict[J]. J Hum Resour Adult learning. 2008;4(1):57-65.

34. Grzywacz JG, Frone MR, Brewer CS, et al. Quantifying work−family conflict among registered nurses[J]. Res Nurs Health. 2006;29(5):414-426.

35. Chen JY, Yen MH, Lin YH, et al. Predictors of Family Function in DMD and SMA Family[J]. SOJ Nurs Health Care. 2016;1(1):01-09.

36. Efeoğlu I, Ozcan S. Work-family conflict and its association with job performance and family satisfaction among physicians[J]. Aust J Basic Appl Sci. 2013;7(7):43-48.

37. Tai S-Y, Lin P-C, Chen Y-M, et al. Effects of marital status and shift work on family function among registered nurses[J]. Ind Health. 2014.

38. Yildirim D, Aycan Z. Nurses' work demands and work−family conflict: A questionnaire survey[J]. Int J Nurs Stud. 2008;45(9):1366-1378.

39. Camerino D, Sandri M, Sartori S, et al. Shiftwork, work-family conflict among Italian nurses, and prevention efficacy[J]. Chronobiol Int. 2010;27(5):1105-1123.

40. Fujimoto T, Kotani S, Suzuki R. Work−family conflict of nurses in Japan[J]. J Clin Nurs. 2008;17(24):3286-3295.

41. Farzianpour F, Nosrati SA, Foroushani AR, et al. Relationship between shift work and personality traits of nurses and their coping strategies[J]. Glob J Health Sci. 2016;8(5):166.

42. Pan J, Qin X, Li Q, et al. Does hospital competition improve health care delivery in China?[J]. China Econ Rev. 2015;33:179-199.

43. Masa'Deh R, Alhalaiqa F, AbuRuz ME, et al. Perceived stress in nurses: A comparative study[J]. Glob J Health Sci. 2017;9(6).

44. General Assembly of the World Medical Association. World Medical Association Declaration of Helsinki: ethical principles for medical research involving human subjects[J]. J Am Med Assoc. 2013;310(20):2191-2194.

Tables

Table 1
Demographic characteristic and outcome of univariate analysis (N = 19422)

	Frequency(%)	Mean rank	U/H	P
Gender				
Male	842(4.34)	9803.26	7744916.000	0.624
Female	18580(95.66)	9707.34		
Age	29.00[a](21–33) [b]		0.021[c]	0.004
Basic education level				
Diploma of SVS	4187(21.56)	9736.62	0.793	0.673
Diploma of HVS	10704(55.11)	99728.77		
Bachelor Degree	4531(23.33)	9647.48		
Highest education level				
Diploma of SVS	495(2.55)	9821.85	36.514	< 0.001
Diploma of HVS	8234(42.40)	9432.17		
Bachelor Degree	10664(54.91)	9920.93		
Master Degree	27(0.14)	10048.33		
PHD Degree	2(0.01)	11151.75		
Hospital level				
Primary or community	316(1.63)	10277.43	69.415	< 0.001
Secondary	10487(54.00)	9997.85		
Tertiary	8619(44.38)	9342.34		
Working years	6.00[a](3–11) [b]		0.016	< 0.031
Rotation shift status				
Yes	10846(55.84)	9987.72	43511762.5	< 0.001
No	8576(44.16)	9362.17		
Working department				
Outpatient	2277(11.72)	9332.97	31.595	< 0.001
Emergency	1165(6.00)	9789.49		
Inpatient general ward	13599(70.02)	9678.57		

	Frequency(%)	Mean rank	U/H	P
ICU	2381(12.26)	10223.42		
Marital status				
Never married	5577(28.71)	9353.18	34.462	< 0.001
Married	13211(68.02)	9869.66		
Widowed	47(0.24)	9680.77		
Divorced	587(3.02)	9558.76		
Number of children				
0	7138(36.75)	9198.45	126.504	< 0.001
1	7701(39.65)	9804.82		
2	4507(23.21)	10339.44		
3	76(0.39)	11202.85		
Living with parents				
Yes	9852(50.73)	9646.85	46504885.00	0.990
No	9570(49.27)	9778.06		
Monthly income per family member				
≤ 550	690(3.55)	10688.62	158.777	< 0.001
551~1200	2185(11.25)	10283.94		
1201~2000	3005(15.47)	10078.86		
2001~3000	5025(25.87)	9891.73		
3001~6000	6142(31.62)	9475.42		
> 6000	2375(12.23)	8665.37		

a: Media; b: IQR; c: Spearman's Correlation Coefficient (R); SVS: Secondary Vocational School; HVS: Higher Vocational School;

Table 2
Outcome of pairwise comparison in different demographic pairs

	Test Statistics	Adjusted P
Highest education level		
Diploma of HVS - Diploma of SVS	389.673	1.000
Diploma of HVS - Bachelor Degree	-488.759	< 0.001
Diploma of HVS - Master Degree	-616.161	1.000
Diploma of HVS -PHD Degree	-1719.577	1.000
Diploma of SVS - Bachelor Degree	-99.087	1.000
Diploma of SVS - Master Degree	-226.488	1.000
Diploma of SVS -PHD Degree	-1329.905	1.000
Undergraduate- Master Degree	-127.401	1.000
Undergraduate-PHD Degree	-1230.818	1.000
Postgraduate-PHD Degree	-1103.417	1.000
Hospital level		
Tertiary-Secondary	655.509	< 0.001
Tertiary-Primary or community	935.091	0.010
Secondary-Primary or community	279.582	1.000
Working department		
Outpatient-Inpatient general ward	-345.602	0.036
Outpatient-Emergency	-456.528	0.134
Outpatient-ICU	-890.458	< 0.001
Inpatient general ward-Emergency	110.926	1.000
Inpatient general ward-ICU	-544.856	< 0.001
Emergency-ICU	-433.93	0.172
Marital status		
Never married-Divorced	-205.584	1.000
Never married-Widowed	-327.589	1.000
Never married-Married	-516.485	< 0.001

	Test Statistics	Adjusted P
Divorced-Widowed	122.005	1.000
Divorced-Married	310.901	1.000
Widowed- Married	188.896	1.000
Number of children		
0−1	-606.372	< 0.001
0−2	-1140.988	< 0.001
0−3	-2004.398	0.01
1−2	-534.616	< 0.001
1−3	-1398.025	0.173
2−3	-863.41	1.000
Monthly income per family member		
> 6000 − 3001~6000	810.047	< 0.001
> 6000 − 2001~3000	1226.361	< 0.001
> 6000 − 1201~2000	1413.488	< 0.001
> 6000 − 551~1200	1618.571	< 0.001
> 6000-≤550	2023.252	< 0.001
3001~6000 − 2001~3000	416.314	0.001
3001~6000 − 1201~2000	603.442	< 0.001
3001~6000 − 551~1200	808.524	< 0.001
3001~6000-≤550	1213.205	< 0.001
2001~3000 − 1201~2000	187.128	1.000
2001~3000 − 551~1200	392.21	0.087
2001~3000-≤550	796.891	0.006
1201~2000 − 551~1200	205.082	1.000
1201~2000-≤550	609.763	0.138
551~1200-≤550	404.681	1.000

Table 3
Outcome of coefficients table

	SC		df	F	P
	Beta	SE of Beta			
Age	-0.039	0.020	1	3.829	0.050
Highest education level	0.052	0.007	3	52.291	< 0.001
Hospital level	-0.046	0.007	2	39.331	< 0.001
Working years	-0.003	0.020	1	0.017	0.898
Rotation shift status	-0.071	0.008	1	72.691	< 0.001
Working department	0.026	0.007	3	14.368	< 0.001
Marital status	-0.012	0.008	3	2.590	0.051
Number of children	0.155	0.012	3	170.248	< 0.001
Monthly income per family member	-0.081	0.008	5	108.718	< 0.001
Dependent variable: FF score; SC: Standardized Coefficients; SE: Standardized error; df: Degree of Freedom					

Table 4
Outcome of Correlation and Tolerance

	Correlation			Importance	Tolerance	
	Zero-order	Part	PC		BT	AT
Age	-0.013	-0.012	-0.012	0.017	0.096	0.097
Highest education level	0.047	0.050	0.050	0.080	0.912	0.915
Hospital level	-0.049	-0.046	-0.045	0.076	0.946	0.942
Working years	-0.022	-0.001	-0.001	0.002	0.101	0.101
Rotation shift status	-0.052	-0.065	-0.064	0.124	0.800	0.750
Working department	0.027	0.027	0.026	0.024	0.993	0.900
Marital status	0.053	-0.009	-0.009	-0.021	0.536	0.629
Number of children	0.095	0.104	0.103	0.491	0.438	0.617
Monthly income per family member	-0.077	-0.076	-0.075	0.207	0.864	0.863
Dependent variable: FF score; PC: Partial correlation; BT: Before transformation; AT: After transformation						