

Health-related Quality of Life and Its Main Related Factors among Nurses in China

Si-Ying WU^{1*}, Huang-Yuan LI², Jun TIAN¹, Wei ZHU³, Jian LI⁴ and Xiao-Rong WANG⁵

¹Department of Epidemiology and Health Statistics, School of Public Health, Fujian Medical University, Fuzhou, Fujian, China

²Department of Occupational and Environmental Health, School of Public Health, Fujian Medical University, Fuzhou, Fujian, China

³Department of Social Medicine, College of Public Health, Zhengzhou University, Henan, China

⁴Department of Preventative Medicine, North Sichuan Medical College, Nanchong, Sichuan, China

⁵School of Public Health and Primary Care, the Chinese University of Hong Kong, Hong Kong SAR, China

Received September 4, 2009 and accepted July 12, 2010

Published online in J-STAGE December 16, 2010

Abstract: The present study is to evaluate the health-related quality of life (HRQOL) and analyze the effect of occupational stress, job burnout and coping resource on the HRQOL among nurses in China. A total of 1,012 nurses were recruited from eight hospitals of two provinces in 2008. The Chinese version of Short Form-36 Health Survey and Maslach Burnout Inventory-General Survey were used to measure the HRQOL and burnout respectively, the Occupation Stress Inventory-Revised Edition was used to evaluate occupational stressor, personal strain and coping resources. Other potential influencing factors for HRQOL were collected using a structured questionnaire. HRQOL in the nurses was lower than that in the general population. Occupational stressor, personal strain and job burnout correlated negatively with the HRQOL ($p < 0.05$) while coping resources was positively related to the HRQOL ($p < 0.05$). Among the predictive factors for HRQOL, occupational stressor (indicated by role insufficiency and physical environment), personal strain (indicated by physical strain and psychological strain), job burnout (indicated by emotional exhaustion and professional efficacy), length of work hours (≥ 10 h per day), diet irregularity and age were the main risk factors for HRQOL, while recreation and self-care were the main protective factors for HRQOL. The findings suggest occupational stress, job burnout and coping resources play important roles in HRQOL in the Chinese nurses.

Key words: Health-related quality of life (HRQOL), Occupational stress, Job burnout, Coping resource, Nurses, China

Introduction

Health related quality of life (HRQOL) is an individual's satisfaction or happiness with the dimensions of life insofar as they affect or are affected by health¹. It contains a multidimensional concept embedded in physical, mental, cultural and social context. The HRQOL in nurses is closely related to their physical and mental well-beings. More importantly, these people are health-

care providers. Their HRQOL may directly or indirectly affect the quality and safety of medical service, and finally influence the health of the population at large.

China is contending with a very serious nursing shortage compared to many other countries². By the end of 2008, the number of registered nurses reached only about 1.65 million³. However, nurses in China frequently suffer from occupational stress owing to the speedy economic development and the new medical reform program, which lead to a higher demand for better medical services and a more complex nurse-patient relationship. A review of employee stress in healthcare settings

*To whom correspondence should be addressed.

E-mail: fmuwsy@163.com

across 17 countries found that nurses in the majority of countries experience high levels of occupational stress⁴). On the other hand, many studies have documented that nurses are more likely to be susceptible to job burnout, which is described as the feelings of emotional exhaustion, depersonalization, and reduced personal accomplishment^{5, 6}). At the same time, nurses are relatively lack of coping resource, which refers to the basic ways that people handle stress, such as recreation, self-care, social support and rational coping⁷). Occupational stress in the absence of adequate coping resources can lead to severe mental or physical illness, and finally to a decrease in HRQOL and service provision⁸).

Killian concluded that occupational stress and job burnout had a major negative influence on the HRQOL, and therefore should not be viewed or assessed in isolation from the other factors influencing people⁹). HRQOL in nurses is affected by many factors. It relates to behavioral factors, occupational factors and coping resources. However, the issue on HRQOL in Chinese nurses failed to draw a public attention. The number of relevant studies has been very limited. Moreover, most of the research in this area has been carried out within western culture countries, with little research being conducted in China. It remains unclear if the findings conducted in western culture countries are applicable to Chinese nurses. Therefore, the objectives of the present study are to assess the HRQOL in nurses and analyze the effect of occupational stressor, personal strain, job burnout and coping resource on the HRQOL among nurses in China. This study addresses all aspects of demographic characteristics, behavioral factors, occupational stress, job burnout and coping resources in relation to the HRQOL in nurses simultaneously. An effective intervention program can be developed by integrating all of the factors to improve HRQOL among the nurses.

Methods

Study subjects

Participants of this study were recruited from eight hospitals in Fujian Province and Henan Province by using the method of stratified cluster random sampling. Basically, two hospitals were randomly chosen from the two stratum (provincial hospitals and municipal hospitals, respectively) in each province. Among the 1,300 eligible nurses who met the criteria of 18–60 yr old and having a minimum one-year service, 1,012 (78%) returned completed questionnaires (520 from Fujian Province and 492 from Henan Province). They came from different settings including internal medicine (285), surgery (413), pediatrics (84), obstetrics and gynecology (107), emergency department (81) and ear-nose-throat

department (42). Nurses from the department of surgery included those from general surgery (252), oncological surgery (82) and operation room (79).

Data collection

A survey coordinator at each hospital distributed questionnaires between March and July in 2008. The research proposal and access to the research data were approved by the Ethics Review Committee of the participating hospital; all study participants were fully informed of the purpose of the study prior to enrollment.

Measures

A Chinese version of Short Form-36 Health Survey (SF-36) was used to measure the HRQOL¹⁰), the Chinese version of Occupation Stress Inventory-Revised Edition (OSI-R) was used to evaluate occupational stressor, personal strain (referring to negative reactions from an employee suffering from stressor) and coping resource among nurses¹¹), and a Chinese version of Maslach Burnout Inventory-General Survey (MBI-GS) was used to assess job burnout among nurses^{12, 13}).

Short Form-36 (SF-36) health survey

The SF-36, originally developed in English, has eight scales measuring eight domains of HRQOL¹⁴): physical functioning (PF), role limitations due to physical problems (RP), bodily pain (BP), general health (GH), vitality (VT), social functioning (SF), role limitations due to emotional problems (RE) and mental health (MH). The first four subscales examine physical health and are summarized in the physical component scores (PCS); the latter four subscales examine mental health and are summarized in the mental component scores (MCS). Item scores for each dimension are coded, summed up and transformed to a scale from 0 (worst possible health state) to 100 (best possible health state)^{14, 15}). The PCS and MCS scores were calculated using the standard scoring algorithms¹⁶). In general, the higher a score is, a better HRQOL it indicates¹⁷).

The SF-36 has been translated into Chinese from the English version and has been confirmed to have good reliability and validity in the general population in China^{18, 19}). However, it had not been used in nurses. Therefore, the validity and reliability of Chinese version of SF-36 were examined in these subjects.

Measurement of Occupational Stress Inventory

The revised edition of the Occupational Stress Inventory (OSI-R) is a concise measure of three dimensions of occupational adjustment: occupational stress, personal strain, and coping resources²⁰). It has been translated from English into Chinese and has been

demonstrated to have good reliability and validity on Chinese in mainland China¹¹).

There were three questionnaires in OSI-R: (1) Occupational Role Questionnaire (ORQ, including six scales of “Role Overload”, “Role Insufficiency”, “Role Ambiguity”, “Role Boundary”, “Responsibility”, “Physical Environment”), (2) Personal Strain Questionnaire (PSQ, including four scales of “Vocational Strain”, “Psychological strain”, “Interpersonal Strain” and “Physical Strain”) and (3) Personal Resource Questionnaire (PRQ, including four scales of “Recreation”, “Self-Care”, “Social Support” and “Rational/Cognitive Coping”). Each of all scales contained 10 items. Scales for the three OSI-R domains are described previously²¹). Higher scores on Occupational Role Questionnaire and Personal Strain Questionnaire indicated greater stress levels, whereas a higher score on Personal Resources Questionnaire indicated a better coping resource.

Maslach Burnout Inventory- General Survey (MBI-GS)

Burnout was assessed using the Maslach Burnout Inventory-General Survey (MBI-GS; Schaufeli *et al.* 1996 version)²²). The MBI-GS consists of 16 items and three sub-scales: emotional exhaustion (five items, e.g. ‘working all day is really a strain for me’, 0=never, 6=everyday); cynicism (five items, e.g. ‘I doubt the significance of my work’, 0=never, 6=everyday); and professional efficacy (six items, e.g. ‘I have accomplished many worthwhile things in this job’, 0=never, 6=everyday). Higher scores of MBI-GS indicate higher levels of burnout. It was concluded that the Chinese version had high validity and reliability^{12, 13}).

Other potentially influencing factors of the HRQOL, such as demographic characteristics (gender, age, education level, marital status and per capita family income), behavioral factors (smoking, drinking, irregularity of work and rest, irregularity of diet and physical activity), occupational factors (including work shift, working years, types of departments and length of work hours (≥ 10 h per day)). Work shift was defined as binary (yes/no); types of departments were divided into: internal medicine, surgery and other clinical departments; irregularity of work, irregularity of diet were categorized into three-level degree: for example, irregular, medium and regular; smoking amount was categorized into none, ≤ 5 cigarettes/day, 6–10 cigarettes/day, 11–20 cigarettes/day and >20 cigarettes/day; drinking amount was categorized into none, seldom, 1–2 times/wk, 3–4 times/wk and ≥ 5 times/wk; regular physical activity was defined as exercise more than 30 min/d or walk over 5 kilometers per day; physical activity was categorized into none or seldom (≤ 1 d/wk), medium (2–3 d/wk) and frequent (≥ 4 d/wk)

Data analysis

Data were input with Epidata3.02, and statistical analyses were performed using SPSS18.0 for Windows. Parametric statistical methods were used for the index scores because the mean sample distribution was nearly normal and the sample size was large.

207 subjects were sampled from one of the hospitals using a random cluster sampling method to examine the reliability and validity of the inventory. Reliability was estimated using the internal consistency method and test-retest method^{23, 24}). Validity was assessed using convergent and discriminant validity checks^{25, 26}).

Basic descriptive statistics were calculated for PCS and MCS and summary scores of HRQOL. Pearson’s correlation analysis was used to examine the relationship among occupational stressor, personnel strain, job burnout and coping resources with the HRQOL, and stepwise multiple regression analysis was then used to determine potential predictors for HRQOL.

The multiple linear regression analysis was performed to identify influencing factors for HRQOL, employing PCS, MCS and total score of HRQOL as the dependent variables, the potential influencing factors (including behavioral factors, occupational factors (including occupational stress, job burnout and others) and coping resources) as the independent variables, meanwhile, region, gender, age, education level, marital status and per capita family income were adjusted. Statistical model were fitted for PCS, MCS and the overall HRQOL separately. Model fitting was accomplished using a stepwise method with criteria for entry $p \leq 0.05$ and removal $p > 0.10$ to select potential predictors for HRQOL. Categorical variables were incorporated in regression models via the use of dummy variables. The lowest level of ordered variables served as a reference category in the models.

Results

Descriptive statistics for demographic information are presented in Table 1. The subjects had a mean age of 30 yr (SD=7.4 yr) with average 9 yr (SD=8.0 yr) working experience. Ninety eight percent of participants were female. The rate of smoking was only 1.2% and the prevalence of drinking was only 5% among them.

The results of the validity and reliability of the SF-36 among nurses in this study were shown in Table 2. Cronbach’s alpha coefficient was higher than 0.70 in all scales. Cronbach’s alpha coefficient and intraclass correlation coefficient of the test-retest reliability exceeded 0.70 in all scales. Within each SF-36 scale, item-scale correlations exceeded the standard of 0.40, and the perfect scaling success rates were achieved across all the scales.

The tests of item discriminant validity indicated high rates of scaling success across all the scales. It indicated that the Chinese version of SF-36 was acceptable and applicable for evaluating the HRQOL of nurses in China.

The SF-36 dimension scores were compared with available data from nurses in New Zealand and general population in China (Shanghai province) (Table 3)^{1, 27}. The nurses in this study had higher score in VT dimensions than that of nurses in New Zealand, while had lower score in GH dimensions, and others were similar to nurses in New Zealand. And the current nurses in this study had lower scores of SH-36 (except for GH) than those in general populations of Shanghai province.

The results of correlation analysis (Table 4) showed that occupational stressor and personal strain correlated negatively with HRQOL ($p<0.01$); three dimensions

Table 3. Comparison of the scores of the present study with other studies

Dimension	Nurses [§] in China (N=1,012)	Nurses* in New Zealand (N=225) ²⁷	Population [#] in Shanghai, China (N=919) ¹
PF	90.3 (13.1)	91.6 (12.4)	89.7 (14.8)
RP	78.5 (31.8)	74.7 (35.5)	93.8 (22.6)
BP	75.6 (18.6)	77.5 (22.0)	94.6 (13.8)
GH	66.1 (20.0)	75.6 (19.7)	68.8 (19.4)
VT	65.5 (17.3)	52.8 (20.4)	71.8 (18.3)
SF	82.0 (17.8)	79.8 (22.6)	94.3 (12.1)
RE	71.6 (37.1)	72.3 (37.8)	95.1 (20.6)
MH	70.1 (17.3)	73.0 (15.3)	81.8 (14.7)

PF: physical functioning; RP: role limitations due to physical problems; BP: bodily pain; GH: general health; VT: vitality; SF: social functioning (SF); RE: role limitations due to emotional problems; MH: mental health.
[§]Mean age was 30.0 yr and 98.0 percent of participants were female;
^{*}Mean age was 37.9 yr and 88.9 percent of participants were female;
[#]Mean age was 47.0 yr and 55.4 percent of participants were female.

Table 1. The demographic data of the nurses (n=1,012)

Demographic characteristics	N	%
Age group, year		
<30	547	54
30–45	354	35
≥45	111	11
Education level		
Associate degree or below	557	55
Bachelors degree and above	455	45
Marital status		
Single	364	36
Married	618	61
Divorce/ Widowed	30	3
Per capita family income		
<1,500 (RMB)	486	48
1,500–2,000	273	27
>2,000	253	25
Types of departments		
Surgery	413	41
Medicine	285	28
Other	314	31
Working years		
<5 yr	496	49
5–15 yr	304	30
≥15 yr	212	21

Table 4. Correlation analysis of stress, burnout, coping resource and HRQOL (n=1,012)

	SF-PCS	SF-MCS	SF-36 total score
Occupational Stressor	-0.403**	-0.453**	-0.489**
Role Overload (RO)	-0.349**	-0.278**	-0.352**
Role Insufficiency (RI)	-0.179**	-0.336**	-0.301**
Role Ambiguity (RA)	-0.174**	-0.291**	-0.270**
Role Boundary (RB)	-0.303**	-0.286**	-0.333**
Responsibility (R)	-0.192**	-0.310**	-0.291**
Physical Environment (PE)	-0.307**	-0.212**	-0.289**
Personal Strain	-0.402**	-0.622**	-0.592**
Vocational Strain (VS)	-0.232**	-0.342**	-0.331**
Psychological Strain (PSY)	-0.336**	-0.607**	-0.551**
Interpersonal Strain (IS)	-0.213**	-0.380**	-0.346**
Physical Strain (PHS)	-0.472**	-0.625**	-0.631**
Job burnout	-0.403**	-0.601**	-0.581**
Emotional exhaustion (EX)	-0.438**	-0.503**	-0.537**
Cynicism (CY)	-0.401**	-0.533**	-0.537**
Professional efficacy (PE)	-0.085*	-0.291**	-0.222**
Coping Resources	0.305**	0.521**	0.471**
Recreation (RE1)	0.189**	0.305**	0.287**
Self-Care (SC)	0.117**	0.269**	0.228**
Social Support (SS)	0.182**	0.387**	0.334**
Rational Coping (RC)	0.143**	0.426**	0.339**

** $p<0.01$, * $p<0.05$.

Table 2. The validity and reliability of the SF-36 among nurses in China (n=219)

Scales	Cronbach's alpha	Intraclass correlation coefficient	Item internal convergency	Scaling success [#]	Item discriminant validity	Scaling success*
PF	0.85	0.84	0.57–0.72	10/10 (100%)	0.04–0.28	70/70 (100%)
RP	0.87	0.89	0.76–0.87	4/4 (100%)	0.21–0.36	28/28 (100%)
BP	0.79	0.85	0.81–0.90	2/2 (100%)	0.22–0.41	14/14 (100%)
GH	0.75	0.87	0.62–0.81	5/5 (100%)	0.18–0.43	35/35 (100%)
VT	0.77	0.88	0.66–0.74	4/4 (100%)	0.05–0.51	28/28 (100%)
SF	0.70	0.89	0.77–0.83	2/2 (100%)	0.24–0.41	14/14 (100%)
RE	0.87	0.91	0.82–0.84	3/3 (100%)	0.12–0.40	21/21 (100%)
MH	0.74	0.89	0.62–0.76	5/5 (100%)	0.18–0.39	35/35 (100%)

PF: physical functioning; RP: role limitations due to physical problems; BP: bodily pain; GH: general health; VT: vitality; SF: social functioning (SF); RE: role limitations due to emotional problems; MH: mental health.

[#]Item internal convergency scaling success=number of item scale correlations greater than 0.40 per total number of correlations; *Item discriminant validity scaling success=number of correlations items with own scales significantly higher (≥two standard deviations) than correlations with other scales per total number of correlations.

Table 5. Multiple linear regression analysis for SF-36 subscales among nurses

factors	B	SE	Beta	t	p
SF-36 PCS					
Physical strain	-0.700	0.083	-0.337	-8.484	0.000
Age	-0.928	0.318	-0.269	-6.828	0.000
Emotional exhaustion	-0.861	0.352	-0.235	-2.445	0.016
Recreation	0.355	0.087	0.149	4.073	0.000
Work time (≥ 10 h per day)	-5.823	1.696	-0.333	-3.433	0.001
Physical environment	-0.188	0.068	-0.101	-2.771	0.006
Role insufficiency	-0.296	0.098	-0.117	-3.025	0.003
Diet irregularity	-3.682	1.517	-0.203	-2.425	0.017
SF-36 MCS					
Psychological strain	-0.633	0.076	-0.321	-8.295	0.000
Emotional exhaustion	-0.616	0.073	-0.269	-8.411	0.000
Professional efficacy	-0.309	0.052	-0.158	-5.898	0.000
Physical strain	-0.471	0.094	-0.190	-5.031	0.000
Self-Care	0.349	0.080	0.131	4.389	0.000
Work time (≥ 10 h per day)	-6.385	1.521	-0.364	-4.197	0.000
SF-36 total score					
Physical strain	-0.564	0.079	-0.278	-7.133	0.000
Emotional exhaustion	-0.524	0.063	-0.280	-8.360	0.000
Psychological strain	-0.310	0.065	-0.192	-4.772	0.000
Recreation	0.199	0.076	0.086	2.606	0.009
Age	-0.182	0.037	-0.134	-4.902	0.000
Work time (≥ 10 h per day)	-6.860	1.446	-0.418	-4.743	0.000
Professional efficacy	-0.203	0.045	-0.127	-4.521	0.000
Self-Care	0.228	0.072	0.104	3.152	0.002
Role insufficiency	-0.226	0.081	-0.091	-2.788	0.005
Diet irregularity	-3.910	1.379	-0.230	2.836	0.006
Physical environment	-0.123	0.054	-0.068	-2.298	0.022

#Variables in the model: demographic factors (including age, education level, marital status, per capita family income), behavioral factors (including regularity of work and rest, regularity of diet and physical activity); occupational factor (including types of departments, working years, work shift, length of work hours (≥ 10 h per day), occupational stressor (6 scales), job burnout (3 dimensions) and coping resources (4 scales).

R Square=37.5%; Adjusted R Square=36.8%, R Square=60.7%; Adjusted R Square=60.3%,

R Square=59.5%; Adjusted R Square=58.8%.

of job burnout were related negatively to the HRQOL ($p < 0.04$); while coping resources correlated positively and significantly with HRQOL ($p < 0.01$).

Potential predictors for HRQOL were shown in Table 5. There were some differences in predictive factors for PCS, MCS and overall HRQOL. These predictive factors, including physical strain, emotional exhaustion and length of work hours (≥ 10 h per day) were found to be significant predictors for PCS and MCS and overall HRQOL. While age, recreation, physical environment, role insufficiency and diet irregularity only affected PCS and overall HRQOL, psychological strain, professional efficacy and self-care only contributed to MCS and overall HRQOL. This set of predictors separately accounted for 36.8%, 60.3% and 58.8% of the variance (adjusted R^2) in the model of PCS, MCS and overall HRQOL. Among the predictive factors for the overall HRQOL, occupational stress (including occupational stressor (indicated by role insufficiency and physical environment) and personal strain (indicated by physical strain and psychological strain)), job burnout (including

emotional exhaustion and professional efficacy), length of work hours (≥ 10 h per day), diet irregularity and age were the main risk factors in the HRQOL, while recreation and self-care were the main protective factors for the HRQOL of nurses in this study.

Discussion

HRQOL refers to a subjective evaluation, which is embedded in a physical, mental, cultural, social context. SF-36 has been used as an instrument for assessing HRQOL world-wide. But few studies have attempted to assess the HRQOL of healthy individuals in China^{28, 29}. This study was one of the first applications of SF-36 to nurses in China. Our data indicated that the Chinese version of SF-36 was acceptable and applicable for evaluating HRQOL of nurses in China.

With respect to the first aim of the study, a comparison between the results of our study and those of other similar studies assessing the HRQOL of nurse would be more valid. Unfortunately, only one study

has reported the scores of SF-36 scales for a sample of registered nurses in New Zealand²⁷). The results from the comparison indicated that HRQOL among nurses in this study was higher in VT and lower in GH dimensions compared with those in nurses in New Zealand, and the HRQOL among nurses was low compared with that in the population of Shanghai. One possible reason is that nurses suffered more occupational stress and job burnout than the general populations; this may lead to a poorer quality of life among nurses.

The second aim of the study was to analyze the effect of occupational stressor, personal strain, job burnout and coping resource on the HRQOL among nurses in China after taking account of other potential predictors. Multivariate analysis indicated that among the predictive factors for the overall HRQOL, occupational stressor (including role insufficiency and physical environment), personal strain (including physical strain and psychological strain), job burnout (including emotional exhaustion and professional efficacy), length of work hours (≥ 10 h per day), diet irregularity and age were the main risk factors in the HRQOL, while coping resources (including recreation and self-care) were the main protective factors for the HRQOL.

Occupational stress is a result of combined exposure to several factors in work environment and employment conditions. The problem of occupational stress is being increasingly recognized. In this study we found that occupational stressor and personal strain correlated negatively with the HRQOL and its two components (PCS and MCS) among nurses. Multiple linear regression analysis demonstrated that occupational stressor and personal strain were important risk factors for the HRQOL among nurses which was consistent with other study³⁰). Nursing is considered to be inherently stressful, work-related stressors associated with nursing include exposure to death and dying and frustrated ideals in this area of care, as well as noise pollution, interpersonal conflicts, lack of knowledge, and insufficient social support^{31, 32}). In this study it was found that "role insufficiency" and "physical environment" were the main occupational stressor for nurses, and their personal strain mainly embodied in physical strain and psychological strain. The results indicated that the vocational skills training for nurses and optimization of nursing working environment may be necessary to improve the HRQOL among nurses.

Data from the study support the view that length of work hours (≥ 10 h per day) may have a similar negative effect on the overall HRQOL and its two components (PCS and MCS) among nurses. Long working hours have become commonplace worldwide and have been found to be associated with cardiovascular and immu-

nologic reactions, reduced sleep duration, unhealthy lifestyle, and adverse health outcomes, such as cardiovascular disease, diabetes, subjective health complaints, fatigue, and depression³³⁻³⁷). Reducing working hours may be a useful measure for improving HRQOL among nurses in China.

Job burnout is a major problem for many professions. Nurses are considered to be particularly susceptible to burnout in many countries^{6, 7, 38-40}). Our findings showed that job burnout, particularly emotional exhaustion and cynicism were strongly related to HRQOL and its two components (PCS and MCS). The results from multiple linear regression analysis shown that emotional exhaustion was the important risk factor for PCS, MCS and overall HRQOL after adjusting other potential predictors, and professional efficacy was the important risk factor for MCS and the overall HRQOL while taking account of other potential predictors. The results showed the need to consider strategies for preventing burnout to improve the HRQOL among nurses in China.

These results also draw our attention to the importance of increasing the coping resource among nurses in China. In this study coping resources included four aspects, i.e., recreation, self-care, social support and rational coping. It was found that recreation and self-care were the important resources for better HRQOL among nurses after adjusting other potential influencing factors in this study. Our result was accorded with other studies^{41, 42}). Coping resources may modify the effect of occupational stress on HRQOL^{43, 44}). Strengthening coping resources may be an efficient measure for reducing the occupational stress and improving their HRQOL.

It was worthwhile to note that there were some differences in predictive factors for MCS and PCS. This implied that mental dimension of HRQOL was affected more by psychological strain, professional efficacy and self-care than physical dimension. And the physical dimension of HRQOL was related more closely to age, recreation, physical environment, role insufficiency and diet irregularity than mental dimension. Accordingly, different interventional programs should be implemented to improve different dimension of HRQOL among nurses.

The findings of this study indicated that HRQOL in nurses was influenced by occupational stressor, personal strain, job burnout and coping resources, etc. Thus, information on factors influencing HRQOL in nurses can be used to improve their health. Interventional programs designed to improve their HRQOL need to be introduced, such as alleviating pressures in the work, insisting on rational daily scheduling, breaking bad behaviors, making use of relaxation techniques and improving work environment.

Strengths and Limitations of This Study

The strengths of this study include a large sample size and the possibility to explore the association among demographic characteristics, behavioral factors, occupational stressor, personal strain, job burnout and coping resource with HRQOL. The most important strength of our study is that using internationally well-know measurement, it is possible to interpret our findings in light of international data.

There are also some limitations in this study. First, the subjects were recruited from two strata (provincial hospitals and municipal hospitals) in two provinces, which might not be representative of the entire nurses in China. Second, a cross-sectional design does not allow us to establish causal relationships among the variables. Future research with a longitudinal approach would be valuable in the area of HRQOL among nurses. Third, measures were obtained from self-reports and may, therefore, reflect bias in reporting is inevitable. However, this limitation is minimized because both instruments are valid and reliable^{6, 45}. Another important limitation is that the comparison among the scores of the present study, those of nurses in New Zealand and those in the population of Shanghai province, since the sample size is relatively small (N=225) and can not completely representative of nurses in New Zealand, and the population of Shanghai are not representative of nursing population in China, consequently any conclusion drawn from this comparison should be treated with caution.

Conclusions

The findings of this study provided support for the hypotheses that HRQOL in nurses was influenced by occupational stressor, personal strain, job burnout and coping resource. Occupational stressor, personal strain and job burnout were the important risk factors and coping resource was the important protective factor for HRQOL among nurses after adjusting for other potential influencing factors. Thus, information on factors influencing HRQOL among nurses can be used to improve their health. This study suggests that improvements especially on occupational stress, job burnout and coping resources predictors will lead to a considerable progress in improving HRQOL among nurses in China.

Acknowledgements

This study was supported by the National Natural Science Foundation of China (No.81001238), the Program for Outstanding Young Talents of scien-

tific research in University of Fujian Province, China (No.JA10124) and the Science Foundation of Education Office of Fujian Province of China (NO.JA07090).

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