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Article

Maritime Workers' Quality of Life: Organizational Culture, Self-efficacy, and Perceived Fatigue

Jae-hee Kim[1] and Soong-nang Jang [2*]

[1] Department of Nursing, Hyejeon College, 25 Daehak-gil, Hongseong-eup, Hongseong-gun, Chungcheongnam-do, 32244, Republic of Korea; jh6857@naver.com
[2] Red Cross College of Nursing, Chung-Ang University, 84 Heukseok-ro, Dongjak-gu, Seoul, 157-657, Republic of Korea; sjang@cau.ac.kr
*Correspondence: sjang@cau.ac.kr; Tel: 8202-820-5806

Abstract Using the culture-work-health model, this study investigates the factors influencing the quality of life of maritime workers. This study conducted a survey of 320 maritime workers who have experience living and working on a ship for more than six months. This self-administered questionnaire included questions on organizational culture and support, self-efficacy, perceived fatigue, as well as the quality of work life. Organizational culture and self-efficacy were identified as factors affecting the quality of work life, while organizational support was found to have an indirect effect after passing through self-efficacy and perceived fatigue. The final model accounts for 63.1% of the variance in maritime workers' quality of life. As such, this study shows that self-efficacy is important for the quality of life of maritime workers, having both direct and indirect effects. Moreover, organizational support may prove the primary intervention point for relieving perceived fatigue and enhancing self-efficacy, thus improving the quality of work life.

Keywords: quality of work life; organizational culture; organizational support; self-efficacy; maritime workers; culture-work-health model

1. Introduction

An individual's quality of life is directly influenced by their job, which shapes both their economic and health status. Indeed, job-related stress is known to have a negative influence on the health and quality of work life [1]. Maritime workers spend more than six months onboard a ship once leaving port. They are typically exposed to a poor working environment—with high noise levels due to the ship's onboard operations—while having to cope with physiological changes resulting from three-shift work. Meanwhile, the diverse and rapid changes to the natural environmental changes while at sea make maintaining physical homeostasis difficult [2]. Maritime workers thus endure a highly stressful work environment, and endure significant degree of fatigue relative to other areas of employment. The accumulated stress and fatigue have a direct negative effect on maritime workers' health that may threaten both their own safety and that of their colleagues and lead to operational accidents.

These issues are compounded by the current conditions in the shipping industry. Onboard cultural clashes occur frequently because of the multinational workforce. Moreover, as a result of the reinforcement of the International Convention and depression in the shipping economy, a lack of skilled workers exacerbates job-related stress and fatigue among maritime workers responsible for onboard operations—negatively impacting physical and mental health [3, 4]. In many cases, maritime workers find themselves unable to alleviate their stress by positive means, often resorting to alcohol or

cigarettes—to which they sometimes become addicted [5]. As a result of this particular working environment, maritime workers tend to feel more deprived relative to other occupational categories [6].

Enhancing the support system for a better working environment may result in mariners having higher subjective satisfaction with their workplace [7], which would lead to greater organizational harmony [8]. Considering the uniqueness of their job—in which they are required to operate efficiently in the socially isolated environment of the ship and successfully perform tasks to increase subjective satisfaction—it can be argued that the self-efficacy of maritime workers is essential [9]. Increasing internal job satisfaction and positive self-management by raising the self-efficacy of maritime workers will make it easier to efficiently organize and manage the ocean industry in the long run. That is to say, the benefits are not limited to improving the individual's ability to cope with stress and fatigue and raise their subjective satisfaction, but have a positive impact on the industry as a whole [9].

Organizational culture needs to be understood from the perspective of organizational and individual health, as well as the organizational policy—that is, the particular set of values and beliefs deciding the behavioral objective and method of the organization, which it uses to manage employees [10]. Indeed, the organizational culture is a very important issue for an employee of a maritime company. However, there is a marked lack of specific research on maritime workers' attitude and behavior, and their effect on the organization [11]. In the effective organizational management of human resources, support is important for increasing the health and quality of work-related life for maritime workers—the main source of manpower in the shipping industry. Accordingly, what can be confirmed as a variable in a maritime worker's organizational culture that influences the quality of their work life, as well as their health in their specific working environment, can be seen as providing valuable basic data for constructing effective intervention.

This study uses the Culture-Work-Health Model developed by Peterson and Wilson [10] in order to identify these variables in the organizational culture of maritime workers, thereby showing how organizational culture and job-related health impact upon the quality of work life. By implementing and verifying this model, this study seeks to provide basic data regarding human resource management for the purpose of improving the quality of life for maritime workers. Moreover, this study reveals and discusses influential factors in organizational culture and support, and how self-efficacy and health impact upon the quality of work life in the maritime industry.

2. Methods

2.1. Study Design and Data Collection

This study implemented the following hypothetical model based on the Culture-Work-Health Model (CWHM) developed by Peterson and Wilson [10].

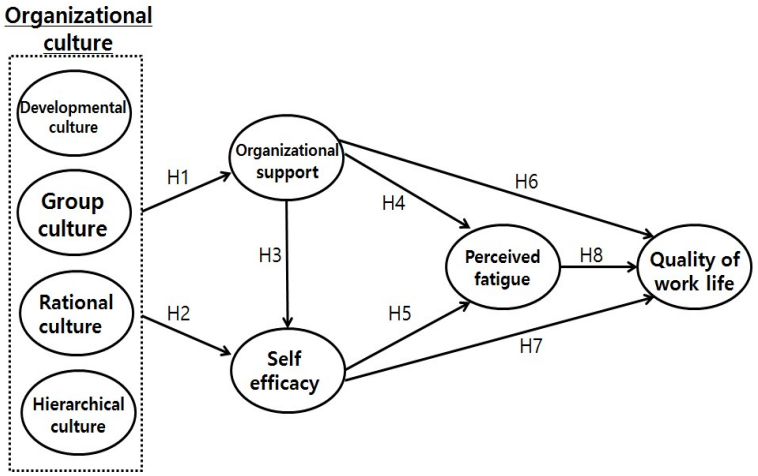

Figure 1. A conceptual framework based on Peterson and Wilson's Culture-Work-Health Model (CWHM)

Using a self-administered questionnaire, this study surveyed maritime workers who have experience of working onboard a ship for more than six months and belong to a shipping firm. The study was explained to the participants, who were made aware that they could reject or stop participation at any point without repercussion. Approximately 320 questionnaires were disseminated, with 40 excluded because of incomplete answers; this resulted in a total of 280 questionnaires accepted for empirical analysis. The survey was conducted over a period of two months from June 30, 2016—August 31, 2016, following the approval of the C University Research Ethics Committee (IRB No: 1041078-201605-HR-095-01).

2.2. Measurements

2.2.1. Organizational culture

The tool of organizational culture was modified and extended by Song on the basis of the organizational culture model developed by Quinn and McGrath [see 12, 13]. In this study, organizational culture was assessed on a 5-point Likert scale and was composed of 17 items in four categories: developmental (five questions), group (five questions), rational (three questions), and hierarchical (four questions) organization. With Cronbach's α = 0.959, the sub-factors are: developmental, 0.901; group, 0.906; rational, 0.855; and hierarchical, 0.849.

2.2.2. Organizational support

We used McMillan's concept of gauging organizational support, first adapted by Kim and modified by Nam [14, 15]. This tool was based on a 5-point Likert scale and consisted of ten items related to emotional support and instrumental support. With Cronbach's α = 0.942, the sub-factors are: emotional support, 0.867; and instrumental support, 0.919.

2.2.3. Self-efficacy

This study used the self-efficacy measurement translated by Cho et al. and effectively used by Chen, Gully, and Eden [16]. Self-efficacy comprised a total of nine items based on a 5-point Likert scale, with a higher score equating to higher self-efficacy. In this study, Cronbach's α = 0.914.

2.2.4. Perceived fatigue

This study measured the perceived fatigue of maritime workers using the short form of measurement tool developed for an operator's perceived fatigue developed by Park et al. [17]. It is comprised of five items—with three questions on mental fatigue and two questions on chronic fatigue—measured on a 5-point Likert scale, wherein a higher score indicates higher perceived fatigue. The reliability of the perceived fatigue in this study is Cronbach's α = 0.853. The sub-variables showed mental fatigue at 0.730, and chronic fatigue at 0.777.

2.2.5. Quality of work life

This study utilized a modified version of the Psychological General Well-Being Index (PGWBI-S), revised by Grossi et al. and suitable for maritime workers [18, 19]. This Index is composed of six items measured on a 5-point Likert scale, wherein a higher score indicates a higher quality of work life. In this study, Cronbach's α = 0.893.

2.3. Hypotheses

Based on both the literature and the measurements identified above, eight hypotheses were formulated:

H1: The organizational culture of maritime workers will have a positive effect on organizational

support.
H2: The organizational culture of maritime workers will have a positive effect on self-efficacy.
H3: Organizational support will have a positive effect on the self-efficacy of maritime workers.
H4. Organizational support will a have negative effect on the perceived fatigue of maritime workers.
H5. Maritime workers' self-efficacy will have a negative effect on perceived fatigue.
H6. Organizational support will have a positive effect on maritime workers' quality of work life.
H7. Maritime workers' self-efficacy will have a positive effect on the quality of work life.
H8. Maritime workers' perceived fatigue will have a negative effect on the quality of work life.

2.4. Statistical Analysis

The general characteristics and descriptive statistics of maritime workers were performed using frequency, percentage, mean, and standard deviation. Factors in maritime workers' quality of work life were analyzed on the basis of CWHM and using a structural equation model to verify the hypotheses. The internal consistency in each of the variables was verified via Cronbach's α. We also tested the validity—including the construct validity—in each of the variables forming the model, as well as the construct reliability and discriminant validity according to confirmatory factor analysis. SPSS 20.0 for Windows and AMOS 20.0 were used in the analysis.

3. Results

3.1. General Characteristics of the Maritime Workers

The general characteristics of the 280 respondents—maritime workers with more than six months experience and employed by shipping firms—are provided in Table 1, below.

With regard to age, the majority of respondents were in their 20s and 30s—with 225 (80.4%) respondents in this age range. In terms of their educational level, 163 (58.2%) of respondents had received college education or lower. With regard to employment, regular workers numbered 192 (68.6%); while—in terms of work experience—215 (76.8%) of respondents had worked for ten years or less. With regard to position, the second- and third-grade maritime officers numbered 252 (90.0%). The majority of respondents were smokers—with 217 (77.5%) smokers, and 63 (22.5%) non-smokers. With regard to stress, the biggest group of the respondents—235 (82.5%)—indicated that they were under significant stress.

Table 1. Maritime workers' General Characteristics

	Classification	N (=280)	%
Age	20s–30s	225	80.4
	Over 40s	55	19.6
Academic background	Below junior college graduate level	163	58.2
	University graduate	117	41.8
Employment type	Full-time position	192	68.6
	Contract worker	88	31.4
Working years	Less than 10 years	215	76.8
	More than 11 years	65	23.2
Job position	2nd or 3rd mate (engineer)	252	90.0

	Above entry-level workers (engineer)	28	10.0
Smoking	Yes	217	77.5
	No	63	22.5
Stress	Less	45	16.1
	A lot of	235	83.9

3.2. Confirmatory Factor Analysis for the Verification of Structural Model

A confirmatory factor analysis was performed for each measurement tool in order to establish its validity. A parameter estimation method was used using maximum likelihood. To evaluate the goodness of fit in the structural model, the following representative indexes—that show the explanation power of the model—were used: Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI), Normed Fit Index (NFI), Incremental Fit Index (IFI), Tucker-Lewis Index (TLI), Comparative Fit Index (CFI), Root Mean Square Residual (RMR), and Root Mean Square Error of Approximation (RMSEA). The goodness of fit of more than 0.9 tends to be acceptable in GFI, AGFI, NFI, IFI, TLI, CFI, as is one less than 0.5 in RMR and less than 0.08 in RMSEA. Given that the goodness of fit is less than 0.05 in this study, the model is recognized as having a good fit.

3.3. Analysis of the Measurement Model

When the factor loading of the model was measured, the β-values were all above 0.4—indicating that the composition of the items was valid. To test convergent validity, construct reliability (CR) and average variance extracted (AVE) were measured to estimate their values. The convergent validity of a model can be proven when the CR and AVE values are above 0.7 and 0.5, respectively. The CR and AVE values of the model satisfied the conditions for convergent validity, thus proving the convergent validity of the model.

Pearson's r was <0.90 for organizational culture, <0.939 for organizational support, <0.954 for self-efficacy, <0.921 for perceived fatigue, and <0.938 for workplace-related quality of life. Thus, the conditions for discriminant validity were satisfied, and the discriminant validity of the model was proven.

3.4. Parameter Estimation Results of the Structural Model

In analyzing the goodness of fit, the initial model was found to satisfy all fitness standards; the estimation results of the parameter value in the structural model are provided Table 2.

As a direct consequence of estimating the parameter value, it was shown that the value of β is 0.893 (p<0.001) in the influence of organizational culture on organizational support, β is 0.507 (p<0.001) in the influence of organizational culture on self-efficacy, β is 0.281 (p<0.05) in the influence of organizational support on self-efficacy, and β is 0.873 (p<0.001) in the influence of self-efficacy on the quality of work life. This shows a significant positive influence. Moreover, it was indicated that β is –0.512 (p<0.001) in the influence of self-efficacy upon perceived fatigue, and that β is –0.373 (p<0.001) in the influence of organizational support on perceived fatigue. This shows a significant negative influence.

In terms of indirect effect, β is 0.567 (p<0.05) in the influence of organizational culture on the quality of work life—indicating a significant positive influence. The value of β in the influence of organizational culture on perceived fatigue was shown to be –0.722 (p<0.05), inferring a significant negative influence. The judgment of significance in a direct effect was implemented via a Bootstrapping test.

Of the eight hypotheses established in the hypothetical model of this study, six were

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supported (Table 2).

Table 2. Parameter Estimation Results of the Structural Model

			B	S.E.	C.R.	P	D β	I β	Total β	SMC	D Hypo.	I Hypo.
Organizational support	←		0.900	0.053	17.031	p<.001	0.893		0.893***	0.798	A	
Self-efficacy	←		0.392	0.108	3.621	p<.001	0.507	0.251	0.758*	0.591	A	R
Perceived fatigue	←	Organizational culture						-0.722*	-0.722*	0.682		A
Quality of work life	←							0.567*	0.567*	0.631		A
Self-efficacy	←		0.215	0.109	1.986	0.047*	0.281		0.281		A	
Perceived fatigue	←	Organizational support	-0.318	0.071	-4.484	p<.001	-0.373	-0.144	-.517*		A	R
Quality of work life	←		-0.070	0.086	-0.811	0.417	-0.092	0.236	0.144		R	R
Perceived fatigue	←	Self-efficacy	-0.569	0.098	-5.8	p<.001	-0.512		-0.512***		A	
Quality of work life	←		0.870	0.147	5.940	p<.001	0.873	-0.009	0.864*		A	R
Quality of work life	←	Perceived fatigue	0.016	0.123	0.132	0.895	0.018		0.018		R	

Note: *p<0.05, ***p<0.001. SMC: Squared multiple Correlation; D: direct; I: indirect; R: rejection; A: adoption.

4. Discussion

This study implemented a comprehensive structural model by confirming the antecedent factors in the quality of work life of maritime workers based on the Culture-Work-Health Model, and identified the relationship between these variables. The findings and suggestions of this study can be summarized in four main points.

First, a maritime workers' organizational culture has a significant positive influence upon organizational support, which corresponds to the structures of the management systems of a shipping enterprise. Organizational support was shown to have an explanation power of 79.8% through the components of organizational culture. Self-efficacy—which corresponds to behaviors, positive influence received from an organizational culture, and organizational support—was shown to have an explanation power of 59.1% through the components of organizational culture and support. This confirmed that the organizational culture of maritime workers is a significant factor influencing the perception of organizational support onboard a ship. Moreover, while the maritime workers have an environmental element available for social exchange, they simultaneously identified that organizational culture and support can positively boost their self-efficacy.

This study found that there is less physical and mental fatigue when general efficacy is better. This is supported by several studies. An investigation of occupational health among nurses, for instance, found that job-related stress is associated with workplace culture and may lead to presenteeism [20]. Similarly, an examination of the relationship between self-efficacy and fatigue among railway workers in charge of signaling lends credibility to the aforementioned finding of this study [21]. Moreover, a study that used a culture-work-health model to evaluate nurses who worked in three shifts—like maritime workers of this study—similarly found that organizational culture affected health [22].

As such, the executives in the maritime industry need to consider a method of strengthening appropriate organizational support by increasing encouragement and compensation in the organizational dimension in order to elevate the self-efficacy of maritime workers, as well as through cementing and enhancing the organizational support that maritime workers can perceive. Further research is needed to construct a viable plan or suggestions for positively reinforcing the management systems in terms of the developmental, rational, hierarchical, and group categories—that is, the sub-elements of the organizational culture in maritime workers.

Second, organizational support—which corresponds to the structures of the management systems of the maritime industry—was found to have a significant negative effect on perceived fatigue, which indicates the health of the maritime workers. This implies that organizational support and encouragement for maritime workers' job satisfaction provided by the executives of the maritime industry ultimately impacted their health. As such, improving organizational support will effectively enhance the efficiency of the maritime organization, which is highly dependent on human resources. This finding is further supported by a study of maritime officers evidencing that better self-efficacy results in higher quality of life, and that organizational support and self-efficacy exert a positive influence on the workplace-related quality of life [23]. Accordingly, a maritime enterprise should necessarily have great interest in the health and welfare of its employees.

Third, maritime workers' self-efficacy—which corresponds to the behaviors of the management systems in the maritime industry—was found to have a negative impact on perceived fatigue, which is indicative of the health of maritime workers, but to have a positive effect on their quality of life. The negative effect on perceived fatigue implies that higher self-efficacy in maritime workers leads to lower perceived fatigue and higher job enjoyment. It seems likely that maritime enterprises are in need of support and planning to improve the self-efficacy of their employees.

However, while self-efficacy was shown to have a positive effect on the quality of life, organizational support and perceived fatigue were indicated as having a statistically insignificant effect on the quality of life. This implies that a welfare service or corporate-level support perceived by maritime workers is a factor that positively impacts self-efficacy and thus upon health, while having an indirect effect on the quality of work life. However, there are several studies whose findings contrast with the findings of this study. An investigation of shipyard workers, for instance, found that fatigue impacted on psychological wellbeing [24], while another examining production workers who did shift work found that fatigue affected the quality of life [25]. In contrast, this study found that perceived fatigue had no direct impact on workplace-related quality of life. Arguably, this is attributable to "the influence of the healthy workers" who were physically equivalent because only maritime officers who are in good physical and mental health are allowed onboard due to the characteristics of this occupation [26]. This may be "an impact of a healthy worker" because only the subjects in who are physically and mentally healthy can work on the ships. Moreover, health can be a means of life for maritime workers.

As such, there is a need to use a health-based approach, which considers the subjects' characteristics. It is condition that a maritime worker boarding a ship should be physically healthy. There is also a structural characteristic to consider: it is difficult to maintain a healthy status for the six-month period onboard the ship, which tends to have difficult working conditions under which many health situations may arise. Accordingly, a solution needs to be sought with regard to understanding the problem of health management and maintenance for maritime workers. The health problem of the group or society to which maritime workers belong will need to be contemplated from a different viewpoint. Hence, to promote productivity in maritime enterprises and improve the quality of work life of maritime workers, it is necessary to investigate and construct a plan for a welfare dimension that systematically promotes the health of maritime workers.

5. Conclusion

This study investigated an influential factor in the quality of life experienced by maritime workers based on the Culture-Work-Health Model. However, there are several limitations to this study.

Notably, there is still insufficient data regarding the variable measured in this research to fully explain maritime workers' quality of work life. Thus, verification through further repeated research is needed. In addition, exactly what perceived fatigue indicates in a maritime workers' health may be problematic. Verification through diverse and repetitive research is required on a scale adequate for representing the health of maritime workers. There is also a need to pay close attention to the representativeness of a scale, which measures the structures and behaviors in management systems. This requires further research confirming the verification of scales. Furthermore, this study used non-probability convenience sampling among maritime employees of a shipping firm in South Korea. As such, this study did consider differences such as corporate scale and regional characteristics. Thus, there is a limitation in generalizing the results of this study to all Korean maritime workers. Moreover, this study verified its model by collecting materials cross-sectionally, and is thus limited in its ability to explain the relationship between relevant variables. Hence, close attention needs to be paid to the interpretation.

Nonetheless, the results of this study show that self-efficacy is important for quality of life among maritime workers, and has both direct and indirect impact. Organizational support may be the first intervention point in relieving perceived fatigue and enhancing self-efficacy, and ultimately inducing a positive impact on the quality of work life. For the workers in a specific working environment—such as those who work onboard a ship for a fairly long period—the development of an intervention program at their workplace from the perspective of health management is sorely needed. An education and training program for the promotion of health is necessary for all maritime workers, as is assigning health coordinators to the ship for long-haul shipping. Most importantly, organizational support for these health promotion programs should be made top priority.

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