Analysis of Factors Affecting Quality of Life of Workers in Korea Participating in Leisure Activities Using Quantile Regression

Suhee Kim[1] & Junghee Kim[2]

[1] Research professor, Mo-Im Kim Nursing Research Institute, College of Nursing, Yonsei University, Seoul, Korea

[2] Doctoral student, Mo-Im Kim Nursing Research Institute, College of Nursing, Yonsei University, Seoul, Korea

Correspondence: Junghee Kim, College of Nursing, Yonsei University, 50-1 Yonsei-ro, Seodaemun-gu, Seoul, 03722, South KOREA. Tel: 82-2-2228-3306.

Abstract

Introduction: This study aimed to identify factors affecting the quality of life (QoL) of workers in Korea participating in leisure activities.

Methods: Cross-sectional survey data were collected from June 10 to June 20, 2013, examining QoL, job stress, social support, serious leisure, and health-related characteristics. Data from 101 participants were analyzed using t-tests, Pearson's correlation, multiple linear regression, and quantile regression.

Results: The workers' mean QoL score was 23.10. Significant predictors of mean QoL score were job stress, social support, and serious leisure. Job stress correlated strongly with QoL in workers who were at 10% (QoL=17.00, p=.013) and 25% (QoL=20.00, p=.001) of the QoL distribution. Social support and serious leisure correlated significantly with QoL in workers who were at 50% (QoL=24.00) and 75% (QoL=27.00) of the QoL distribution.

Conclusion: Quantile regression analysis identified factors affecting QoL in workers. Therefore, intervention strategies for increasing workers' QoL should be tailored to workers' QoL level.

Keywords: Quality of Life, job stress, workers, quantile, regression

1. Introduction

It is important to improve the health of the Korean workforce, as workers occupy a very large proportion of Korea's population (around 50%), and unhealthy lifestyle habits (e.g. smoking and drinking) of workers affect productivity by reducing work efficiency (J. Y. Lee et al., 2014). Alongside health, quality of life (QoL) implies concepts such as happiness, satisfaction, positive affect, and morale. QoL incorporates physical, mental, social, and economic factors, and comprehensively explains human well-being (WHOQOL group, 1995). Government and enterprises have therefore begun working to improve workers' overall QoL and health, and research has also addressed this goal.

To improve workers' QoL, the Korean government has used the Labor Standards Act Amendments of 2003 to gradually reduce the statutory working week to 40 hours over 5 days. As a result, workers spent 2,090 hours working annually in Korea in 2011, a reduction of 422 hours per year and 9 hours per week compared to 10 years prior (2,512 hours per year in 2000) (Organization for Economic Co-operation and Development, 2013). This increased leisure time has brought changes to workers' lives. While passive leisure activities such as resting have decreased, active leisure activities such as sport participation, and social leisure activities such as engaging in voluntary work or clubs, have increased (Y. S. Kim, 2011). To enhance the QoL of workers, both the government and corporations are facilitating leisure activities by establishing various welfare spaces such as ecological parks, experiential landscapes, and baseball fields (The Seoul Economic Daily, 2016). According to the national leisure activity survey conducted in 2014, 11.7% of people over 15 years of age have participated in club activities for leisure during the past year (Ministry of Culture, Sports and Tourism, 2014). The rate of participation in club activities was the same or increased compared to that of 2012 except for teenagers, and 91.5% of the club members reported satisfaction with current clubs (Ministry of Culture, Sports and Tourism, 2014).

Leisure activities such as sports and exercise, as well as social activities make people happier (Bakker, Demerouti,

Oerlemans, & Sonnentag, 2013). The lifestyle changes noted above increase the time available for self-development and leisure with family, enhanced leisure life satisfaction, and further increased happiness levels (Y. S. Kim, 2011). In working life, leisure activities reduce job stress, correlate positively with job satisfaction and organizational commitment, and ultimately increase QoL (Lim & Park, 2012; Brajša-Žganec, Merkaš, & Šverko, 2011; M. S. Lee & Langsner, 2010). However, as shown in the results of the national leisure activities survey, 8.5% of the club members reported dissatisfaction with current clubs (Ministry of Culture, Sports and Tourism, 2014), and there is still a difference in the QoL among workers participating in leisure activities. In other words, there are people who participate in leisure activities but still have low QoL due to other factors. Therefore, for those who are participating in leisure activities but have very high or low QoL, it is important to understand what factors affect the QoL before developing an effective intervention program for workers.

Social support can be considered a factor that improves QoL alongside leisure activities. Social support refers to information that provides one with the belief that one is cared for, loved, esteemed, valued, and belongs to a network of communication and mutual obligation (Cobb, 1976). Social support reduces job stress, boosts job satisfaction (Park, 2012), and improves workers' mental health and QoL (Lent et al., 2011; Stansfeld, Shipley, Head, Fuhrer, & Kivimaki, 2013).

Job stress may significantly reduce employees' job satisfaction and organizational commitment. In addition, working conditions are associated with psychological status such as depression and anxiety (Rusli, Edimansyah, & Naing, 2008). Further, job control and job demand are related with QoL (Rusli, Edimansyah, & Naing, 2008).

Recently, greater attention has been directed towards serious leisure, in which one may develop a valuable and interesting life by acquiring and using specific skills, knowledge and experience (Stebbins, 1992). Stebbins has also identified 6 characteristics that distinguish serious leisure from everyday leisure: perseverance, career, personal effort, durable benefits, strong identity, and unique ethos (Stebbins, 1992). Serious leisure refers to the systematic pursuit of an amateur, hobbyist, or volunteer, and serious leisure may yield personal benefits such as fulfillment, self-realization, self-expression, positive self-image, personal satisfaction, overall refreshment, and economic reward, as well as social benefits such as increased personal attractiveness, organizational achievement, and contribution to organizations' maintenance and development (Stebbins, 1992). In previous studies of serious leisure, regarding costs and rewards, members of the American Birding Association found that the benefits of the bird-watching experience were considered to greatly outweigh the costs (Lee & Scott, 2006), and in a study of quilting as a hobby, it was found that the quilts made by participants were perceived as a work expressing themselves as a woman as an intermediate understood by many other participants (King, 2001). Moreover, serious leisure is reported to improve QoL (Hwang, Kim, & Lee, 2011; Choi, 2012). In Korea, as legal working hours were changed to 40 hours per week, the number of people who are engaged in serious leisure activities such as club activities has increased. However, there is almost no research identifying the relationship between the amount of serious leisure activities undertaken by the workers, and their QoL.

Previous researchers have found that job-related factors such as working hours, job security, and wages affect the QoL of workers (Drobnič, Beham, & Präg, 2010), and that physical environments, health-promoting behavior, and health status directly affect QoL (Lee & Jung, 2011). In addition, workers vary with respect to the extent to which their QoL is affected by the various factors, despite participating in leisure activities. However, previous studies examining workers' QoL have principally identified factors affecting the dependent variable's average value (Lee & Jung, 2011) without identifying factors affecting extreme scores of the dependent variable. Thus, regardless of individual QoL scores, intervention programs would have been provided considering factors that affect the mean of QoL. These same interventions would not have been effective for workers with very low or high QoL, even if they were participating in leisure activities.

Factors affecting workers with relatively high or low QoL may differ. Hence, to develop effective workplace-based nursing interventions, it is necessary to examine extreme scores of QoL in workers who engage in leisure activities, and identify the factors affecting these workers' QoL. Quantile regression (QR) is useful in estimating how independent variables affect various quantiles of a dependent variable (Jun & Lee, 2013). However, ordinary least-squares regression (OLS) has been used in many studies and mainly identifies conditional mean of the dependent variable with respect to the values of the independent variable (Koenker & Hallock, 2001). OLS may produce less reliable results in extreme outlier and non-normal distribution (Koenker & Hallock, 2001) and hide some significant parts of the results distribution. It may be irrelevant to focus on the mean in a distribution that encompasses heterogeneous individuals (Binder & Coad, 2011). On the other hand, QR provides an effective way to identify effects in various parts of the distribution in this area of research (Cavrini, 2010). It can help to understand the various factors that affect individual well-being and account for the overall distribution of

dependent variables (Binder & Coad, 2011). QR may identify variations in independent variables' effects at varying levels of QoL. Previous studies using QR include a study of ecological factors across quantiles of preschoolers' BMI (H. S. Kim, Park, Park, & Kim, 2014) and a study of effective factors across quantiles of nursing students' critical thinking dispositions (Jun & Lee, 2013). As QR can identify factors affecting each level of the dependent variable, it is able to provide empirical data suited to the development and implementation of intervention strategies tailored to specific levels of worker QoL.

This study aimed to identify factors affecting the QoL of workers in Korea participating in leisure activities. Specifically, the study sought to answer the following research questions:

Research Question 1: What are the characteristics and the level of QoL among workers participating in recreational activities?

Research Question 2: What are the factors affecting high or low QoL ratings among workers?

2. Methods

2.1 Design and Participants

This study was a descriptive study using a cross-sectional survey to investigate factors affecting the QoL of workers engaging in leisure activities. Participants were workers who engaged in club activities in Seoul, such as dance sport, baseball, flute, or saxophone.

Participants understood the study's aims, and voluntarily participated in the study. Convenience sampling was used. The survey was administered to 110 workers engaging in club activities; 106 participants responded, and 101 of their responses were used in the final analysis, after eliminating 5 responses that were insincere. For calculating study power, an effect size of 0.15, a significance level of 0.05, total sample size of 101, and 4 predictors were entered into the G power program (Version 3.1.5). The calculated power result was 0.877, which indicated that the sample size in this study was adequate for linear regression analyses.

This study received approval from the Institutional Review Board of Yonsei University, School of Nursing (IRB 2013-1017). Informed consent was obtained from all participants, following explanation of the study's purposes. Regarding confidentiality, personal information was not recorded, and ID numbers were assigned to collected questionnaires for management.

2.2 Instruments

2.2.1 Quality of Life

Regarding QoL, the satisfaction with life scale (SWLS) developed by Diener, Emmons, Larsen and Griffin (1985) was used. The SWLS consists of 5 items; responses use a 7-point Likert scale, ranging from "strongly disagree" to "strongly agree" for each of the 5 items. Scores range from 5 to 35 points and higher scores indicate greater QoL, with score ranges indicating the following: 5–9: extreme dissatisfaction; 10–14: dissatisfaction; 15–19: slight dissatisfaction; 20: neutral; 21–25: slight satisfaction; 26–30: satisfaction; and 31–35: extreme satisfaction. Regarding reliability, Cronbach's α was .87 when the scale was first used, and was .88 in this study.

2.2.2 Job Stress

Regarding job stress, 24 items from the Korean Occupational Stress Scale Short Form (KOSS-SF) developed by the Korea Occupational Safety & Health Agency (Chang et al., 2005), were used. The KOSS-SF consists of 7 subscales: job demand (4 items), insufficient job control (4 items), interpersonal conflict (3 items), job insecurity (2 items), organizational system (4 items), lack of reward (3 items), and occupational climate (4 items). Participants submitted responses for each of these subscales on a 4-point scale. Scores were converted into percentage points, with higher scores indicating more job stress. Each subscale's Cronbach's α was .512–.822 when the scale was first used. In this study, Cronbach's α for the subscales was as follows: job demand=.715; insufficient job control=.612; interpersonal conflict=.700; job insecurity=.665; organizational system=.770; lack of reward=.564; and occupational climate=.702. Total reliability was .755.

2.2.3 Social Support

The social support scale (SSS) developed by J. W. Park (1985), and modified and supplemented by Y. S. Kim (1995) was used. The scale consists of 25 items distributed over 4 sub-scales: emotional support (7 items), material support (6 items), informational support (6 items), and appraisal support (6 items). Responses use a 5-point scale, and thus, the scores range from 25 to 125 points. Higher scores indicate greater social support. Cronbach's α was .94 when the scale was first used. In Y. S. Kim (1995) it was .97. In this study, the Cronbach's α for the 4 sub-scales was as follows: emotional support=.857, informational support=.842, material support=.825, and

appraisal support=.832. Total reliability was .950.

2.2.4 Serious Leisure

The serious leisure scale (SLS), developed by M. L. Kim (2009a), consists of 29 items distributed over 6 sub-scales: perseverance (3 items), career (3 items), effort (3 items), internal reward (7 items), identification (7 items), and unique ethos (6 items). Responses use a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree). Higher scores indicated greater serious leisure. Sub-scales' Cronbach's α was .811–.917 when the scale was first used. In this study, the Cronbach's α for the respective sub-scales was as follows: perseverance=.856, career=.812, effort=.870, internal reward=.925, identification=.912, and unique ethos=.873. The SLS' overall Cronbach's α was .947, indicating high reliability.

2.3 Data Collection Procedures

Data were collected from June 10 until June 20, 2013; respondents were workers, least 20 years of age, who were current members of clubs, participating in activities on an ongoing basis. Regarding data collection methods, study researchers or trained survey researchers visited clubs, introduced the study's aims to potential participants, and asked if potential participants would like to participate in the survey. Individuals who agreed to participate self-administered a structured questionnaire, and a toothbrush set worth KRW2000 was provided as compensation for participation.

2.4 Data Analysis

Data was analyzed using SPSS 21.0 and STATA 13.0. Regarding general participant characteristics, frequency analysis was used to calculate real values, percentages, the mean, and the standard deviation. Differences in QoL between levels of general characteristics were analyzed by *t*-test. Correlations between key variables, including QoL, were analyzed using Pearson's correlation. Multiple linear regression (MLR) and QR were used to verify factors affecting workers' QoL. In this study, the number of bootstraps was designated as 1000, and QR was performed with QoL scores divided between the 10th, 25th, 50th, 75th, and 90th percentiles.

3. Results

3.1 General Characteristics and QoL

Of 101 participants who reported engaging in leisure activities, 53.5% were female. Of these 101 participants, single workers accounted for 83.8%. Three quarters of participants (79.0%) were permanent employees. Workers participating in music-related activities made up 23.8% of participants, compared to 76.2% in exercise-related clubs. In addition, 82.0% of participants were non-smokers, 53% drank once a month or more, and less than one-third (29.7%) reported engaging in vigorous physical activity at least 3 days a week. Comparison of QoL with participant characteristics indicated a significant relationship between QoL and reported feelings of health (p=.037) (Table 1).

Table 1. QoL by General Characteristics (N = 101)

Characteristics	Category		n (%)	QoL		
				Mean ± SD	t/F	p
Demographic characteristics	Sex	Male	47 (46.5)	22.87 ± 5.02	-0.42	.679
		Female	54 (53.5)	23.30 ± 5.22		
	Marital status	Single	83 (83.8)	22.82 ± 5.34	-1.20	.232
		Married	16 (16.2)	24.50 ± 3.71		
	Educational level	≦College	27 (27.0)	23.07 ± 5.62	0.01	.996
		≧University	73 (73.0)	23.07 ± 4.97		
Job-related characteristics	Employment type	Permanent worker	79 (79.0)	22.58 ± 5.29	-1.76	.081
		Temporary worker	21 (21.0)	24.76 ± 3.96		
	Occupation type	Administrator, Senior executive	3 (3.0)	28.67 ± 4.04	1.78	.140
		Professional	42 (41.6)	22.24 ± 5.31		
		Office worker	41 (40.6)	23.49 ± 4.68		
		Service or sales worker	7 (6.9)	24.29 ± 3.45		
		Laborer	2 (2.0)	27.00 ± 1.41		
Leisure-related characteristics	Leisure type	Musical instrument club	24 (23.8)	24.17 ± 4.97	1.18	.243
		Exercise club	77 (76.2)	22.77 ± 5.13		
Health-related characteristics	Chronic disease	No	61 (64.2)	22.70 ± 5.13	-0.48	.635
		Yes	34 (35.8)	23.24 ± 5.34		
	Health status	Healthy	81 (89.0)	23.41 ± 4.78	2.11	.037
		≦Moderate	10 (11.0)	19.90 ± 6.26		
	Smoking	No	82 (82.0)	23.07 ± 5.23	0.01	.990
		Yes	18 (18.0)	23.06 ± 4.75		
	Alcohol use	<1 time per month	47 (47.0)	23.51 ± 5.09	0.81	.421
		≧1 time per month	53 (53.0)	22.68 ± 5.17		
	Vigorous physical activity	< 3 days per week	71 (70.3)	22.62 ± 4.41	-1.26	.215
		≧ 3 days per week	30 (29.7)	24.23 ± 6.40		

3.2 Correlation between Main Variables and QoL

The mean QoL score was 23.10 (±5.11), with a range of 5–35. Job stress, social support, and serious leisure were all found to be significantly correlated with workers' QoL. Participants' mean job stress score was 41.63 (±8.92) and job stress scores were found to be negatively related to QoL (r=-.28, p=.004). Among sub-scales of job stress, insufficient job control and organizational system were significantly correlated with QoL (p=.045, p=.009, respectively). The mean social support score was 94.98 (±11.91); social support scores were found to be positively correlated with QoL (r=.37, p<.001). Sub-scales of social support (e.g. emotional, material, informational, and appraisal) were all significantly correlated with QoL. The mean serious leisure score was 5.22 (±0.69); serious leisure scores were found to be positively related to QoL (r=.38, p<.001). Regarding the sub-scales of serious leisure, the internal reward score was the highest (5.89). However, the relationship between internal reward and

QoL was not significant. Scores on other sub-scales (e.g. perseverance, career, effort, identification, and unique ethos) were significantly correlated with QoL (Table 2).

Table 2. Correlation between main variables and QoL (N = 101)

Variables		M ± SD	Range	r	p
QoL		23.10 ± 5.11	5–35	1	
Age		33.16 ± 6.35	24–60	.02	.827
Monthly income (USD)		2,768 ± 2,741	1,134–26,173	.03	.772
Work hours (weekly)		35.71 ± 18.05	8–80	-.05	.617
Period of leisure participation (monthly)		29.65 ± 30.41	1–120	.03	.759
Frequency of leisure participation		1.92 ± 1.17	1–6	.18	.082
Job Stress	Total	41.63 ± 8.92	0–100	-.28	.004
	Job demand	58.25 ± 18.65	0–100	-.09	.366
	Insufficient job control	36.11 ± 16.75	0–100	-.20	.045
	Interpersonal conflict	41.27 ± 19.05	0–100	-.09	.357
	Job insecurity	34.82 ± 24.16	0–100	-.15	.128
	Organizational system	43.25 ± 17.23	0–100	-.26	.009
	Lack of reward	38.72 ± 15.66	0–100	-.16	.108
	Occupational climate	38.28 ± 19.55	0–100	-.05	.596
Social Support	Total	94.98 ± 11.91	25–125	.37	.000
	Emotional support	3.83 ± 0.51	1–5	.35	.000
	Material support	3.64 ± 0.57	1–5	.30	.002
	Informational support	3.80 ± 0.52	1–5	.32	.001
	Appraisal support	3.86 ± 0.52	1–5	.42	.000
Serious Leisure	Total	5.22 ± 0.69	1–7	.38	.000
	Perseverance	5.33 ± 1.01	1–7	.28	.004
	Career	4.01 ± 1.12	1–7	.24	.017
	Effort	4.85 ± 1.00	1–7	.39	.000
	Internal reward	5.89 ± 0.75	1–7	.18	.070
	Identification	5.04 ± 0.94	1–7	.41	.000
	Unique ethos	5.38 ± 0.81	1–7	.22	.026

3.3 Comparison of MLR and Quantile Regression Analysis

In MLR analysis, job stress (p=.002), serious leisure (p=.003), and social support (p=.024) were found to be significantly correlated with workers' QoL. In the upper 50% and 75% groups of the QoL distribution, serious leisure (p=.004, p=.002, respectively) and social support (p=.004, p=.030, respectively) showed significant effects. In the bottom 10% and 25% groups, serious leisure and social support no longer showed significant effects, though job stress showed a significant effect (p=.013, p=.001, respectively) (Table 3).

Table 3. Workers' Quantile Regression Results by QoL

Variables	MLR (23.10)	Quantile regression (QoL)				
		10% (17.00)	25% (20.00)	50% (24.00)	75% (27.00)	90% (30.00)
Job Stress	-0.169**	-0.246*	-0.260**	-0.140	-0.012	-0.095
Serious Leisure	0.076**	0.086	0.074	0.090**	0.090**	0.035
Social Support	0.094*	0.053	0.105	0.105**	0.100*	0.087

Controlling for health status.

*p < .05, **p < .01

4. Discussion

This study's participants were employees aged 20–60 years, who worked an average of 35 hours per week, and engaged in club activities. Their average QoL score was 23.1, indicating slight satisfaction according to Diener's SWLS. Participants scored higher than the mean QoL for college students and adults (21.16 points; Lim, Lee, & Suh, 2010, 20.4 points; Pavot & Diener, 2008), and higher than the mean QoL for employees working in the DaeJeon area (20.02 points; Lee & Jung, 2011). Compared with the study conducted in Turkey, it was higher than the score of university students (21.91 points) and correctional officers (15.68 points) (Durak, Senol-Durak, & Gencoz, 2010). It may be that the mean QoL score estimated in this study was greater than the scores from previous research, because this study's participants engaged in leisure activities, worked an average of 35.7 hours per week (less than the statutory working week of 40 hours), and earned an average of over 2,700 dollars per month.

Participants' average social support score was about 3.80 (5-point scale), which was higher than migrant workers in Korea (3.75 points; Lee, Lee, Kim, & Kim, 2009) and higher than middle-aged women (3.58 points; Heo, & Tae, 2014). Participants' average job stress score was 41.63, which was lower than that of chief executive directors of nursing departments in hospitals (66.86) (K. O. Park, 2012), and lower than that of male and female employees in large-scale domestic workplaces (45.3 and 48.6, respectively) (Park & Jung, 2010). This study's participants may have elevated social support due to club activities; participants' lowered job stress may be due to relatively stable working conditions and fewer working hours, as mentioned above.

Participants' average serious leisure score was 5.22, with internal reward giving the highest scores (5.89), and career giving the lowest (4.01). M. L. Kim (2009b) examined individuals engaging in sport leisure; average scores on sub-scales in that study were perseverance, 5.23; career, 5.08; effort, 5.39; internal reward, 5.51; identification, 5.22; unique ethos, 5.47. In our study, internal reward scores were high, while career scores were low. While M. L. Kim (2009b) examined individuals who engaged in sport competition (e.g. community baseball tournaments, amateur tennis tournaments, and amateur football leagues), our study examined individuals who engaged in club activities, some of whom had recently started their activity or participated in their activity for a short time, and therefore exhibited lower expertise. Nonetheless, in the same study, office workers and college students attending a general physical education class whose survey results were compared to those of the serious leisure group showed average sub-scale scores ranging from 4.17 to 4.93 (Kim, 2009b). Compared to those scores, this study's participants showed higher serious leisure scores, particularly regarding internal reward.

Factors affecting workers' QoL varied depending on QoL level. Regarding participants in the lowest 10% (QoL=17.00) and 25% (QoL=20.00) of the QoL distribution, job stress was the only significant factor, and was negatively correlated with QoL. Job stress may diminish job satisfaction and organizational commitment, and it has been reported that, among hospital workers, hotel staff and white-collar migrant workers, higher job stress results in lower QoL (Tsai, 2012). Therefore, instead of encouraging serious leisure activities that require more involvement, time, and cost for workers with low QoL even if they have everyday leisure activities, health managers need to find out if their employees are under stress in their current job and try to reduce them with company executives. This is a more difficult, but is a more productive approach to assisting workers with particularly low QoL.

For participants in the upper 50% (QoL=24.00) and 75% (QoL=27.00) of the QoL distribution, social support and serious leisure, rather than job stress, were significantly correlated with QoL, with higher social support and serious leisure being associated with greater QoL. Similarly, a study examining Italian school teachers found that

social support-related self-efficacy directly affects job satisfaction, and that job satisfaction positively affects QoL (Lent et al., 2011). Stansfeld, Shipley, Head, Fuhrer, and Kivimaki (2013) who examined British citizens, found that working environment and personal social support significantly affect subjective well-being, which is consistent with the findings or our study. Additionally, Hwang, Kim, and Lee (2011), who examined adults in Seoul, GyeongGi, and ChungNam, Korea regarding associations between serious leisure and QoL, found the same result, and also noted that serious leisure positively affects QoL not only directly, but also through the mediating effect of leisure satisfaction. In our study, when the analysis was applied to all 101 workers, the score of serious leisure was the highest in the internal reward area, whereas the correlation and the significance were the highest in effort and identification areas. In the previous research, women who quilted felt that they were satisfied with expressing themselves through their quilting work (King, 2001). It is necessary for the workers to understand what positively influences the QoL while participating in serious leisure. Based on the results of this study, health managers should try to encourage serious leisure and provide social support to maintain higher QoL for workers with high QoL.

In this study, MLR and QR were used to examine factors affecting workers' QoL. MLR, which analyzes the mean of the dependent variable and its relationships with independent variables, is limited in as much as values not close to the dependent variable's mean value may not be used in the analysis (Hao & Naiman, 2007; Jun & Lee, 2013). By contrast, QR, which is able to verify factors affecting various levels of the dependent variable (e.g. the 10th, 25th, and 75th percentiles), rather than the mean of the dependent variable, is able to generate more accurate and in-depth results. In this study, MLR analysis of factors influencing workers' QoL found job stress, serious leisure, and social support to be significant predictive factors; however, QR analysis of the lowest 10% and 25% groups identified only job stress as significantly predicting QoL, while serious leisure and social support, rather than job stress, significantly predicted QoL for the upper 50% and 75% groups. The lowest 10% and 25% QoL groups may be considered top-priority intervention targets for workplace health promotion programs, and it will be of great benefit to identify factors affecting these individuals' QoL in order to design more efficient health promotion programs.

This study's results suggest that interventions aiming to improve workers' QoL may require different strategies depending on the target population's QoL level. For example, interventions targeting workers with low QoL should aim to reduce job stress, rather than implement social support or serious leisure. In this study, the stress of job demand was the most influential among the sub-scales of job stress. Similarly, additional concrete stress factors should be identified, and company policy and resources should be mobilized to address identified stress factors. Thus, by providing suitable stress management strategies, it will be possible to improve workers' low QoL. By contrast, regarding workers with high QoL, social support and serious leisure should be promoted to further enhance these workers' QoL.

This study examined workers who engaged in leisure activities, who were selected by accessible extraction; further, not all occupations were included. The generalizability of this study's results to all workers is therefore limited. This study is nonetheless significant because, by identifying factors affecting various levels of QoL in workers, it provides evidence supporting development of tailored, rather than standardized, intervention programs for groups with low or high QoL.

5. Conclusions

This was a descriptive study that investigated the QoL of workers who engage in leisure activities, and identified factors affecting these workers' QoL. Participants' QoL scores indicated that they were "slightly satisfied". QR analysis of factors affecting participants' QoL indicated that, regarding workers in the lowest 10% and 25% of the QoL distribution, job stress was the only assessed factor that was correlated with QoL, and that, regarding the top 75% and 50% of the QoL distribution, social support and serious leisure were correlated with QoL. QR analysis effectively identified factors affecting the low or high QoL group. Although workers participate in leisure activities, the lowest 10% and 25% QoL groups may be considered top-priority intervention targets for workplace health promotion programs. Thus, by providing suitable stress management strategies, it will be possible to improve workers' low QoL.

Competing Interests Statement

The authors declare that there are no conflicts of interest.

Ethics and Consent

Ethical approval was obtained from the Institutional Review Board of Yonsei University, School of Nursing (IRB 2013-1017). Agreement to participate was received from all participants, following explanation of the study's purposes.

Authors' Contributions

Suhee Kim and Junghee Kim were mainly responsible for study design and analysis. Junghee Kim provided technical and material support. Suhee Kim was principal investigator and supervised the study.

References

Bakker, A. B., Demerouti, E., Oerlemans, W., & Sonnentag, S. (2013). Workaholism and daily recovery: A day reconstruction study of leisure activities. *Journal of Organizational Behavior*, *34*(1), 87-107. https://doi.org/10.1002/job.1796

Binder, M., & Coad, A. (2011). From average joe's happiness to miserable jane and cheerful john: using quantile regressions to analyze the full subjective well-being distribution. *Journal of Economic Behavior & Organization*, *79*(3), 275-290. https://doi.org/10.1016/j.jebo.2011.02.005

Brajša-Žganec, A., Merkaš, M., & Šverko, I. (2011). Quality of life and leisure activities: How do leisure activities contribute to subjective well-being?. *Social Indicators Research, 102*(1), 81-91. https://doi.org /10.1007/s11205-010-9724-2

Cavrini, G. (2010). A quantile regression approach for modelling a health-related quality of life measure. *Statistica*, *70*(3), 273.

Chang, S. J., Koh, S. B., Kang, D., Kim, S. A., Kang, M. G., Lee, C. G., ... Kim, J. W. (2005). Developing an occupational stress scale for Korean employees. *Korean Journal of Occupational and Environmental Medicine*, *17*(4), 297-317.

Choi, Y. S. (2012). The effects of participation in leisure activities on leisure satisfaction and life satisfaction: focused on hospital nurse. *Korea Journal of Tourism and Hospitality Research, 26*(2), 381-397.

Cobb, S. (1976). Social support as a moderator of life stress. *Psychosomatic Medicine, 38*(5), 300-314.

Diener, E. D., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment, 49*(1), 71-75.

Drobnič, S., Beham, B., & Präg, P. (2010). Good job, good life? working conditions and quality of life in Europe. *Social Indicators Research, 99*(2), 205-225. https://doi.org/10.1007/s11205-010-9586-7

Durak, M., Senol-Durak, E., & Gencoz, T. (2010). Psychometric properties of the satisfaction with life scale among Turkish university students, correctional officers, and elderly adults. *Social Indicators Research, 99*(3), 413-429. https://doi.org/10.1007/s11205-010-9589-4

Hao, L., & Naiman, D. Q. (2007). *Quantile regression: Sage Publications*, Incorporated.

Heo, J. E., & Tae, Y. S. (2014). Influence of spiritual wellbeing and social support on depression in middle-aged women. *Korean Journal of Adult Nursing, 26*(2), 181-190. http://dx.doi.org/10.7475/kjan.2014.26.2.181

Hwang, S. H., Kim, M. L., & Lee, Y. J. (2011). Investigating the mediation effect of leisure satisfaction on the relationship between serious leisure and perceived quality of life. *Journal of Leisure Studies, 9*(2), 1-16.

Jun, W. H., & Lee, E. J. (2013). Effects of S-PBL in fundamental nursing practicum among nursing students: comparision analysis of a ordinary least square and a quantile regression for critical thinking disposition. *The Journal of the Korea Contents Association, 13*(11), 1036-1045. https://doi.org/10.5392 /JKCA.2013.13.11.1036

Kim, H. S., Park, Y. H., Park, H. B., & Kim, S. H. (2014). Estimation of effects of factors related to preschooler body mass index using quantile regression model. *Asian Nursing Research, 8*(4), 293-299. https://doi.org/10.1016/j.anr.2014.07.005

Kim, M. L. (2009a). Development for serious leisure scale (SLS). *The Korean Journal of Physical Education, 48*(4), 397-408.

Kim, M. L. (2009b). Development and validation of the serious leisure exercise scale. *Korean Journal of Sport Psychology, 20*(4), 217-228.

Kim, Y. S. (1995). *Study on relationship between life satisfaction and perceived social support among adults with*

mental disorders. Unpublished master's thesis, Ehwa University, Seoul.

Kim, Y. S. (2011). The effect of 40-hour work week system on leisure life of workers. *Korean Journal of Labor Studies*, *17*(1), 37-71.

King, F. L. (2001). Social dynamics of quilting. *World Leisure Journal*, *43*(2), 26-29. http://dx.doi.org/10.10 80/04419057.2001.9674227

Koenker, R., & Hallock, K. (2001). Quantile regression [Electronic version]. *Journal of Economic Perspectives, 15*(4), 143-156.

Lee, B. I., & Jung, H. S. (2011). A predictive model of workers' quality of life. *Korean Journal of Occupational Health Nursing, 20*(1), 35-45. http://dx.doi.org/10.5807/kjohn.2011.20.1.035

Lee, J. H., & Scott, D. (2006). For better or worse? A structural model of the benefits and costs associated with recreational specialization. *Leisure Sciences*, *28*(1), 17-38. http://dx.doi.org/10.1080/01490400590962461

Lee, J. Y., Kang, S. J., Kang, H. S., Kim, G. S., Kim, B. J., Kim, E. K., … Han, J. Y. (2014). *Theory and practice of community health nursing*. Seoul: Hyunmoon.

Lee, M. S., & Langsner, S. J. (2010). The effect of Leisure Activity on We-ness and Job stress of workers. *Journal of Leisure and Recreation Studies, 34*(1), 227-236.

Lee, S. H., Lee, Y. J., Kim, S. Y., & Kim, S. J. (2009). Social support and acculturative stress in migrant workers. *Journal of Korean Academy of Nursing, 39*(6), 899-910. http://dx.doi.org/10.4040/jkan.2009.39.6.899

Lent, R. W., Nota, L., Soresi, S., Ginevra, M. C., Duffy, R. D., & Brown, S. D. (2011). Predicting the job and life satisfaction of Italian teachers: test of a social cognitive model. *Journal of Vocational Behavior, 79*(1), 91-97. http://dx.doi.org/10.1016/j.jvb.2010.12.006

Lim, N., Lee, H., & Suh, E. M. (2010). Review of the satisfaction with life scale (SWLS) findings in Korea. *Korean Journal of Psychology: General, 29*(1), 21-47.

Lim, S., & Park, S. (2012) Mediating effect of job satisfaction in the relationship between leisure satisfaction and organization commitment according to individual versus group leisure activity of the employees. *Korean Journal of Industrial and Organizational Psychology, 25*(1), 171-193.

Mark, G., & Smith, A. P. (2012). Occupational stress, job characteristics, coping, and the mental health of nurses. *British journal of health psychology, 17*(3), 505-521. https://doi.org/10.1111/j.2044-8287.2011.02051.x.

Ministry of Culture, Sports and Tourism. (2014). *2014 National leisure activity survey*. Retrieved from http://www.mcst.go.kr/web/s_data/research/researchView.jsp?pSeq=1562&pMenuCD=0406000000&pCurr entPage=7&pTypeDept=&pSearchType=01&pSearchWord=

Organisation for Economic Co-operation and Development. (2013). *Average annual hours actually worked per worker*. Retrieved April 6, 2013, from http://stats.oecd.org/index.aspx?queryid=27359#

Park, H. J., & Jung, H. S. (2010). Health behaviors by job stress level in large-sized company with male and female workers. *Journal of Korean Academy of Nursing, 40*(6), 852-862. https://doi.org/10.4040/jkan.2010.40.6.852

Park, J. W. (1985). *(A) Study to development a scale of social support*. Unpublished doctoral dissertation, Yonsei University, Seoul.

Park, K. O., Kim, J. K., Kim, S. Y., & Chang, S. j. (2012). A model on turnover intention of chief nurse officers. *Journal of Korean Academy of Nursing*, *42*(1), 9-18. https://doi.org/10.4040/jkan.2012.42.1.9

Pavot, W., & Diener, E. (2008). The satisfaction with life scale and the emerging construct of life satisfaction. *The Journal of Positive Psychology, 3*(2), 137-152. https://doi.org/10.1080/17439760701756946

Rusli, B. N., Edimansyah, B. A., & Naing, L. (2008). Working conditions, self-perceived stress, anxiety, depression and quality of life: a structural equation modelling approach. *BMC Public Health*, *8*(1), 1. https://doi.org/10.1186/1471-2458-8-48

Stansfeld, S. A., Shipley, M. J., Head, J., Fuhrer, R., & Kivimaki, M. (2013). Work characteristics and personal social support as determinants of subjective well-being. *PloS one, 8*(11), e81115. https://doi.org/10.1371/journal.pone.0081115.

Stebbins, R. A. (1992). *Amateur, professionals and serious leisure*. Montreal, Quebec: McGill Queen's University Press.

The Seoul Economic Daily. (2016*). [Consumer & Business] Samsung "Family happy employee, good job and*

good law" Family friendly welfare. Retrieved from http://www.sedaily.com/NewsView/1L5CF9K69I

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*(10), 3740-3754. https://doi.org/10.3390/ijerph9103740

WHOQOL group. (1995). The World Health Organization quality of life assessment (WHOQOL): position paper from the World Health Organization. *Social science & medicine, 41*(10), 1403-1409. https://doi.org/10.1016/0277-9536(95)00112-K