Scientific
Research

The Influence of Socio-Demographic, Health and Work-Related Factors on Health-Related Quality of Life among Iranian Industrial Workers

Sayed Mohammad Taghavi[1], Hamidreza Mokarami[2*], Morteza Nazifi[3], Alireza Choobineh[4], Hossein Marioryad[5*], Mehdi Faraji Kujerdi[6]

[1]Kohgilouyeh & Boyer-Ahmad Health Care Management of Social Security Organization, Yasuj, Iran
[2]Department of Ergonomics, School of Health, Shiraz University of Medical Sciences, Shiraz, Iran
[3]Department of Psychology, University of Bojnord, Bojnord, Iran
[4]Research Center for Health Sciences, Shiraz University of Medical Sciences, Shiraz, Iran
[5]Social Determinants of Health Research Center, Department of Environment Health, Yasuj University of Medical Sciences, Yasuj, Iran
[6]Student Research Committee, School of Health, Shiraz University of Medical Sciences, Shiraz, Iran
Email: *hamidreza.mokarami@yahoo.com, *oryadhsn@gmail.com

Abstract

Health-related quality of life (HRQOL) has not been investigated among Iranian industrial workers. The present paper aimed to study the influence of the socio-demographic, health and work-related factors on HRQOL among Iranian industrial workers. In this cross-sectional study, participants were 280 workers of two factories. The Persian version of World Health Organization Quality of Life-Brief (WHOQOL-BREF) was used to assess the HRQOL. A questionnaire was developed to assess the socio-demographic, health and work-related factors. Results showed that the means (SD) of physical health, psychological health, social relationships, and environment domains of HRQOL were 13.2 (2.7), 13.3 (2.6), 14.2 (3.5) and 12.6 (2.5), respectively. A multiple linear regression showed that types of job, exercise activity, working schedule, sleep quality, smoking, and conflict between work and social life were significantly associated with physical health domain; whereas, working schedule, marital status, working demand, sleep quality, BMI, and conflict between work and individual life were significantly associated with psychological health domain. Working schedule, working demand, sleep quality, conflict between work and individual life, and having children over two years were significantly associated with social relationship domain; however, working demand, working schedule, smoking, sleep quality, working hour, job satisfaction, marital sta-

---
*Corresponding authors.

tus and exercise activity were significantly associated with environment domain. Collectively, work-related factors including unhealthy working conditions, unsafe working environments, long working hours, irregular working schedules, and the lack of occupational training may negatively influence the HRQOL of workers. To improve workers' HRQOL, intervention programs should focus on improving work environment, working schedule, occupational training and restricting working hours.

Keywords

Health-Related Quality of Life, World Health Organization Quality of Life-Brief, WHOQOL-Brief, Industrial Workers, Iran

1. Introduction

Quality of life is an important aspect of the human's life. According to a definition from the World Health Organization (WHO), it can be understood as the subjective analysis of how healthy, happy and satisfied a person is with his/her life in general. This value judgment will be dependent on the person's culture, education, aims in life and resources that are available to achieve the person's goals [1] [2]. Health related quality of life (HRQOL) has been often used to describe health-related aspects of life which mostly influenced by health or illness. In fact, HRQOL is an important assessment of health and well-being in any population [1] [3] [4].

Researches have shown that many scio-demographic and health-related factors such as age, Body Mass Index(BMI), gender, educational level, marital status, smoking, exercise, sleeping time, and health condition have significant influences on HRQOL [5]-[7]. Yu *et al.* in their study among Chines workers found a strong relationship between HRQOL and educational level, marital status, birth place, hobbies, smoking, drinking and one-child families [8]. In another study, Nedjat *et al.* investigated the quality of life among an Iranian general population. They found a significant association between HRQOL and age, marital status, educational level, and health condition [9].

Work is another significant component of HRQOL. Poor work factors can be a predictor of poor HRQOL. Many aspects of work such as physical work load, safe and healthy working conditions, job tenure, type of job, and working hours have been shown to be related to HRQOL [6] [10]-[12]. However, the influences of other aspects of work-related factors on HRQOL such as working schedule, work demand, work load, second job, overtime working, occupational accident and occupational training have been less investigated. To the best of our knowledge, HRQOL correlates have not been investigated among Iranian industrial workers. Thus, the current study aimed to examine the influence of socio-demographic, health and work-related factors on HRQOL in two big factories in Kohkilouyeh and Boyer-Ahmad province, Iran.

2. Methods

2.1. Study Design and Subjects

Workers of two factories (*i.e.* Cosmetic and Steel) in Kohgilouyeh and Boyer-Ahmad province, Iran, participated in our study and filled out the questionnaires. There were 140 and 190 workers employed at the Steel and Cosmetic factories, respectively. 280 out of 330 workers (response rate: 84.85%) participated in the present study (167 and 113 workers in cosmetic and steel factories, respectively). The participants agreed voluntarily to participate in the present research, and also the researchers obtained the approval of factory managers. The participants were given a written consent form to read and sign before participating in the study.

As far as income, working time, job tenure, employment status and demographic features were considered, workers of the two factories were relatively alike, but they differed with respect to their work environments. In the steel factory, workers were exposed to occupational risk factors such as heavy physical work, extreme temperatures, air pollution, machinery, noise, radiation, electrical hazard, and etc. However, the processes in the cosmetic factory were more automated, and the workers were exposed to lower levels of occupational risk factors.

2.2. Measures

Using two parts of questionnaires, the researchers assessed the HRQOL (Part 1) and socio-demographic, health, and work-related factors (Part 2). The Persian version of World Health Organization Quality of Life-Brief (WHOQOL-BREF) was used to assess the HRQOL. In order to gather required data on socio-demographic, health, and work-related factors a questionnaire including socio-demographic factors (*i.e.* gender, age, BMI, marital status, having children under/over two years and educational level), health-related factors (*i.e.* smoking, sleep quality and exercise activities), and work-related factors (*i.e.* job title, job tenure, working schedule, second job, overtime working, work hours per day, work demand, working load, conflict between work and individual, family and social lives, occupational accident, occupational training and job satisfaction) was developed and applied.

The WHOQOL-BREF is a self-report questionnaire extracted from the World Health Organization Quality of Life questionnaire (WHOQOL-100) [13]. It consists of 26 items and assesses 4 broad domains of health including: physical health (7 items), psychological health (6 items), social relationships (3 items) and environment (8 items). There are also two additional items that explore the overall quality of life (QOL) and the general health of respondents. Items are scored on a five-point Likert scale (in which 1 indicates Very poor/Very dissatisfied and 5 indicates Very well/Very satisfied). Usofi *et al.* [14] have reported sound psychometric properties for the Persian version of WHOQOL-BREF. Also the researchers studied the internal consistency of the Persian version of WHOQOL-BREF in the present paper. Results showed that the Cronbach's alpha for the physical health, psychological health, social relationships, and environment domain were 0.81, 0.72, 0.78 and 0.76, respectively.

2.3. Procedures

Once the researchers obtained the consent of the workers and the approval of the managers of the two factories, the questionnaires were distributed among the workers. To maintain confidentiality, the questionnaires were filled out anonymously. The Yasuj University of Medical Sciences' Ethical Committee approved the ethical standards of the present study.

2.4. Statistical Analysis

Statistical analyses were conducted using the IBM SPSS for Windows, version 21.0. Descriptive statistics were used to describe the characteristics of the study population. Independent *t*-tests and univariate analyses of variance (ANOVAs) were performed to examine the effects of socio-demographic, health and work-related variables on each domains of HRQOL. The Significance level was set at $p \leq 0.05$. Finally, a multiple linear regression analysis (using stepwise method) was used to determine the variables which best predict the four domains of HRQOL. Independent variables with $p \leq 0.05$ were retained in the model.

3. Results

Overall, 93.9% of subjects were male and they had a mean age of 31.39 years (SD = 5.6; range 19 - 59). Mean years of job tenure was 4.47 (SD = 4.47). Twenty six percent of participations worked in three-shift schedule, thirty percent of them had a college degree and twenty four percent of them had an office career. The mean BMI was 24.9 (SD = 3.08). **Table 1** shows socio-demographic and health-related variables for the subjects. The participants' work-related factors and descriptive statistics for domains of HRQOL are presented in **Table 2** and **Table 3**, respectively.

3.1. Results of Physical Health Domain

The Mean (SD) of the physical health domain was 12.3 (2.3) and 13.4 (2.9) for the workers of Steel and Cosmetic factory, respectively. Independent *t*-tests indicated that Cosmetic factory workers had significantly higher physical health compared to steel factory workers. Results of univariate ANOVAs showed that physical health significantly differed with age(the higher the worker's age the lower his or her physical health), gender (lower physical health in males), educational levels (the higher the educational level the higher the physical health), sleep quality levels (the higher the sleep quality the higher the physical health), exercise activity levels (the higher the exercise activity the higher the physical health), smoking (those who did not smoke had higher physical

Table 1. Scio-demographic and health-related factors of the study subjects and HRQOL scores among different subgroups (n = 280).

Characteristics	N (%)	Physical Health		Psychological Health		Social relationships		Environment	
		Mean (SD)	p-value	Mean (SD)	p-value	Mean (SD)	p-value	Mean (SD)	p-value
Age groups (yr)									
≤29	105 (37.5)	12.4 (2.7)		12.8 (2.6)		13.5 (3.9)		12.1 (2.8)	
30 - 39	151 (53.9)	13.3 (2.7)	0.025	13.7 (2.6)	0.024	14.7 (3.1)	0.023	12.9 (2.4)	0.047
≥40	24 (8.6)	13.4 (2.9)		13.2 (2.4)		14.0 (3.9)		12.8 (1.8)	
Gender									
Male	263 (93.9)	12.9 (2.7)	0.013	13.2 (2.6)	0.025	14.1 (3.5)	0.10	12.5 (2.5)	0.028
Female	17 (6.1)	14.6 (2.0)		14.7 (2.7)		15.5 (3.0)		13.9 (2.5)	
Marital status									
Single	67 (23.9)	12.8 (2.6)	0.55	12.6 (2.5)	0.013	13.2 (3.5)	0.009	11.7 (2.4)	0.002
Married	213 (76.1)	13.0 (2.8)		13.5 (2.6)		14.5 (3.5)		12.8 (2.5)	
Having children under 2 years									
Yes	71 (25.4)	12.6 (2.7)	0.22	13.3 (2.1)	0.92	14.4 (3.4)	0.46	12.8 (2.3)	0.4
No	209 (74.6)	13.1 (2.8)		13.3 (2.7)		14.1 (3.5)		12.5 (2.6)	
Having children over 2 years									
Yes	115 (41.1)	13.3 (2.6)	0.10	13.7 (2.3)	0.031	14.9 (2.9)	0.002	12.9 (2.4)	0.10
No	165 (58.9)	12.8 (2.8)		13.0 (2.8)		13.7 (3.8)		12.4 (2.7)	
Educational level									
Elementary	55 (19.6)	12.1 (2.5)		12.6 (2.5)		13.4 (3.8)		11.7 (2.3)	
Diploma	141 (50.4)	13.1 (2.9)	0.026	13.6 (2.5)	0.052	14.3 (3.5)	0.192	12.7 (2.6)	0.016
University degree	84 (30.0)	13.3 (2.4)		13.1 (2.7)		14.4 (3.2)		12.9 (2.5)	
Sleep quality									
Very good	11 (3.9)	14.7 (4.7)		14.5 (4.3)		15.6 (4.8)		13.2 (3.7)	
Good	71 (25.4)	14.7 (2.0)		14.4 (2.1)		15.1 (2.7)		13.7 (2.2)	
Neither poor nor good	134 (47.9)	12.7 (2.4)	0.000	13.1 (2.3)	0.000	13.9 (3.3)	0.001	12.4 (2.2)	0.000
Poor	44 (15.7)	11.9 (2.3)		12.5 (2.6)		14.3 (3.7)		12.1 (2.7)	
Very poor	20 (7.1)	10.2 (2.7)		11.9 (3.6)		11.7 (4.6)		10.8 (3.1)	
Exercise activity									
No	163 (58.2)	12.5 (2.6)		13.0 (2.5)		13.8 (3.5)		12.3 (2.5)	
Once a week	63 (22.5)	13.4 (2.8)	0.003	13.7 (2.8)	0.134	14.4 (3.6)	0.186	12.7 (2.6)	0.044
Twice or thrice a week	42 (15.0)	13.8 (2.8)		13.6 (2.4)		15.1 (2.7)		13.2 (2.5)	
Every day	12 (4.3)	14.4 (2.8)		14.3 (2.5)		14.4 (4.5)		14.0 (2.3)	
Smoking									
Yes	33 (11.8)	11.3 (2.3)	0.000	12.2 (2.9)	0.010	13.1 (4.3)	0.057	10.8 (3.4)	0.002
No	247 (88.2)	13.2 (2.7)		13.4 (2.5)		14.3 (3.4)		12.8 (2.3)	
BMI (kg/m²)									
≤24.9	160 (57.1)	12.7 (2.7)		12.9 (2.7)		13.9 (3.6)		12.3 (2.6)	
25 - 29.9	101 (36.1)	13.3 (2.8)	0.102	13.7 (2.4)	0.008	14.5 (3.2)	0.307	12.8 (2.5)	0.162
≥30	19 (6.8)	13.6 (2.3)		14.3 (2.4)		14.6 (4.2)		13.3 (2.4)	

Table 2. Work-related factors of the study participants and HRQOL scores among different sub-groups (n = 280).

Characteristics	N (%)	Physical health		Psychological health		Social relationships		Environment	
		Mean (SD)	p-value	Mean (SD)	p-value	Mean (SD)	p-value	Mean (SD)	p-value
Job title									
Office	66 (23.6)	14.4 (2.4)	0.000	13.8 (2.3)	0.051	15.4 (2.5)	0.000	13.4 (2.1)	0.002
Other Jobs	214 (76.4)	12.5 (2.7)		13.1 (2.7)		13.8 (3.7)		12.3 (2.6)	
Job tenure (yr)									
≤5	212 (75.7)	12.9 (2.7)	0.304	13.1 (2.7)	0.011	14.0 (3.5)	0.228	12.5 (2.5)	0.218
>5	68 (24.3)	13.3 (3.0)		13.9 (2.1)		14.6 (3.6)		12.9 (2.6)	
Working schedule									
Day-work	163 (58.2)	13.6 (2.6)		13.9 (2.6)		14.8 (3.1)		13.3 (2.2)	
Two-shift	44 (15.7)	12.4 (2.7)	0.000	12.6 (2.4)	0.000	12.8 (4.1)	0.001	11.5 (2.9)	0.000
Three-shift	73 (26.1)	11.9 (2.5)		12.3 (2.3)		13.6 (3.6)		11.8 (2.5)	
Second job									
Yes	18 (6.4)	12.1 (2.5)	0.177	12.6 (2.6)	0.226	12.9 (3.9)	0.119	11.6 (3.0)	0.102
No	262 (93.6)	13.0 (2.7)		13.3 (2.6)		14.3 (3.5)		12.6 (2.5)	
Overtime working									
Yes	249 (88.9)	12.8 (2.7)	0.009	13.2 (2.6)	0.033	14.1 (3.6)	0.057	12.5 (2.5)	0.033
No	31 (11.1)	14.2 (2.6)		14.2 (2.3)		15.1 (2.8)		13.5 (2.4)	
Working hour									
≤8	37 (13.2)	14.4 (2.8)	0.001	14.3 (2.8)	0.015	15.3 (3.2)	0.043	13.9 (2.8)	0.000
>8	243 (86.8)	12.8 (2.7)		13.1 (2.6)		14.0 (3.5)		12.4 (2.4)	
Working demand									
Physical	58 (20.7)	12.6 (2.6)		12.5 (2.9)		13.0 (4.2)		12.2 (3.0)	
Mental	41 (14.6)	13.6 (2.5)	0.192	13.4 (2.0)	0.025	14.6 (3.1)	0.017	12.9 (2.3)	0.40
Physical-mental	181 (64.6)	13.0 (2.8)		13.5 (2.6)		14.5 (3.2)		12.6 (2.4)	
Working load									
Light	8 (2.9)	13.4 (2.8)		12.1 (4.2)		13.3 (4.4)		12.6 (4.2)	
Medium	112 (40.0)	13.5 (2.6)	0.037	13.4 (2.4)	0.408	14.2 (3.2)	0.786	12.7 (2.1)	0.728
Heavy	160 (57.1)	12.6 (2.8)		13.3 (2.6)		14.2 (3.6)		12.5 (2.7)	
Conflict between work and individual life									
Very much	77 (27.5)	11.5 (2.8)		12.5 (2.9)		13.3 (3.9)		11.8 (2.9)	
Much	53 (18.9)	12.2 (2.5)		12.5 (2.8)		13.2 (3.4)		12.0 (2.6)	
Somewhat	107 (38.2)	13.9 (2.4)	0.000	14.0 (2.1)	0.000	14.9 (3.2)	0.001	13.2 (2.1)	0.001
Low	35 (12.5)	14.2 (1.9)		13.7 (2.3)		15.2 (2.7)		12.9 (2.0)	
Very low	8 (2.9)	14.7 (3.5)		15.6 (2.3)		15.0 (4.8)		13.7 (3.1)	
Conflict between work and family life									
Very much	65 (23.2)	11.6 (2.7)		12.5 (2.8)		13.5 (3.7)		12.1 (3.0)	
Much	68 (24.3)	12.0 (2.2)		12.6 (2.4)		13.4 (3.2)		12.1 (2.4)	
Somewhat	94 (33.6)	13.6 (2.6)	0.000	13.8 (2.5)	0.000	14.5 (3.6)	0.012	12.9 (2.5)	0.020
Low	39 (13.9)	14.3 (2.1)		13.7 (2.2)		15.3 (2.4)		13.2 (1.9)	
Very low	14 (5.0)	15.9 (2.6)		15.3 (2.1)		15.7 (4.2)		13.6 (2.2)	
Conflict between work and social life									
Very much	70 (25.0)	11.6 (2.5)		12.6 (2.7)		13.5 (3.6)		12.0 (2.9)	
Much	73 (26.1)	11.8 (2.5)	0.000	12.5 (2.8)	0.000	13.0 (3.9)	0.000	11.9 (2.7)	0.000
Somewhat	85 (30.4)	14.1 (2.4)		14.0 (2.3)		15.0 (2.9)		13.3 (2.0)	

Continued

Low	41 (14.6)	14.3 (2.1)		13.9 (2)		15.5 (2.8)		13.2 (2.1)	
Very low	11 (3.9)	16.0 (2.3)		15.3 (2.0)		15.1 (3.6)		14.2 (1.9)	
Occupational accident									
Yes	84 (30.0)	12.4 (2.7)	0.015	13.0 (2.4)	0.258	13.9 (3.9)	0.436	11.9 (2.4)	0.002
No	196 (70.0)	13.2 (2.7)		13.4 (2.7)		14.3 (3.3)		12.9 (2.5)	
Occupational training									
Yes	153 (54.6)	13.2 (2.9)	0.224	13.6 (2.5)	0.020	14.4 (3.5)	0.166	12.7 (2.4)	0.443
No	127 (45.4)	12.8 (2.6)		12.9 (2.7)		13.9 (3.5)		12.5 (2.7)	
Job satisfaction									
Yes	167 (59.6)	13.7 (2.6)	0.000	13.8 (2.3)	0.000	14.9 (3.1)	0.000	13.2 (2.2)	0.000
No	113 (40.4)	11.9 (2.7)		12.6 (2.8)		13.1 (3.9)		11.7 (2.7)	

Table 3. Descriptive statistics of the domains of HRQOL of the participants (n = 280).

Characteristics	Mean (SD)	N (%)
Physical health	13.0 (2.7)	
Psychological health	13.3 (2.6)	
Social relationships	14.2 (3.5)	
Environment	12.6 (2.5)	
Overall QOL (q1)		
Very poor		22 (7.9)
Bad		31 (11.1)
Fair		116 (41.4)
Good		91 (32.5)
Very good		20 (7.1)
Overall general health (q2)		
Very poor		17 (6.1)
Bad		39 (13.9)
Fair		80 (28.6)
Good		105 (37.5)
Very good		38 (13.6)

health), job title (those with office works, had higher physical health), working schedules (those with three-shift schedules had lowest physical health), overtime working (those who worked overtimes had lower physical health), working hours per day (those who worked over eight hours per day had lower physical health), work load (the heavier the work load the lower the physical health), levels of conflict between work and individual life (the higher the conflict the lower the physical health), conflict between work and family life (the higher the conflict the lower the physical health) and conflict between work and social life (the higher the conflict the lower the physical health), levels of occupational accidents (those who had occupational accidents had lower physical health) and levels of job satisfaction (those who was satisfied with their jobs had higher physical health).

3.2. Results of Psychological Health Domain

The Mean (SD) of psychological health was 12.6 (2.2) and 13.8 (2.7) for the workers of Steel and Cosmetic factory, respectively. Independent *t*-tests indicated that Cosmetic factory workers had significantly higher psychological health compared to the steel factory workers. Psychological health significantly differed with age (the lower the worker's age the lower his or her psychological health), gender (lower psychological health in males), marital status (Singles had lower psychological health), having children over two years (those with children over two years had higher psychological health), sleep quality (the higher the sleep quality the higher the psychological health), smoking (those who did not smoke, had higher psychological health), BMI (those with higher BMI

had higher psychological health), Job tenure (those with lower than five years job tenure, had lower psychological health compared to those with higher than five years), working schedule (those with three-shift schedules had lower psychological health), overtime working (those who worked overtimes had lower psychological health), working hours per day (those who worked over eight hours per day had lower psychological health), working demands (those with both physical and mental demands had lower psychological health), levels of conflict between work and individual life (the higher the conflict the lower the psychological health), conflict between work and family life (the higher the conflict the lower the psychological health), and conflict between work and social life (the higher the conflict the lower the psychological health), occupational training (those who had occupational trainings had higher psychological health), and job satisfaction (those who was satisfied with their jobs had higher psychological health).

3.3. Results of Social Relationships Domain

The Mean (SD) of social relationships domain was 13.7 (3.4) and 14.5 (3.5) for the workers of steel and cosmetic factory, respectively. Independent *t*-tests indicated that the Cosmetic factory workers had significantly higher social relationships compared to steel factory workers. Social relationships significantly differed with age (those with 30 - 39 years old had higher social relationships), marital status (those who was married had higher social relationships), having children over two years (those with children over two years had higher social relationships), sleep quality (those with higher sleep quality had higher social relationships), job title (those with office jobs had higher social relationships), working schedule (those with two shift schedules had lowest social relationships), working hours per day (those who worked over eight hours per day, had lower social relationships), working demand (those with more physical work demands had lowest social relationships), levels of conflict between work and individual life (the lower the conflict, the higher the social relationships), conflict between work and family life (the lower the conflict, the higher the social relationships), and conflict between work and social life (the lower the conflict, the higher the social relationships), and job satisfaction (those who was satisfied with their job had higher social relationships).

3.4. Results of Environment Domain

The Mean (SD) of environment domain was 11.7 (2.5) and 13.1 (2.4) for the workers of steel and cosmetic factory, respectively. Independent *t*-tests indicated that Cosmetic factory workers had significantly higher scores on environment domain (*i.e.* better environmental conditions) compared to Steel factory workers. The environment domain significantly differed with age (the higher the worker's age the better his or her environment), gender (better environmental conditions for females), marital status (better environmental conditions for married workers), educational level (better environmental conditions for more educated workers), sleep quality (the lower the sleep quality the worst the environmental conditions), exercise activity (the more the exercise activity the better the environmental conditions), smoking (worst environmental conditions for those who smoked), job title (better environmental conditions for those who had office works), working schedule (better environmental conditions for those with day-work schedule), overtime working (better environmental conditions for those who did not work overtimes), levels of working hours per day (better environmental conditions for those with under 8 hour work per day), levels of conflict between work and individual life (better environmental conditions for those with lowest conflicts), conflict between work and family life (better environmental conditions for those with lowest conflicts), and conflict between work and social life (better environmental conditions for those with lowest conflicts), occupational accidents (better environmental conditions for those without occupational accidents), and job satisfaction (better environmental conditions for those who were satisfied with their jobs).

3.5. Multiple Linear Regression Analysis

The results of multiple linear regression analysis to predict the scores on each HRQOL domains are shown in **Table 4**. There are some differences in predictive variables of the four domains of HRQOL among the subjects. Poor sleep quality and working schedule had a negative relationship with all domains of HRQOL. In addition, among assessed independent variables, poor sleep quality had the highest standardized regression coefficients with physical health, psychological health and environment domains of HRQOL (−0.330, −0.229 and −0.202, respectively). The results of this analysis showed that explained variances (adjusted R^2) for physical health,

Table 4. Association between socio-demographic, health and work-related factors and domains of HRQOL (n = 280).

Characteristics	β*	SE	t	p-value
Physical health				
Job title Other jobs versus office jobs	−0.114	0.161	−2.288	0.023
Exercise activity No versus every day exercise	−0.159	0.229	−3.283	0.001
Working schedule Three-shift versus day-work	−0.116	0.158	−2.341	0.020
Poor sleep quality	−0.330	0.149	−6.549	0.000
Smoking (yes)	−0.129	0.205	−2.669	0.008
Conflict between work and social life	−0.270	0.125	5.253	0.000
Psychological health				
Working schedule Two-shift versus day-work	−0.190	0.188	−3.519	0.001
Single versus married	−0.111	0.164	−2.060	0.040
Working demand Physical versus Physical-mental	−0.151	0.174	−2.784	0.006
Poor sleep quality	−0.229	0.159	−4.067	0.000
BMI (kg/m²)	0.143	0.045	2.663	0.008
Conflict between work and individual life	−0.176	0.132	3.152	0.002
Social relationships				
Working schedule Two-shift versus day-work	−0.161	0.266	−2.833	0.005
Working demand Physical versus Physical-mental	−0.115	0.245	−2.012	0.045
Poor sleep quality	−0.151	0.223	−2.565	0.011
Conflict between work and individual life	−0.129	0.188	2.182	0.030
Having children over 2 years (yes)	0.142	0.198	2.557	0.011
Environment				
Working schedule Two-shift versus day-work	−0.174	0.189	−3.137	0.002
Smoking (yes)	−0.148	0.215	−2.717	0.007
Poor sleep quality	−0.202	0.152	−3.652	0.000
Working hour	−0.143	0.089	−2.462	0.014
Satisfaction (no)	−0.126	0.143	−2.281	0.023
Single versus married	−0.131	0.158	−2.465	0.014
Exercise activity No exercise versus every day	−0.107	0.234	−2.012	0.045

*Standardized regression coefficients derived from multivariate linear regression.

psychological health, social relationships and environment domains were 39%, 22%, 15% and 25%, respectively.

4. Discussion

In the present cross-sectional study, the researchers found that 60.4% of the participants did not feel "well" or "very well" in the question "how would you rate your quality of life?", and nearly half of them did not feel "well" or "very well" in the question "how satisfied are you with your health?". The results of the present paper revealed that the mean of environment domain was the lowest among four domain of HRQOL, which was similar to the results of other studies done among industrial workers [8] [10] [12] [15]. Moreover, the mean of physical

health were lower than that of Iranian general population [9]. The later result is consistent with conclusions drawn by Rostami *et al.* [16] who found that medical staff had lower physical health than the general population. The participants had more physical problems such as additional unhealthy working conditions and further unsafe work environments as compared to the general population. Previous studies have shown that these health problems may affect the HRQOL domains [8] [12]. Similarly, our results demonstrated that the steel factory workers who were exposed to higher occupational health problems and high-risk environments had lower means in the four domains of HRQOL as compared to the cosmetic factory workers. Multiple linear regression analysis indicated that a major factor affecting domains of HRQOL was sleep quality. Similar to the findings of other studies [17]-[19], those participants who had "very poor" sleep quality, had lower means in the domains of HRQOL as compared to those workers with "very well" sleep quality. This difference was particularly obvious in the physical health domain. Since sleep quality is an important aspect of health [20], it is obvious that poor sleep quality causes many physical and psychological health problems [17] [18] [21]. Additionally, our results indicated that shift workers (two- and three-shift workers) had lower means in the four domains of HRQOL than day workers. Similarly, researches demonstrated that sleep disturbances are among the most problematic issues shift workers face [22]-[24]. Nonstandard and irregular working schedules could result in fatigue, anxiety, depression, stress, gastrointestinal disorders, cardiovascular disorders, reproductive problems, and disturbances in family and social lives [25]-[27]. These problems can cause poor HRQOL among shift workers, those who have an irregular work schedules. We found that two-shift workers had lower mean in social relationships and environment domains as compared to three-shift workers and day-workers. Unfortunately, there are few published studies using HRQOL on two-shift workers, and drawing more deterministic conclusions, requires further studies on the influence of two-shift working on HRQOL.

The Mean of the four domains of HRQOL were higher among those workers who had occupational training compared to those who had not. As workers gain professional skills, their confidence and work performance increases and it in turn can lead to a promotion in HRQOL.

The findings of the present paper were similar to those of other studies [28] [29] which demonstrated a negative relationship between work-life conflicts and domains of HRQOL. Workers with "very much" conflicts between work and individual, family, and social lives had lower means in all domains of HRQOL than workers with "very low" conflicts. Linear regression analysis showed that conflict between work and individual life was a significant predictor of psychological health and social relationships domains, and conflict between work and social life was a significant predictor of physical health domain. The amount of time spent at work and irregularity of shift working are the most important job factors which affect work-life conflicts [30] [31]. The results also revealed that workers with daily working hours > 8 who also had a second job, had overtime working and irregular working schedules had lower means in domains of HRQOL than day-workers with daily working hours ≤ 8, without second job and overtime working.

4.1. Limitations

The cross-sectional design of our study does not allow the researchers to draw causal relationships among socio-demographic, health and work-related factors and domains of HRQOL. The present sample consisted of the industrial workers from only one province of Iran, namely Kohgiluyeh & Boyerahmad, and therefore the results may not be generalized to all Iranian industrial workers. Similarly, generalization may be limited by young mean age of the participants (31.39 years) and their low job tenure (4.47 years). Additionally, most of the participants were men (263 men versus 17 women); therefore, the present sample may not be representative of all Iranian industrial workers.

4.2. Conclusion

Together, workers participated in the present study had poor HRQOL, particularly in the environment domain. It can be concluded that sleep quality and working schedule are the most important predictors of HRQOL. Conflict between work and life was another significant predictor of levels of HRQOL. Work-related factors including unhealthy working conditions, unsafe work environments, long working hours, irregular working schedule, and the lack of occupational training may negatively influence HRQOL in industrial workers in our study. Consequently, to improve worker's HRQOL, interventional programs should focus on improving work environment, work schedule, occupational training, and restricting work hours.

Acknowledgements

Conflict of Interest

The authors have no competing interests to report.

References

[1] Sabbah, I., Sabbah, H., Khamis, R., Sabbah, S. and Droubi, N. (2013) Health Related Quality of Life of University Students in Lebanon: Lifestyles Behaviors and Socio-Demographic Predictors. *Health*, **5**, 1-12. http://dx.doi.org/10.4236/health.2013.57A4001

[2] Group, T.W. (1998) The World Health Organization Quality of life Assessment (WHOQOL): Development and General Psychometric Properties. *Social Science & Medicine*, **46**, 1569-1585. http://dx.doi.org/10.1016/S0277-9536(98)00009-4

[3] Zhu, C.-Y., Wang, J.-J., Fu, X.-H., Zhou, Z.-H., Zhao, J. and Wang, C.-X. (2012) Correlates of Quality of Life in China Rural-Urban Female Migrate Workers. *Quality of Life Research*, **21**, 495-503. http://dx.doi.org/10.1007/s11136-011-9950-3

[4] Watanabe, M., Tanaka, K., Aratake, Y., Kato, N. and Sakata, Y. (2008) The Impact of Effort-Reward Imbalance on Quality of Life among Japanese Working Men. *Industrial Health*, **46**, 217-222. http://dx.doi.org/10.2486/indhealth.46.217

[5] Zhu, C., Geng, Q., Yang, H., Chen, L., Fu, X. and Jiang, W. (2013) Quality of Life in China Rural-to-Urban Female Migrant Factory Workers: A Before-and-After Study. *Health and Quality of Life Outcomes*, **11**, 123. http://dx.doi.org/10.1186/1477-7525-11-123

[6] Wu, S.-Y., Li, H.-Y., Tian, J., Zhu, W., Li, J. and Wang, X.-R. (2011) Health-Related Quality of Life and Its Main Related Factors among Nurses in China. *Industrial Health*, **49**, 158-165. http://dx.doi.org/10.2486/indhealth.MS1160

[7] Tsai, S.-Y. (2012) A Study of the Health-Related Quality of Life and Work-Related Stress of White-Collar Migrant Workers. *International Journal of Environmental Research and Public Health*, **9**, 3740-3754. http://dx.doi.org/10.3390/ijerph9103740

[8] Yu, H.-M., Ren, X.-W., Chen, Q., Zhao, J.-Y., Zhu, T.-J. and Guo, Z.-X. (2008) Quality of Life of Coal Dust Workers without Pneumoconiosis in Mainland China. *Journal of Occupational Health*, **50**, 505-511. http://dx.doi.org/10.1539/joh.L7167

[9] Nedjat, S., Naieni, K.H., Mohammad, K., Majdzadeh, R. and Montazeri, A. (2011) Quality of Life among an Iranian General Population Sample Using the World Health Organization's Quality of Life Instrument (WHOQOL-BREF). *International Journal of Public Health*, **56**, 55-61. http://dx.doi.org/10.1007/s00038-010-0174-z

[10] dos Santos, M.F.O. and de Oliveira, H.J. (2011) Influence of Work-Related Variables on Quality of Life of Anesthesiologists in the City of Joao Pessoa. *Brazilian Journal of Anesthesiology*, **61**, 338-343. http://dx.doi.org/10.1016/S0034-7094(11)70039-3

[11] Silva, A.A., Souza, J.M.P.D., Borges, F.N.D.S. and Fischer, F.M. (2010) Health-Related Quality of Life and Working Conditions among Nursing Providers. *Revista de Saúde Pública*, **44**, 718-725. http://dx.doi.org/10.1590/S0034-89102010000400016

[12] Edimansyah, B.A., Rusli, B.N., Naing, L., Mohamed Rusli, B.A. and Winn, T. (2007) Relationship of Psychosocial Work Factors and Health-Related Quality of Life in Male Automotive Assembly Workers in Malaysia. *Industrial Health*, **45**, 437-448. http://dx.doi.org/10.2486/indhealth.45.437

[13] Skevington, S.M., Lotfy, M. and O'Connell, K.A. (2004) The World Health Organization's WHOQOL-BREF Quality of Life Assessment: Psychometric Properties and Results of the International Field Trial. A Report from the WHOQOL Group. *Quality of Life Research*, **13**, 299-310. http://dx.doi.org/10.1023/B:QURE.0000018486.91360.00

[14] Usefy, A., Ghassemi, G.R., Sarrafzadegan, N., Mallik, S., Baghaei, A. and Rabiei, K. (2010) Psychometric Properties of the WHOQOL-BREF in an Iranian Adult Sample. *Community Mental Health Journal*, **46**, 139-147. http://dx.doi.org/10.1007/s10597-009-9282-8

[15] Milosevic, M., Golubic, R., Knezevic, B., Golubic, K., Bubas, M. and Mustajbegovic, J. (2011) Work Ability as a Major Determinant of Clinical Nurses' Quality of Life. *Journal of Clinical Nursing*, **20**, 2931-2938. http://dx.doi.org/10.1111/j.1365-2702.2011.03703.x

[16] Rostami, A., Ghazinour, M., Nygren, L., Nojumi, M. and Richter, J. (2013) Health-Related Quality of Life, Marital Satisfaction, and Social Support in Medical Staff in Iran. *Applied Research in Quality of Life*, **8**, 385-402. http://dx.doi.org/10.1007/s11482-012-9190-x

[17] Faubel, R., Lopez-Garcia, E., Guallar-Castillón, P., Balboa-Castillo, T., Gutiérrez-Fisac, J.L., Banegas, J.R. and Rodríguez-Artalejo, F. (2009) Sleep Duration and Health-Related Quality of Life among Older Adults: A Population-Based Cohort in Spain. *Sleep*, **32**, 1059-1068.

[18] Zeitlhofer, J., Schmeiser-Rieder, A., Tribl, G., Rosenberger, A., Bolitschek, J., Kapfhammer, G., *et al.* (2000) Sleep and Quality of Life in the Austrian Population. *Acta Neurologica Scandinavica*, **102**, 249-257. http://dx.doi.org/10.1034/j.1600-0404.2000.102004249.x

[19] Yasuhara, Y., Kobayashi, H., Tanioka, T., Fujikawa, E., Fujinaga, H., Kongsuwan, W. and Locsin, R.C. (2013) Sleep Conditions and Quality of Life among Patients with Ischemic Heart Disease after Elective Percutaneous Coronary Intervention. *Health*, **5**, 532-537. http://dx.doi.org/10.4236/health.2013.53A072

[20] Shao, M.F., Chou, Y.C., Yeh, M.Y. and Tzeng, W.C. (2010) Sleep Quality and Quality of Life in Female Shift-Working Nurses. *Journal of Advanced Nursing*, **66**, 1565-1572. http://dx.doi.org/10.1111/j.1365-2648.2010.05300.x

[21] Magee, C.A., Caputi, P. and Iverson, D.C. (2011) Relationships between Self-Rated Health, Quality of Life and Sleep Duration in Middle Aged and Elderly Australians. *Sleep Medicine*, **12**, 346-350. http://dx.doi.org/10.1016/j.sleep.2010.09.013

[22] Nazifi, M., Mokarami, H., Akbaritabar, A., Kalte, H.O. and Rahi, A. (2014) Psychometric Properties of the Persian Translation of Pittsburgh Sleep Quality Index. *Health Scope*, **3**, e15547.

[23] Viaene, M., Vermeir, G. and Godderis, L. (2009) Sleep Disturbances and Occupational Exposure to Solvents. *Sleep Medicine Reviews*, **13**, 235-243. http://dx.doi.org/10.1016/j.smrv.2008.07.003

[24] Åkerstedt, T. (2003) Shift Work and Disturbed Sleep/Wakefulness. *Occupational Medicine*, **53**, 89-94. http://dx.doi.org/10.1093/occmed/kqg046

[25] Harrington, J.M. (2001) Health Effects of Shift Work and Extended Hours of Work. *Occupational and Environmental Medicine*, **58**, 68-72. http://dx.doi.org/10.1136/oem.58.1.68

[26] Caruso, C.C. (2014) Negative Impacts of Shiftwork and Long Work Hours. *Rehabilitation Nursing*, **39**, 16-25. http://dx.doi.org/10.1002/rnj.107

[27] Choobineh, A., Soltanzadeh, A., Tabatabaee, H., Jahangiri, M. and Khavaji, S. (2012) Health Effects Associated with Shift Work in 12-Hour Shift Schedule among Iranian Petrochemical Employees. *International Journal of Occupational Safety and Ergonomics*, **18**, 419-427.

[28] Allen, T.D., Herst, D.E., Bruck, C.S. and Sutton, M. (2000) Consequences Associated with Work-to-Family Conflict: A Review and Agenda for Future Research. *Journal of Occupational Health Psychology*, **5**, 278-308. http://dx.doi.org/10.1037/1076-8998.5.2.278

[29] Greenhaus, J.H., Collins, K.M. and Shaw, J.D. (2003) The Relation between Work-Family Balance and Quality of Life. *Journal of Vocational Behavior*, **63**, 510-531. http://dx.doi.org/10.1016/S0001-8791(02)00042-8

[30] Hämmig, O. and Bauer, G. (2009) Work-Life Imbalance and Mental Health among Male and Female Employees in Switzerland. *International Journal of Public Health*, **54**, 88-95. http://dx.doi.org/10.1007/s00038-009-8031-7

[31] Hämmig, O., Gutzwiller, F. and Bauer, G. (2009) Work-Life Conflict and Associations with Work- and Nonwork-Related Factors and with Physical and Mental Health Outcomes: A Nationally Representative Cross-Sectional Study in Switzerland. *BMC Public Health*, **9**, 435. http://dx.doi.org/10.1186/1471-2458-9-435