

Study of Continuing Medical Education, Job Stress and Sleep Quality in Health and Medicine Industry – The Impact Relatedness

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ABSTRACT

The development of medical technology has largely enhanced physicians' professional responsibilities. Besides, the emergence of consumer rights, patients' awakening of human right awareness, and the intervention of insurance have healthcare quality and physicians' professional abilities gradually become the focus of health policies. The importance of continuing medical education is therefore highlighted. With nonequivalent pretest posttest control group design, two hospitals in Hubei Province are studied. One is proceeded continuing medical education, while the other maintains the original situation without continuing medical education. The experimental study is preceded for half a year. The research results show that 1.continuing medical education would affect job stress, 2.continuing medical education would influence sleep quality, 3.job stress presents significantly negative effects on sleeping time in sleep quality, and 4.job stress shows remarkably negative effects on quality level in sleep quality. According to the results, suggestions are proposed, expecting to enhance healthcare staff's physiological and psychological health, promote job safety and performance, reduce medical incidents, and enhance healthcare service quality.

Keywords: healthcare industry, continuing medical education, job stress, sleep quality

INTRODUCTION

Healthcare staff has to continue learning due to the large development of medical technology, the large enhancement of physicians' professional responsibilities, and the emphasis on evidence-based medicine and medicine ethics in past years. Furthermore, the emergence of consumer rights, patients' awakening of human right awareness, and the intervention of insurance have the maintenance of healthcare quality and physicians' professional abilities become the focus of health policies. The importance of continuing medical education (CME) is therefore gradually highlighted. A lot of healthcare staff is proud of themselves being the public health protectors and takes the harsh role in health care. The emphasis on nursing staff's health is the basis of patients' safe health care. In face of the changes of healthcare environment, patients' rise of customer awareness, cost concept, and accreditation systems in past years, the huge job stress of nursing staff might harm the physiological and psychological health as well as influence the overall service quality of an institute. Under the heavy health care burden, healthcare staff's health conditions are worth concerning, as healthy patients rely on healthy healthcare staff's high-quality and safer healthcare environment. Healthcare staff, with the highest ratio in the work team in a hospital, is responsible for taking care of patients and assisting in physicians and administrative services. Medical professional is a science as well as an art to concern about people and enhance human health. In addition to assisting in physicians, healthcare staff also plays a critical role between physicians and patients and doctor-patient relationship. The transformation of time enhances the high technology of health care that the public have enhanced the requirements. Medical professionals do not simply take care of patients, but also take the responsibilities for

Contribution of this paper to the literature

- It is essential to practice continuing medical education system for enhancing healthcare staff's sleep and healthcare quality.
- Qualified teachers of continuing medical education should be established the database and requested the intention to conduct education plans. Teachers' practice should be reasonably evaluated, such as having the organizers fill in evaluation tables and opinions after the continuing medical education.
- The time, location, contents, and places for continuing medical education should be taken into account for healthcare staff's suitability and convenience.

ethics. Medical work is a high-profession and high-stress occupation that it is more easily to result in poor physical and mental symptoms, such as fatigue, muscular tension, pain, anxiety, depression, and poor sleep.

Medical manpower shortage and frequent turnover are the harsh challenges for hospitals; besides, the problems of excessive squeezing and sweat hospitals have continuously induced the public concerns. Healthcare staff often suffers from declined sleep quality and physical & mental fatigue due to responsibility system, shift, and overtime work; more seriously, it might harm patients' safety because of nursing staff's fault. Shift workers often complain about sleep disorder and not recovering from fatigue. Moreover, sleep is closely related to health. For this reason, healthcare staff's continuing medical education toward job stress and sleep quality is discussed in this study, expecting to enhance healthcare staff's physiological and psychological health, enhance job safety and performance, reduce medical incidents, and promote healthcare service quality.

LITERATURE AND HYPOTHESIS

Continuing Medical Education

Education is a purposive and planned learning process (Jeong et al., 2013). Campion (2015) definitely explained continuing education as a planned education activity for people returning to formal schools' education system, including non-traditional students in the USA and those being interested in adult education. The definition was gradually reduced the coverage; and now, the common definition refers to "adult education programs provided for profession and occupation oriented advanced training" (Kivimäki, Singh-Manoux, Nyberg, & Batty, 2013). Healthcare staff's continuing education refers to educational activity for continuing professional development, i.e. the provision of knowledge for the professional growth and professional continuing education activity required for enhancing work effectiveness (Chiou et al., 2014). Michl, McLaughlin, Shepherd, and Nolen-Hoeksema (2013) defined continuing medical education as the education or training for enhancing or developing the abilities of medical professional knowledge, the inference and explanation abilities, and appropriate professional skills to complete the doctor-patient relationship standards or capability. Continuing medical education, focusing on knowledge and skills, should be accredited and agreed by professional staff, including basic medicine science, clinical guidelines, and public health care norms (Chou, Li, & Hu, 2014). Walters et al. (2013) revealed continuing medical education as a planned activity and training, which allowed nursing staff enhancing the professional abilities of clinical work, teaching, research, and administrative management through professional knowledge or skills to eventually promote healthcare quality (Hatherill et al., 2016). Pritchard (2017) indicated that both science and humanities should be emphasized in continuing medical education for the constant acquisition of new knowledge and self-development so as to constantly learn and make progress in the medical career. Lee et al. (2015) regarded continuing medical education aimed to improve physicians' knowledge, attitudes, and techniques as well as continue the latest knowledge to improve the process and result of patients' care, assist physicians in accepting or refusing new medical techniques, and helping physicians distinguish care with less effectiveness.

Job Stress

Stress, being the subjective feeling, refers to the interactive relationship presented in individual life to cope with the constantly changing environment, i.e. the changing perception when an individual physiologically and psychologically encountering the environment (Lesuffleur, Chastang, Sandret, & Niedhammer, 2014). Åkesson, Larsson, Discacciati, and Wolk (2014) stated that people would experience three stages of alarm, resistance, and collapse, when encountering long-term and continuous stress. In the process, a series of physiological responses would be generated, called general adaptation syndrome (GAS). Job stress is the conceptualization process, implying individual cognition and response to the threats or danger of certain work characteristics in the work environment (Kivimäki et al., 2015). Davey et al. (2015) pointed out job stress as a dynamic process with continuous changes, rather than static and disconnected phenomena. Job stress was the specific result of constant coordination and interaction between an individual and the environment; and, subjectivity, interactivity, history, and specificity

were the essence of job stress. Different individuals would perceive distinct stress on the same potential stress source, and the effects on individuals would not be identical. When an individual could not acquire the balance with the job, job stress was resulted from individual physical and mental unbalance because of work requirements or the expectation of self-actualization in the work environment (Nyberget al., 2013). Heinen et al. (2013) defined job stress as the response harmful for body or emotion when the work requirement could not conform to the worker's capability, resources, or personal needs; job stress would result in bad health and even cause damage (Touré et al., 2016). Johns and Jepsen (2015) proposed experts' definition of job stress as the job requirements not being able to conform to the worker's responsibility, resources, or job needs.

The "nursing staff's stress scale" developed by Cheng et al. (2014) is used for measuring nursing staff's stress in this study. The scale contains four dimensions.

- (1) Personal response: To understand nursing staff's perceived personal and physical/mental symptoms.
- (2) Work concern: To understand nursing staff's perception of healthcare team's communication and coordination as well as the capability of medical professional role.
- (3) Work competency: To understand nursing staff's confidence in completing nursing and healthcare work on time.
- (4) Private work: To understand nursing staff's perceived personal and family time management.

Sleep Quality

Sleep, as a physiological behavior, refers to a person, without consciousness of external environment, being awakened by external stimuli (Kang et al., 2014). Sleep takes about one-third of time in human life. The process of sleep presented reversible reduction of perceptual sensitivity and decreasing muscular tension that the immune system could recover the damaged cells and tissues, when spirit and energy are thoroughly rested, to keep balanced physiological, psychological, and emotional health (O'Keefe & Lavie, 2013). Ansoleaga (2015) regarded sleep quality as the indicator showing good physiological and psychological state. The level of sleep quality could result in physical or functional disorder, and good sleep could predict or grasp the trend of diseases (Vijendren, Yung, & Sanchez, 2015). Lee et al. (2014) considered that sleep quality evaluation should cover perceived night sleep and time for continuing sleep. With sequence, Go et al. (2013) proposed three dimensions to evaluate sleep quality, including being easy to fall asleep, integrated sleep cycle, and behavior and rest after getting up. Wong, Amsterdam, and Blumenthal (2015) regarded sleep quality as individual sleep pattern and subjective sleep satisfaction, including the spiritual state in daytime, perceived sleep hour, and perceived sleep satisfaction. Among the factors in overall sleep quality, subjective sleep quality appeared the strongest relationship with overall sleep quality, followed by sleep latency and sleep disturbance. The subjective perception of bad sleep quality might be caused by long sleep latency or sleep disturbance (Hsu et al., 2015).

Lin et al. (2015) indicated that the level of sleep quality could be judged subjectively and objectively. Objective evaluation could be delivered the sleep situation of the case through equipment, and subjective evaluation referred to the case judging the time to fall asleep, the level of sleep quality, and the adequacy. Referring to Chou and Hu (2015), subjective evaluation is applied to measure sleep quality with sleeping time and quality level.

Research Hypothesis

Davey et al. (2015) mentioned that, with the rapidly increasing new knowledge in basic medicine science, preventive medicine, and clinical medicine as well as the rapid advance of medical technology development, continuing medical education could ensure physicians presenting adequate professional abilities and being competent of medical businesses in the future career to reduce physicians' job stress and enhance the healthcare quality (Touré et al., 2016). Pritchard (2017) explained that continuing medical education as the education or training to enhance or develop professional medical knowledge, the abilities of inference and explanation, and appropriate professional skills to complete the doctor-patient relationship standard or ability and effectively reduce medical staff's job stress (Hatherill et al., 2016). Johns and Jepsen (2015) considered that continuing medical education could have healthcare staff master the abilities and techniques related to the job to face the changeable medical conditions and reduce work load and stress. Such a process would continue from the graduation from schools to the retirement. The following hypothesis is therefore proposed in this study.

H1: Continuing medical education would affect job stress.

Wong et al. (2015) explained continuing medical education as a planned learning, exceeding basic education and aiming to enhance healthcare staff's knowledge, skills, and attitudes to reinforce medical practical ability, reduce job stress caused by medical work, and enhance work adjustment and sleep quality; and, promoting the public health care was the top goal (Vijendren et al., 2015). Lee et al. (2015) indicated that several researchers also mentioned to provide a series of teaching activity in an institution in order to affirm medical professional and to

provide the opportunities of continuing medical education for healthcare staff' work, education, administration, and research. It would enhance healthcare staff's knowledge, techniques, and attitudes to cope with the rapidly changing healthcare environment (Hsu et al., 2015), achieve the professional standard and expectation, as well as reduce work adjustment and sleep quality caused by rapid changes of healthcare environment (Chiou et al., 2014). In this case, the following hypothesis is proposed in this study.

H2: Continuing medical education would influence sleep quality.

Chou and Hu (2015) pointed out the importance of nursing staff in the entire healthcare system. They had to directly face patients and learn responses to different situations; besides, patients appeared increasing request for nursing quality that stress was generated. Campion (2015) mentioned that nursing staff's perceived stress often came from work environment, the job, career & achievement, knowledge & skills, administrative management, and patients' conditions (Kivimäki et al., 2015). Nursing staff would perceive larger stress as they undertook most of the work to take care of patients and stressed on the importance of service and the responsibility for human life (Kang et al., 2014). Lin et al. (2015) mentioned that nursing staff's job stress to induce sleep disorder covered energy- and spirit-consuming shift, annoying cognition labor, and unstressed emotional labor, which were mainly caused by human allocation of hospitals. To control costs, hospital management tended to performance and profit orientation, but applied flexible and tight human resources so that nursing staff were induced sleep disturbance by job stress (Cheng et al., 2014). Accordingly, the following hypotheses are proposed in this study.

H3: Job stress presents significantly negative effects on sleeping time in sleep quality.

H4: Job stress shows remarkably negative effects on quality level in sleep quality.

RESEARCH METHODOLOGY

Measurement of Research Variable

Job stress

Referring to Cheng et al. (2014), job stress contains four dimensions of (1) personal response, (2) work concern, (3) work competency, and (4) private work.

Sleep quality

Referring to Chou and Hu (2015), (1) sleeping time and (2) quality level are covered.

Research Subject and Sampling Data

To effectively achieve the research objective and test the research hypotheses, nonequivalent pretest posttest control group design is utilized for this study. Two hospitals in Hubei Province are studied; one is proceeded continuing medical education, while the other maintains the original state without continuing medical education for the half-a-year experiment. SPSS is used for analyzing the data in this study, and Factor Analysis, reliability analysis, Regression Analysis, and Analysis of Variance are applied to test various hypotheses.

Analysis Method

Analysis of Variance is applied to discuss the difference of continuing medical education in job stress and sleep quality; furthermore, Regression Analysis is used for understanding the relationship between job stress and sleep quality.

ANALYSIS RESULT

Reliability and Validity Analysis

Job stress, with Factor Analysis, is extracted four factors of "personal response" (eigenvalue=2.762, α =0.83), "work concern" (eigenvalue=2.215, α =0.85), "work competency" (eigenvalue=1.946, α =0.87), and "private work" (eigenvalue=1.757, α =0.86). The cumulative covariance explained achieves 76.281%.

Sleep quality, with Factor Analysis, is extracted two factors of "sleeping time" (eigenvalue=4.638, α =0.90) and "quality level" (eigenvalue=3.829, α =0.89). The cumulative covariance explained reaches 85.774%.

Table 1. Analysis of Variance of continuing medical education toward job stress

	Variable	F	P	Scheffe post hoc
continuing medical education	personal response	7.63	0.000*	without education (3.98)>continuing medical education (3.25)
	work concern	11.25	0.000*	without education (4.51)>continuing medical education (3.16)
	work competency	13.17	0.000*	without education (4.69)>continuing medical education (3.27)
	private work	9.86	0.000*	without education (4.22)>continuing medical education (3.46)

* stands for $p < 0.05$ **Table 2.** Analysis of Variance of continuing medical education toward sleep quality

	Variable	F	P	Scheffe post hoc
continuing medical education	sleeping time	16.72	0.000*	continuing medical education (3.82)>without education (3.22)
	quality level	18.91	0.000*	continuing medical education (4.46)>without education (3.51)

* stands for $p < 0.05$

Effects of Continuing Medical Education on Job Stress and Sleep Quality

Analysis of variance of continuing medical education towards job stress

According to Analysis of Variance, the difference of continuing medical education in job stress is discussed. From **Table 1**, continuing medical education presents significant differences on personal response in job stress, where without continuing medical education (4.51) shows higher personal response than with continuing medical education (3.25). Continuing medical education reveals remarkable differences on work concern in job stress, where without continuing medical education (4.51) appears higher work concern than with continuing medical education (3.16). Continuing medical education presents notable differences on work competency in job stress, where without continuing medical education (4.69) shows higher work competency than with continuing medical education (3.27). Continuing medical education reveals remarkable differences on private work in job stress, where without continuing medical education (4.22) appears higher private work than with continuing medical education (3.46).

Analysis of variance of continuing medical education toward sleep quality

Analysis of Variance is applied to discuss the difference of continuing medical education in sleep quality. From **Table 2**, continuing medical education presents notable difference on sleeping time in sleep quality, where with continuing medical education (3.82) presents higher sleeping time than without continuing medical education (3.22). Continuing medical education shows significant differences on quality level, where with continuing medical education (4.46) reveals higher quality level than without continuing medical education (3.51).

Correlation Analysis of Job Stress and Sleep Quality

Correlation analysis of job stress and sleeping time

To test H3, **Table 3**, personal response ($\beta = -2.043^{**}$), work concern ($\beta = -2.317^{**}$), work competency ($\beta = -2.288^{**}$), and private work ($\beta = -2.126^{**}$) reveal remarkably negative effects on sleeping time that H3 is supported.

Correlation analysis of job stress and quality level

To test H4, **Table 3**, personal response ($\beta = -2.096^{**}$), work concern ($\beta = -2.372^{**}$), work competency ($\beta = -2.293^{**}$), and private work ($\beta = -2.187^{**}$) appear notably negative effects on quality level that H4 is supported.

Table 3. Analysis of job stress toward sleep quality

Dependent variable→	sleep quality			
	sleeping time		quality level	
Independent variable↓	β	Beta	β	Beta
job stress				
personal response	-2.043**	-0.194	-2.096**	-0.199
work concern	-2.317**	-0.223	-2.372**	-0.228
work competency	-2.288**	-0.215	-2.293**	-0.217
private work	-2.126**	-0.207	-2.187**	-0.210
F		26.83		33.29
significance		0.000***		0.000***
R2		0.276		0.347
Adjusted R2		0.243		0.311

Note: * stands for $p < 0.05$, ** for $p < 0.01$.

Data source: Self-organized in this study

CONCLUSION

The study reveals that continuing medical education could assist healthcare staff in promoting professional abilities to be competent of medical businesses, reducing physicians' job stress, and enhancing sleep and healthcare quality. Nevertheless, continuing medical education should not become a mere formality as healthcare staff is so busy that healthcare staff in remote areas is not easy to receive continuing medical education. Besides, the healthcare environment is getting complicated, patients is rising the rights awareness, and physicians are promoting the medical ethics that the course content, lecturer training, and course selection for continuing medical education should be comprehensively planned. Continuing medical education could help healthcare staff understand more about new knowledge of medicine in other fields, acquire new knowledge of medicine and synchronous information with medical centers, effectively reduce healthcare staff's job stress, enhance healthcare staff's practice capability, and promote the sleep quality. Under rising patients' rights and constantly enhancing convenience of network technology, it is also important to receive medicine ethics related regulations through continuing medical education. As a consequence, continuing education courses should be urgently practiced for healthcare staff.

SUGGESTION

Aiming at above research results, the following suggestions are proposed in this study.

1. It is essential to practice continuing medical education system for enhancing healthcare staff's sleep and healthcare quality. However, healthcare staff is busy at work that online courses and medicine journals are suggested for practicing continuing medical education and reducing the difficulties for healthcare staff in remote areas. Moreover, courses for continuing medical education should be improved, e.g. opening real-time education of epidemic, publishing patents, increasing clinical courses, exchanging practical experiences, and holding on holidays, to reduce the time conflict of healthcare staff and balance the location.
2. Qualified teachers of continuing medical education should be established the database and requested the intention to conduct education plans. Teachers' practice should be reasonably evaluated, such as having the organizers fill in evaluation tables and opinions after the continuing medical education. The organizers could register and analyze such data to give proper feedback to the teachers. A national talent bank could be established, allowing suitable people to take charge in the continuing medical education courses, e.g. the establishment of bank, the cultivation of seed teachers, the storage of lecturers' list, and the emphasis on the professional attribute.
3. The time, location, contents, and places for continuing medical education should be taken into account for healthcare staff's suitability and convenience. It is important to create the participation incentive, rather than forcing healthcare staff to receive continuing medical education which does not benefit the medical work, with giving sign-in/sign-off or accumulated points for certificates. It should provide courses required for healthcare staff to develop the effectiveness of continuing medical education.

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