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REDUCING SUBJECTIVE FATIGUE AMONG UNIVERSITY TEACHERS OF INDONESIA

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Abstract

Objectives: This study aimed to reduce subjective fatigue and increase knowledge of fatigue among university teachers. Methods: A quasi experimental design was used to examine the efficacy of fatigue-controlled training among university teachers in intervention and control groups. As many as 37 teachers from intervention group and 40 teachers from control group completed T1 (baseline) and T2 (follow-up) data on knowledge, subjective fatigue using an item subscale of Self-Diagnosis Checklist for Assessment of Workers' Accumulative Fatigue. Results: The results of repeated measured analysis of variances showed that training program for fatigue was associated with higher knowledge and lowered subjective fatigue compared with control group. Significant main effects of fatigue training on knowledge, and subjective were revealed. After controlling for all covariates, the repeated measured analysis of variances showed significant main effects of fatigue training program on knowledge and subjective fatigue. Conclusions: Fatigue-controlled training program reported in this study was efficacious to enhance university teachers' knowledge of fatigue and occupational health and safety at a work place. University teachers experienced lower subjective fatigue after been trained. This program may be considered as an initial strategy for occupational safety and health program in education setting to reduce fatigue particularly among university teachers. The training should be conducted frequently to enable university teachers controlled their fatigue.

Keywords: subjective fatigue, knowledge, training; university teacher; Indonesia

Introduction

Fatigue is a common phenomenon to all workers, regardless of type of occupation and cultural influences. It is also the commonest occupational health problem in developing countries, including Indonesia, that faced the rapid technological development in recent decades, and the education sectors have experienced considerable changes. This resulted in increasing competition particularly in higher education due to the combination of both education and scientific research (Sun *et al.,* 2011).

Educational workers may tend to feel more fatigue than other professions (Finkelman *et al.,* 1994) Compared with primary school and high school, most university teachers are directly linked to the outcome of their research in addition to teaching (Sun *et al.,* 2011) that needs a lot of effort on psychological and physical activities. Mostly activities of university teachers is a sedentary work that requires sitting or standing postures in a long time (Finkelman *et al.,* 1994), using computer or lap top in a poor sitting posture for a long time can cause physical fatigue and disease due to static work (Anizar, 2005). According to the Maastrich cohort study, prevalence of prolonged fatigue in education workers was 24.4% (Kant *et al.,* 2003).

The increase in university teacher resources was less proportional to the amount of students. Although appropriate university teachers and students ratio is 1:20, actual rate in Indonesia is still 1:40 (Latief, 2010). This condition inevitably placed a great teaching burden on university teachers in Indonesia. All this facts increase the likelihood that university teachers might suffer serious occupational health problems, such as sleep deprivation, prolonged fatigue and work stress (Sun, 2011; Latief, 2010). Sleepiness is resulted from sleep deprivation that can cause accident and injury at work (Fukusawa *et al.,* 2006). For

fatigue, when teachers work for prolonged periods with accumulated fatigue, their physical and mental condition may be negatively affected (Nakasako *et al.,* 2001; Shimizu *et al.,* 2011). Stress at work has been increasingly recognized as a major risk factor for chronic disease, injury, and poor quality of life among employees in contemporary society (Safaria *et al.,* 2011; Ketola *et al.,* 2002). Job stressors can cause worsening relationship with students, colleagues and supervisor, pain, low performance and also fatigue (Shernoff *et al.,* 2011).

Some characteristics of private university are different from public university in Indonesia. Private university has inadequate ratio between lectures and students. This situation causes private university lecturers handle more workload than public university teachers because private university students usually have low academic performance, attitude, motivation and ability (Yogisutanti, 2011), teachers should work very hard to meet the standard of teaching and learning process. Low wages, many assessment rating, incomplete facilities, constantly changing teaching materials and methods, the difficult teaching environment, lacking of effective teaching education and training of private university may be caused fatigue on the private university teachers.

Focus group discussion among 7 university teachers in a private university of health science in West Java Indonesia was conducted on 8th February 2012 and lasted for about 2 hours (Safaria *et al.,* 2011). Participants were 10 private university teachers including 4 women and 6 men. Age was ranged from 29 to 45 years old, and lengths of teaching experiences were from 5 to 16 years and they teach different subject in different university. Result of the discussion indicates that most teachers suffered from both psychological and physical fatigue due to lack of knowledge of safety at work (e.g., "We suffered from both psychological and physical fatigue.", "No explanation about the workplace hazard in the first time work, and we had never got training about it/occupational health and safety at work."), sleep deprivation (e.g., "I feel fatigue because of lack of sleep."), irregular breaks at work (e.g., "Students always come to my room when I want to break, no time."), high workload so that they had to do at home (e.g., "Teaching, supervising and giving consultation to students make me have no time to make a report and preparing next lesson, so I have to do it at home."), poor communication with supervisor (e.g., "I do not like my supervisor's decision which was different from my opinion, that is why I keeping away from her."), and sometimes has no time to have lunch and breakfast because they have to teach in class early in the morning (e.g., "I plan to have breakfast at campus, but I had to teach in the morning, and then my breakfast was at 11 a.m or more."). In Indonesia, no universities have conducted a training to give information about occupational health and safety at work. Training to enhance the knowledge and attitude of university teachers in managing fatigue at work can be applied for university teachers (Ketola *et al.,* 2002).

Fatigue among university teachers must be managed properly because university teachers have a central function for students' academic achievement. If the university teachers could not achieve their optimal performance mainly in teaching learning process, they will not be able to transfer the knowledge optimally and effectively to the students. If teachers experience fatigue in their work and they cannot manage it will decrease their productivity and negative impact will also be experienced by students (Doorman, 2003; Rice, 2005; Philips *et al.,* 2007). Occupational fatigue affected not only teachers' physical, mental health and students' healthy growth, but also the education enterprises and society development.

Although there were so many studies about training in occupational and safety at work, the intervention for university teachers using a-fatigue training method seems never been doing. This study aimed to analyze the difference of knowledge about fatigue and occupational health and safety at work and subjective and objective fatigue among university teachers before and after given two consecutive days fatigue-controlled training during office hours compared with control group. To address the aims, we examined the effect of fatigue-controlled training program to increase knowledge about fatigue and occupational health and safety at workplace, and reduce subjective and objective fatigue among university teachers.

Subjects and methods

A quasi experimental design was used to examine the efficacy of fatigue- training among university teachers in intervention and control groups. The study was conducted at two private schools of education located in West Java, Indonesia. The first school was for control group and the other was an intervention group which was given a-training during office hours. Group of intervention consists of 37 of 45 university teachers (82.2%). Four teachers could not attend the training mainly due to studying abroad, two teachers were studying doctoral degree out of the city and two teachers had business trip. While in the control group, 40 of 48 university teachers (83.3%) completed the self-administered questioner and reaction time measurement. Four teachers could not follow on this research due to studying master degree out of city, two teachers had business trip to another city and two teachers did not want to participate.

In May 2012, a baseline survey (T1) was conducted. A subjective fatigue measurement lasted about 4 weeks both in control and intervention groups, followed by the training program for intervention group. Follow-up survey was carried out until August 2012, 2 to 3 months after the

training program (T2) both in control and intervention groups.

Informed consent was obtained beforehand from the participants. The study protocol was in accordance with the ethical standards of the Helsinki declaration and the study procedures were approved by the Medical and Health Research Ethics Committee (MHREC), Faculty of Medicine Gadjah Mada University, Yogyakarta, Indonesia.

Outline of the program

In order to develop an effective and practical program for university teachers in controlling and managing fatigue at workplace, the training procedure such as number of sessions and the session time is important. A previous meta-analysis concluded that optimum number of sessions is around 6-8, and there is no increase in efficacy of the programs with a greater number of sessions (van der Klink *et al.,* 2001). Session time is also important for practical implementation of a training program in a workplace. Multi-component stress management training programs needed a longer session time, at least 50 minutes for one session (Gaardner *et al.,* 2005). Every session in this training program was designed no more than 50 minutes. Relaxation time was given in adequate time to prevent fatigue caused by the training at the middle of the training program.

Contents of the program

The contents of the program were developed under consultation of Occupational Health and Safety Office in West Java and were adjusted according to the needs learned from interviewing 37 university teachers. The 2 consecutive days training program (during office hours) was conducted for the intervention group, in the time when the student were having holiday after last semester was completed. This training program consisted of several sessions: relaxation training in the beginning program; lecture on selected topic for each session concerning basic knowledge of fatigue management, occupational health and safety at work, and also work nutrition; discussion and case study; question; and summary. Details of the programs in each day were as follows:

Starting with relaxing techniques which participants allowed for sitting in a chair, standing or walking around that they feel comfortable and free position themselves were conducted after answering the pretest. Brainstorming was also conducted to raise awareness of their work environment and fatigue. (2) Participants learned the basics of knowledge of occupational health and safety at campus to raise the understanding of their own environment and the importance of knowing the hazard and risk at work. (3) Participants studied about fatigue and intake calorie for daily activities. They trained to manage the intake calorie particularly when they were going to work and at work. Participants were provided a lecture and exercise to improve their efficiency and control of workload by planning their work schedules for next semester and effectively using their work hours. (5) Participants worked in small group to discuss the cause of fatigue in their workplace based on their experience then make a plan and to develop new views on their fatigue problems. (6) Follow up was a commitment of participants to do what they have planned. Posttest was the last program of the training.

Measures for intervention effects

All data were measured by self-adminisered questionnaire. Details of the questions and scales used in the studies are described below. The questionnaire was distributed to individuals, who filled it out anonymously using a code to allow for matching of before and after intervention surveys.

Knowledge about fatigue was assessed using 27 questions of the following topics which were explained in each session: 1) work environment; 2) subjective fatigue; 3) intake calorie for university teacher; 4) sleeping duration; 5) recuperation; 6) university teachers' workload and the impact of fatigue among university teachers. Respondents were asked to choose the most suitable option among four presented. Scoring for each item of 0 was given for a wrong answer and 1 for the right answer. Knowledge was surveyed using a questionnaire before the intervention and after intervention.

Subjective fatigue was assessed using an item subscale of the Self-Diagnosis Checklist for Assessment of Worker's Accumulated Fatigue (Japan International Center for Occupational Safety and Health, 2004) presented by the Japanese Ministry of Health, Labor and Welfare. This questionnaire was a state measure of worker's subjective fatigue with 13 items (Otsuka, 2010).

Statistical analyses

All data were analyzed using the Statistical Package for Social Sciences (SPSS) version 17.0. Baseline characteristics of the intervention and control groups were compared and tested with the *t*-test for continuous data and χ^2 test for ordinal and categorical data. Information on age, gender, number of children, marital status, type of work, education background, work hours, smoking status, alcohol intake, years of experience, sleeping duration and absenteeism was obtained through self-reported in the baseline questionnaire. To examine the intervention effect, the changes score at T1 (baseline) from that at T2 (follow-up), and the difference in change of the score between the intervention and control groups was compared and tested using analysis of covariance (ANCOVAs), with T1 scores and all of covariate variables. The effect size was also calculated as a standardized measure of change.

Results

Characteristics of the study participants

The recruitment for intervention and control groups was shown in Fig.1. At T1, 77 university teachers consisting of 40 teachers from control group and 37 teachers from intervention group completed the questionnaires and completed the reaction time measurement. Characteristics of the study participants and the analysis results by control and intervention groups are shown in Table 1 to Table 2.

Table 1 and Table 2 presented the demographic and study variables of two groups. In both groups, the proportion of marital status, smoking status and educational background are almost the same. The average of age, work hours and sleep duration also have no significant differences between two groups. Since alcohol intake was prohibited in Indonesian culture, only one participant in intervention group took alcohol. The average days of absenteeism of intervention group were higher than that of control group. Table 3 showed the differences of baseline data for knowledge and subjective and objective fatigue of two groups. Although selection processes certainly played part in this study, baseline levels of subjective and objective fatigue were significantly different among groups. Thus, we carried out ANCOVAs at follow-up considering baseline variables as covariates.

Characteristics of participants

The recruitment for intervention and control groups was shown, 77 university teachers consisting of 40 teachers from control group and 37 teachers from intervention group completed the questionnaires and completed the reaction time measurement. Characteristics of the study participants and the analysis results by control and intervention groups are shown in Table 1 to Table 2.

Table 1: Characteristics of participants and the results of χ^2 test by groups

Characteristics of participants	Groups				*p*
	Control (n=40)		Intervention (n=37)		
	n	%	n	%	
Gender					0,900
Female	27	67,5	32	86,5	
Male	13	32,5	5	13,5	
Marital status					1.000
Not married	10	25,0	9	24,3	
Married	30	75,0	28	75,7	
Education					0.339
Undergraduate	20	50,0	23	62,2	
Graduated	20	50,0	14	37,8	
Smoking status					0,755
Not smoker	36	90,0	35	94,6	
Smoker	4	10,0	2	5,4	
Health examination					0.000*
Yes	3	7,5	19	51,4	
No	37	92,5	18	48,6	
Induction training					-
Yes	40	100,0	37	100,0	
No	0	0,0	0	0,0	
Sport activity					0,227
Yes	29	72,5	21	56,8	
No	11	27,5	16	43,2	
Breakfast					0,222
Yes	31	77,5	23	62,2	
No	9	22,5	14	37,8	
Having lunch					1,000

Yes	35	87,5	32	86,5	
No	5	12,5	5	13,5	
Doing work at home					0,649
No	8	20,0	5	13,5	
Yes	32	80,0	32	86,5	
On time teaching					0,877
100%	6	15,0	7	18,9	
76-99%	5	12,5	4	10,8	
50-75%	6	15,0	9	24,3	
0-49%	23	57,5	17	45,9	
Complete the sylabus					0,210
100%	5	12,5	14	37,8	
76-99%	34	85,0	21	56,8	
50-75%	1	2,5	2	5,4	
Disease					0,073
No	21	52,5	11	29,7	
Yes	19	47,5	26	70,3	
Feeling fatigue					0,637
No	5	12,5	5		
Yes	35	87,5	32	86,5	

*p<0.05

Table 2. Characteristics of the study participants and the results of *t*- test by groups

Characteristics of participant	Groups				*p*
	Control (n=40)		Intervention (n=37)		
	M	*SD*	*M*	*SD*	
Age (year)	35,57	8,71	35,57	9,97	0,997
Workhour (hour)	5,92	4,09	7,00	3,48	0,220
Number of Children (person)	1,28	0,96	1,05	1,03	0,332
Length of work (year)	7,93	0,96	8,05	1,39	0,659
Length of sleep (hour/day)	6,06	0,533	6,08	0,83	0,907
Using laprop (hour/day)	5,72	2,15	7,51	2,00	0,000**
Absence (days/year)	2,35	4,69	6,16	4,18	0,000**

**p<0.01

Effect of training program on knowledge and subjective fatigue subjective

The results of ANCOVAs showed that fatigue training program was associated with higher knowledge and lower subjective fatigue compared with control group. There were significant main effects of fatigue training on knowledge, and subjective fatigue. There was a significant main effect of knowledge before and after training on control and intervention group (F=69.24, P<0.001), and subjective fatigue (F=55.7, P<0.001) Also, after controlling for all covariate variables (age, gender, number of children, marital status, type of work, education background, workhours, smoking status, alcohol intake, years of experience, sleeping duration and absenteeism), the ANCOVAs also showed significant main effect of fatigue training program on knowledge of fatigue, and subjective fatigue. The main effect for knowledge of fatigue, and subjective fatigue were 13.11, and 8.28 respectively.

Discussion

The main purpose of this study was to evaluate the effects of fatigue-controlled training program to reduce subjective fatigue level and increase knowledge about fatigue among university teachers. A significant intervention effect was observed on knowledge of fatigue. Also, fatigue-controlled training program was associated with decreasing of subjective fatigue. Thus, this study provided evidence that

university teachers in Indonesia need training to lowere their fatigue and increasing their awareness of fatigue at workplace since they never had it from their beginning to work. In addition, fatigue-controlled training should be undergone regularly to maintenance their knowledge and awareness because it seems that refreshing was needed in this case. Therefore, these findings suggest that every university teachers in Indonesia should be better given a fatigue-controlled training to decrease fatigue and enhance their knowledge of fatigue at work.

Although the frequency and length of time of the fatigue training program only one day with 6 sessions, the findings of this study indicated that this training in which necessary information and behavior were provided to university teachers has a favorable effect, at least in the short term, on knowledge and fatigue among private university teachers in Indonesia. The frequency and number of training sessions should be also be examined in future by assessing the cost-benefit of university teacher training as a fatigue measure. In particular, the type of training at a particular location, even for a short time, is worth examining further (Tsutsumi, 2011) For the university teachers, it is very difficult to hold training in a long time since they have many duties in teaching and learning process for their daily activities. The most suitable method of training for university teacher in controlling fatigue and occupational safety and health at workplace is by on the job training. They can evaluate and learn what they experienced in their real workplace. This study was using this method in conducted the fatigue-training for university teachers.

Knowledge can be enhanced by giving information and lecturing in class through fatigue training program. Providing information about health-related behavior is one component, which raise awareness builds the knowledge base of the participants. Lack of awareness and knowledge of occupational health and safety is one of many problems among workers in Indonesia (Manno, 1996). So does the knowledge of fatigue among university teachers, the lower their knowledge about fatigue and its impact, the lower the awareness of the university teacher in preventing it from their work. Health education tends to be relatively ineffective for individuals, especially for those who do not expect substantial and immediate rewards, but in this study, health education by training in order to raise the awareness of university teacher about fatigue at worksite did increase the score of knowledge among university teachers in the intervention group. Based on the results of interaction effect of training between groups, it showed the knowledge of subjective fatigue fatigue before and after training in two groups have significant difference, intervention group is higher than control group.

Occupational fatigue among teacher has become one of the core issues which are commonly concerns the education field recently. Studies global fatigue among Korean-American male English teachers in South Korea (Cho, 2012) and study about burnout teachers in Turkey (Aydogan *et al.,* 2010) and Nigeria (Nwikina, 2010) had been conducted. However, study among university teacher that different from teacher in primary and secondary school was still limited. According to the findings (Table 4 and 5), we can see that subjective fatigue in intervention group has lower score than control group. The training significantly decreased subjective fatigue among university teachers in Indonesia.

Compared with the baseline data of intervention group, it showed that there is significant decreased for objective fatigue after training. However, when it measured 2 months after training, the scores became raised to 215.81±29.40 m s. It can be concluded that the training only work short time for university teachers, and it will increase after several or longer time. It means that the training should be undergone frequently so that university teachers can control their fatigue and prevent fatigue raised.

Some limitations of this study should be pointed out. The first limitation relates to inadequate participants in both groups, and the short of the training program may not affect to the decreasing of subjective and objective fatigue. The training should be held regularly and not only by training but also using poster, flyer or any medias in keeping the knowledge and awareness of university teacher about fatigue and occupational health at workplace in a good level and become habitual. The second limitation is related to the use of reaction time in measuring objective fatigue. It can change with practice and sensitive to expectancy and strategy, therefore, we should point out that the literature provides limited data regarding reaction time in education work. So far we have no data on measurement of reaction time among university teachers. However, investigation using reaction time is useful as an indicator of fatigue (Park *et al.,* 2001). The third limitation relates to the comparison of study's findings with other similar studies, there were limited studies about fatigue among university teachers. Still, some limitation relates some university teachers who had serious health problems were unable to follow the study; thus, we cannot disregard the healthy worker effect in our results.

After considering these limitations, the fatigue-controlled training program was effective in increasing the level of knowledge about fatigue in workplace and reducing subjective and objective fatigue among university teachers. To sum up, all this recommendation should be conducted the training with consistency and effective ways, so the goal of reducing fatigue in the workplace can be achieved in satisfaction and optimal level and also meet the benefits economically. **Acknowledgments**

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