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Mental workload and occupational burnout among the faculty members and administrative staff of Yazd Public Health School

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Abstract:

BACKGROUND: Administrative staff may be exposed to a great deal of the mental workload (MWL) due to the long working hours and the responsibility of responding to large numbers of clients. Occupational burnout (OB) is one of the issues that can be affected by MWL. The aim of the present study was to investigate the relationship between mental MWL and OB, as well as the internal interactions between OB dimensions.

MATERIALS AND METHODS: This cross-sectional and descriptive (correlation) study was conducted among faculty members and administrative staff of public health school of Yazd province. Samples were collected through the simple random sampling. NASA task load index and Maslach questionnaire were used for the assessment of MWL and OB, respectively. Frequency and percentage were used for the descriptive analysis. Spearman, Mann–Whitney U, and Kruskal–Wallis H tests were used for inferential statistics.

RESULTS: Ultimately, 29 individuals from faculty members and 82 individuals from administrative staff participated in this study. Most of the participants (73.9%) had experienced many MWL instances in performing their jobs duties. No significant relationship between MWL with OB and MWL with any of the demographic characteristics was found, as well ($P > 0.05$). In case of OB, a significant relationship was discovered between depersonalization with gender and personal accomplishment with work section ($P < 0.05$).

CONCLUSIONS: MWL cannot be considered as a contributing factor of OB of the administrative staff because no significant relationship has been noted between them. Reducing working hours, selection of suitable staff, and allowing a few minutes to rest on a daily basis represent the suggested solutions for reducing the MWL of staff.

Keywords:

Administrative staff, Maslach questionnaire, mental workload, NASA task load index, occupational burnout

Introduction

Today, more than half of everyone's life is spent in occupation and workplace. In the workplaces, five categories of harmful agents such as the physical, chemical, biological, environmental, and psychological, threats to human health

exist. Among these threats, psychological threat is the most important one affecting human health, which ultimately can reduce physical and psychological resistances of the working staff.^[1] According to the World Health Organization, "a healthy workplace is one in which workers and managers collaborate to use a continual

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improvement process to protect and promote the health, safety, and well-being of all workers and the sustainability of workplace.^[12] Experience shows that if no attention is paid to the health of human resources, work environments become one of the most hazardous places for employees as a result of which it can impose a lot of costs on organizations. From the ergonomics point of view, the most significant reason for injuries and occupational incidences is the incongruity between the workload and individual abilities.^[3]

The mental workload (MWL) represents a multidimensional concept and one of the subsets of the psychological agent, which is a structure for describing the number of physical and cognitive resources involved in performing a particular action. Moreover, it is influenced by the factors such as external demands, organizational, psychological factors, and cognitive abilities.^[4,5] Accordingly, MWL is defined as the cost or amount of resources required to process information per unit of time to perform a task.^[6] High levels of workload can cause physiological and cognitive changes such as decreasing concentration and attention, increasing muscle tension and problems with coordination, which can cause negative effects on individuals' performances.^[7] Naturally, it is mentioned that low level of MWL may cause problems such as disorders in perception, attention, and processing of information.^[8] Furthermore, concurrent studies indicate the increasing effect of MWL on the risks of accidents and decreasing effect on performance and safety levels.^[6,9,10]

Plethora studies have examined the workload and its complications. The study conducted for investigating the effect of workload on job stress has implied the positive and significant relationship between them.^[11] Another study by Portoghese *et al.* which investigates the occupational burnout (OB) and MWL in health-care unit demonstrates the positive and significant correlation between MWL and exhaustion.^[12]

According to the Maslach's definition, burnout is a psychological syndrome which includes three dimensions: Emotional exhaustion, which represents a feeling of being pressurized and a loss of individual internal resources; depersonalization, which represents a sense of negative and indifferent response to people receiving services or care; and personal accomplishment, which represents the same as the decrease in the sense of competence, the feeling of failure to perform personal duties, and performing a momentous role.^[13] OB is a disorder which is caused by person's long-term exposure to work-related mental strain and clients and this happens along with the symptoms of emotional, physical, and mental breakdown.^[14] Similarly, some studies noted that factors such as emotional stress, excess workload, poor leadership, conflicts with staff,

lack of social support, presence of stressors in work environment, and ... are associated with OB.^[15,16]

OB may be the reason behind health problems such as hypertension and gastrointestinal disorders.^[17] Organizations may incur high costs such as absenteeism and low morale due to OB. Further, researchers believe that burnout is the cause of problems such as excessive alcohol consumption, insomnia, fatigue, and family and marital problems.^[18] In general, studies have indicated that OB accounts for 8% of all occupational diseases.^[19]

MWL and OB among staff in office and educational settings such as colleges may have irreparable consequences, like disorders in the implementation of academic programs and poor learning. The aim of the present study was to investigate the relationship between MWL and OB among administrative staff and faculty members of school of public health of Shahid Sadoughi University of Medical Sciences.

Materials and Methods

Study design and setting

The present study was a cross-sectional and descriptive (correlation) study designed and performed in 2019. Evaluation of MWL and OB was the main aim of the present study. An inclusion criterion was having at least 1 year of experience as faculty member or at the administrative setting. Suffering from a psychological impact such as divorce or death of one family member were the exclusion criteria of the present study.

Study participants and sampling

The participants were divided into two categories: Faculty members and administrative staff of distinct parts of the school. According to previous study which examined the relationship between MWL and OB among nurses in the intensive care ward,^[20] the correlation between MWL and OB and placing it in the formula No. 1, the sample size of 211 employees (n_0) was calculated. Then, informed by the combined population of administrative staff and faculty members in school of health in Yazd University of Medical Sciences, which was equal to 183, the sample size was corrected through the limited community reform formula (formula no. 2), and it was estimated to be 98 employees. Eventually, 82 from administrative staff and 29 from faculty members participated in this study. Samples were collected through the simple random sampling.

$$\text{Formula No. 1} = n_0 = 4 + \left(\frac{(Z_{1-\alpha/2} + Z_{1-\beta})}{0.5 \ln \left(\frac{1+r}{1-r} \right)} \right)^2$$

Formula No. 2
$$n = \frac{n_0}{1 + \frac{(n_0 - 1)}{N}}$$

Data collection tool and technique

The data collection tool was a questionnaire, comprising of three parts. The first part was related to demographic characteristics of the participants. The second part was about the NASA task load index (NASA-TLX). Moreover, the final part was related to the Maslach OB assessment questionnaire.

In the first part of the questionnaire, related to demographic characteristics, information such as gender (male and female), age, work experience, number of children (none, a child, two children, three children and four children), education level (diploma, bachelor, MSc, and PhD), marital status (married and single), type of employment (formal, contract, contractual, projective, and company), and the work section (administrative staff and faculty member) of the participants were collected.

The NASA-TLX was used to collect MWL information. NASA-TLX has six dimensions related to the workload, three of which are related to the imposed demands on individuals while working (mental demand, physical demand, and temporal demand). Moreover, the remaining three are related to the outcome of the work (performance, effort, and frustration).^[21] The dimension of performance is scaled between the two levels of perfect and failure but other dimensions are scaled between two levels of very low and very high. In the first section of the NASA TLX, participants should evaluate the score of each dimension with a scale of 0–100 with a five-point interval. In the second section, the dimensions are compared in a binary comparison, each dimension, which is more important and effective in experienced MWL than the other one (in the opinion of the participant), will be chosen. Then, the number of the selected times for each dimension in binary comparisons must be multiplied by the score assigned to that dimension at first section. Ultimately, the sum of these multiplications is divided by 15 to calculate the experienced MWL of the participants.^[20] MWL scores below 50 (cut point) are acceptable and scores above it are unacceptable.^[22] The validity and reliability of the used NASA TLX were investigated and reported by Mazloumi *et al.* in which Cronbach’s alpha was 0.897.^[23]

Maslach questionnaire was used for the assessment of OB which includes three dimensions, two scales (intensity and frequency) and 22 separate questions. Nine of which are related to emotional exhaustion, eight questions are about personal accomplishment and five questions are related to depersonalization. To score this questionnaire, two scales of frequency and intensity are assigned

to each question [Table 1]. Moreover, if a participant chooses never option for frequency scale, he/she is bound to choose never option for intensity scale, as well. Otherwise, according to the selected symbol for each question, the frequency and intensity of the score of each question will be calculated on the two scales. The scale frequency of each question was measured on Likert scale from zero (never) to six (every day). Moreover, the scale intensity of each question was also measured on a Likert scale from zero (negligible) to six (very high). Ultimately, the scores related to each dimension will be computed and the OB syndrome score is calculated in that dimension (for two scales frequency and intensity). The scores for frequency and intensity in each dimension and scale are divided according to Table 1.^[13,24] The reliability of this questionnaire was measured through Cronbach’s alpha coefficient, and its reliability coefficient was reported to be 60%–80%.^[25]

Kolmogorov–Smirnov test was employed for investigating the normality of quantitative variables of the study. To investigate the relationship between MWL and quantitative variables of demographic characteristics of participants (age, work experience, and number of children), spearman’s correlative test was performed. In addition, independent statistical *t*-test was used to examine the relationship between MWL and two-level qualitative variables of demographic characteristics of participants (marital status, work section, and gender). Finally, one-way analysis of variance was used to investigate the relationship between MWL and multivariate variables of demographic characteristics of participants (academic level and type of employment).^[26]

To examine the relationship between the frequency and intensity scales of each dimension of OB with quantitative variables of the demographic characteristics of participants (age, work experience, and number of children), spearman’s correlative test, with two-level qualitative variables of demographic characteristics of participants (marital status, work section, and gender), Mann–Whitney *U*-test and with multivariate qualitative variables of demographic characteristics of

Table 1: Scoring each dimension of the occupational burnout

Dimension	Amount	Frequently	Intensity
Emotional exhaustion	Low	≥ 17	≥ 25
	Medium	18-29	26-39
	High	≤ 30	≤ 40
Personal accomplishment	Low	≥ 33	≥ 36
	Medium	34-39	37-43
	High	≤ 40	≤ 44
Depersonalization	Low	≥ 5	≥ 6
	Medium	6-11	7-14
	High	≤ 12	≤ 15

participants (academic level and type of employment), and Kruskal Wallis H test were used.^[26]

For determining the relationship between MWL and scales of frequency and intensity of each dimension of OB, spearman’s correlative test was used. Data were analyzed using Statistical Package for the Social Sciences (SPSS) for Windows (version 22); United states; 2013. Data were analysed regarding 0.05 of confidence level, as well.

Ethical consideration

This study was approved by ethics committee of school of public health of Shahid Sadoughi University of Medical Sciences (IR. SSU. SPH. REC.1398.146). All participants willingly filled the informed consent form of the study.

Results

All of the participants had work experience of more than 1 year with no psychological impact. Most of the participants in this project were men (55.8%), majority of them had MSc degree (34.2%), mostly married (65.8%), the type of employment of the most participants was contracted (35.1%), most of them bore no children (40.5%), and most of them were administrative staff (73.9%). The average and standard deviation of age and work experience were 35.48 (9.22) and 9.24 (8.25), respectively.

The experienced MWL and OB of the participants are demonstrated in Table 2.

The results of this study show that most of the participants (73.9%) have experienced MWL greater than the cutting point (50) [Table 2].

Data analysis has indicated that 32.4% of the participants in the frequency scale and 28.8% in the intensity scale were suffering from OB in terms of the emotional exhaustion. Regarding personal accomplishment dimension in the frequency scale, 48.6%, and in the intensity scale 52.2% of participants were suffering from OB. Moreover, in

the depersonalization dimension, 27.9% of participants in the frequency scale and 28.8% in intensity scale were suffering from OB [Table 2].

The results of Kolmogorov–Smirnov test in determining the normality of the data indicate the abnormality of all dimensions of OB in frequency and intensity scales and the normality of MWL score.

The significance level between demographic characteristics, MWL, and OB is presented in Table 3.

In the study of the relationship between MWL score and quantitative variables of the demographic characteristics of the participants (age and number of children and work experience), no significant relationship was found. There was no significant relationship between MWL and two-level qualitative variables (gender, marital status, and work section), was detected. Furthermore, no significant relationship was found even between MWL and the multivariate qualitative variables of demographic characteristics of the participants (education level and type of employment) [Table 3].

In terms of significance, the relationship between the dimensions of OB in both frequency and intensity scales with quantitative variables of the demographic characteristics of the participants bore no significant relationship. The exception for this result is the frequency scale in terms of personal accomplishment and age [Table 3].

There was a significant relationship between frequency and intensity scales of depersonalization dimension and gender and frequency and intensity scales of personal accomplishment dimension and work section. However, in the other cases, no significant relationship was found [Table 3].

There was a significant relationship between multivariate qualitative variables (education and type of employment) and frequency and intensity scales of OB dimensions.

Table 2: Number and percentage of staff suffering from mental workload and occupational burnout in different categories

Workload		Job burnout			
Levels	n (%)	Dimensions	Amount	Scales	
				Frequency n (%)	Intensity n (%)
1-50	29 (26.1)	Emotional exhaustion	Low	75 (67.6)	79 (71.2)
51-100	82 (73.9)		Medium	19 (17.1)	24 (21.6)
			High	17 (15.1)	8 (7.2)
		Personal accomplishment	Low	57 (51.4)	53 (47.8)
			Medium	16 (14.4)	18 (16.2)
			High	38 (34.2)	40 (36)
		Depersonalization	Low	80 (72.1)	79 (71.2)
			Medium	20 (18)	25 (22.5)
			High	11 (9.9)	7 (6.3)

Moreover, a significant relationship was seen between frequency scale in terms of personal accomplishment and academic status. However, no significant relationship was discovered between other scales of OB dimensions and these two qualitative variables [Table 3].

The correlation coefficients between the quantitative variables of the study are demonstrated in detail in Table 4. Meanwhile, no significant correlation was observed between the MWL of the participants and any of the quantitative variables of the study.

In examining the correlation between the frequency and intensity scales of the dimensions of OB with each other, with exception of frequency scale of the emotional exhaustion and the frequency scale of personal accomplishment ($P > 0.05$), the other cases were significantly correlated ($P < 0.05$) [Table 4].

Discussion

The lack of significant relationship between MWL and any of the dimensions of OB and the possibility of an incremental or regressive effect in the relationship between the dimensions of OB that is rarely considered in studies can be regarded as the most significant

results of the present study. Despite the fact in previous studies, the effect of demographic characteristics on cognitive processes has been demonstrated,^[27] in this study, no significant relationship was found between MWL and any of the demographic characteristics of the participants. The results of a similar study indicated the lack of relationship between MWL, gender and age, and confirm the results of the present study.^[28] The results of the study by Arghami *et al.*, points out the significant relationship between MWL, age and work experience of individuals and the lack of significant relationship between MWL and gender of employees participating in the study, that this may be related to the difference in place of conducting the studies.^[21] A significant relationship between the MWL perceived by individuals and their work experience may indicate the significant impact of increasing experience on energy reduction and the necessary effort to perform tasks.

The findings of the present study showed that there was no significant relationship between gender and dimensions of emotional exhaustion and personal accomplishment. However, there is a significant relationship between this variable and depersonalization. Naturally, it should be noted that the degree of OB in the dimensions of depersonalization was more significant in men than

Table 3: Significance level between demographic characteristics, mental workload, and occupational burnout

Variables	OB						MWL
	Emotional exhaustion		Personal accomplishment		Depersonalization		
	Intensity	Frequency	Intensity	Frequency	Intensity	Frequency	
Gender	0.508	0.724	0.199	0.544	0.003*	0.006*	0.197
Age	0.604	0.725	0.046*	0.199	0.368	0.384	0.216
Education level	0.251	0.236	0.028*	0.008	0.18	0.121	0.105
Marital status	0.707	0.52	0.293	0.725	0.15	0.149	0.334
Type of employment	0.198	0.462	0.406	0.139	0.284	0.581	0.088
Number of children	0.781	0.712	0.306	0.128	0.969	0.834	0.384
Work section	0.528	0.532	0.033*	0.036*	0.712	0.471	0.705
Work experience	0.501	0.303	0.178	0.087	0.595	0.748	0.056

* $P < 0.05$. OB=Occupational burnout, MWL=Mental workload

Table 4: Coefficients of correlations between variables and significant relationship at the levels of 0.01 and 0.05

Variable	1	2	3	4	5A	5B	6A	6B	7A	7B
1. Age	1									
2. The number of children	0.692**	1								
3. Work experience	0.893**	0.626**	1							
4. Mental work load	-0.118	-0.083	-0.182	1						
5. Emotional exhaustion										
5A. Frequency	0.008	0.035	-0.099	0.185	1					
5B. Intensity	0.05	0.027	-0.065	0.173	0.905**	1				
6. Personal accomplishment										
6A. Frequency	0.198	0.128	0.163	0.133	-0.134	-0.193*	1			
6B. Intensity	0.123	0.098	0.129	0.065	-0.262**	0.279**	0.804**	1		
7. Depersonalization										
7A. Frequency	0.083	0.02	0.031	-0.008	0.429**	0.436**	-0.393**	-0.485**	1	
7B. Intensity	0.086	0.004	0.051	-0.015	0.372**	0.448**	-0.379**	-0.444**	0.915**	1

** $P < 0.01$, * $P < 0.05$

women. Higher OB in men than women can indicate the importance of selecting the appropriate personnel for different job cases. The study conducted among dentists, indicates there was a significant relationship between gender and dimensions of OB and age.^[25] Differences in occupations and places of study may be one of the most influential factors affecting the differences in results.

In the present study, no significant relationship was found between age and depersonalization dimension. Therefore, the results of our study are consistent with the results of the studies conducted in the field of dentistry,^[29] but not with the results of the studies in one industrial setting.^[30]

The results of this study showed that there was a significant relationship between educational status and frequency scale of personal accomplishment dimension. Thus, with increasing the level of education, employees on frequency scales of this dimension of OB feel more inadequate. In this regard, the results of consistent study confirm the results of the present study.^[31] The results of other study conducted in dentistry setting indicate a significant relationship between academic status and OB, as well.^[29]

According to the results of the present study, there is no significant relationship between marital status and none of the dimensions of OB, which is consistent with the results of previous studies.^[25,31,32] This can indicate the low importance of marital status on OB in different job fields.

In this study, no significant relationship was discovered between the type of employment and none of the frequency and intensity scales of OB dimensions which was consistent with the results of the study conducted among nurses,^[33] and not consistent with other one conducted in an industrial setting.^[31]

The results of the present study showed that there was a significant relationship between work section and personal accomplishment, that is consistent with the study conducted in one industrial setting^[31] and not consistent with other one conducted in health care unit,^[32] respectively.

Work experience bore no significant relationship with any scale of OB dimensions. Which is consistent with a previous similar study^[31] and inconsistent with other two studies on the existence of significant and positive^[34] and significant and negative relationships.^[25] The results of this study showed there was no significant correlation between MWL and frequency and intensity scales of any dimensions of OB. In fact, OB may be unaffected by MWL, as the results have indicated. The results of

similar studies in the field of health care are not consistent with the findings of this study, which could indicate the importance of doubling the MWL in health care unit.^[20,33]

OB represents a multidimensional issue that can be affected by a number of factors.^[34] Moreover, dimensions of OB itself may interact with each other. This principle has received less attention in previous studies on OB. One study found out that emotional exhaustion can lead to depersonalization, which in turn can lead to personal inefficacy.^[17] In the present study, attempt has been made to measure the interaction of the frequency and intensity scales of OB dimensions with each other. In examining the correlation between the frequency and intensity scales of OB's dimensions, most of the scales are significantly correlated. The only exceptions are the frequency scale in terms of emotional exhaustion and the frequency scale in terms of personal accomplishment. This indicated the role of reciprocating effectiveness of scales on each other. In previous studies, the importance of emotional exhaustion has been pointed out, so that an increase in the score of this dimension would affect other dimensions of OB which ultimately leads to increased OB.^[34] The results of this study show the importance of emotional exhaustion and its effect on other dimensions of OB, as well.

Ultimately, it can be indicated that different occupations and various places of study, different job forces and varying working hours can be considered among the most effective factors on the workload and OB. Lack of similar studies in office and academic work environments and high workload of faculty staff and lack of time to cooperate with research project implementers were among the most significant limitations of the current study. The small number of samples is considered as limitation of our study, which the conduction of similar studies with larger statistical community in various occupational groups is suggested.

Conclusions

Considering the results of the present study, it can be concluded that MWL is not one of the contributing factors of OB. Hence, it can be comprehended that decrement of perceived MWL by adjusting the work schedule of staff cannot decrease the OB. Lack of significant association between personal characteristics and perceived MWL like age and work experience shows that perceived MWL cannot be considered as cumulative complication. In case of OB, dimensions may have an incremental or subtractive interaction with each other which was not thoroughly investigated in the previous study. This implication indicated that by controlling one dimension other dimensions could be also controlled. Moreover, significant positive correlation between frequency and

intensity scales of each dimension of OB indicates the possibility of the reduction of intensity by controlling the frequency for each dimension.

Reducing working hours, hiring suitable staff and allowing staff to enjoy a few minutes to rest during working days seem to be important actions to be adopted by managers of administrative and educational settings to decrease perceived MWL and OB of staff.

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Conflicts of interest

There are no conflicts of interest.

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Nodoushan, *et al.*: Interaction of mental workload and occupational burnout

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