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Comparison of the Work Ability Status in Manual and Office Workers – an Occupational Health Survey

Mahin Hosseininejad¹, Elham Mirzamohammadi¹, Yasser Labafinejad¹, Amir Mohammad Mazhari² and Saber Mohammadi^{1*}

¹Occupational Medicine, Faculty of Medicine, Iran University of Medical Sciences, Iran

²Emenjuyan occupational medicine clinic- Tehran, Iran

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***Corresponding author:** Saber Mohammadi, Faculty of Medicine, Iran University of Medical Sciences, Iran, Tel: +98 21 66551204, Email: sabermohammadi@gmail.com

Abstract

Today, disability is turning into a major occupational health issue. Therefore, work ability is forming and developing as a multilateral concept. The objective of this study was to compare work ability among manual and office workers in a manufacturing industry. This cross-sectional study was carried out on 784 workers of a manufacturing industry in 2014. The subjects completed an inventory that measured their work ability based on the work ability index (WAI). Demographic and occupational information of the subjects was also collected. The WAI scores of the manual and office workers were obtained and compared. In total, the response rate to the questionnaire and mean WAI score of workers were 84.40% and 42.46 ± 3.96 , respectively. In addition, the mean WAI scores of office workers, older subjects, married individuals, smokers, and subjects with BMI > 25 was significantly lower; whereas, work experience and educational level had no impact on this score. Research findings showed that WAI scores of the workers were affected by demographic factors, and thus these factors should be corrected to maintain the score at an optimal level. Moreover, the work potential of all people with different levels of ability can be exploited by modifying current strict recruitment criteria.

Keywords: Work Ability Index; Disability; Work

Introduction

Workability is a broad concept that includes physical, psychological, and social abilities of a worker to do job and cope with certain occupational and individual needs, health conditions, and psychological and mental resources [1-4]. Today, disability has turned into a major occupational health issue in industrial societies. Therefore, work ability is forming and developing as a multilateral concept. In occupational setting, the vision of work ability generally refers to the equilibrium between resources and individual's work demands [5]. The assessment of work ability is essential for different reasons including the identification of work ability decline in early stages, investigation into and follow-up assessment of the effects of preventive measures and early rehabilitation, and evaluation of work disability [6].

An applicable method is needed to consider all dimensions of work ability. This method has been developed under the title 'Workability Index'. In 1980, Finnish researchers developed the Work Ability Index by integrating the concepts of health

resources and coping with work demands into work ability to show the current and near future work ability based on job demands, health factors, and psychological resources [7]. WAI is a self-report instrument for the assessment of a worker's ability to work. It is used in workplaces for establishing objectives to maintain work ability throughout working life and to identify workers prone to disability and early disability-related retirement. This study aimed at measuring work ability and comparing it between manual and office workers, as well as investigating the effect of demographic and occupational variables on work ability in a manufacturing industry.

Materials and Methods

Study design and subjects

In this cross-sectional study, information of a group of workers in a manufacturing industry in Tehran, capital city of Iran, was collected between December 2013 and November 2014. To collect demographic information, such as age, marital

status, BMI, educational level, and smoking status, the workers were asked to complete the questionnaires. Among 817 workers, with at least one-year work experience, who completed the questionnaire, 33 female workers were excluded due to the minority matter. Finally, data of 784 workers were analyzed.

Work Ability Index

The work ability of workers was measured using the 7-item Work Ability Index:

- Current work ability compared with the lifetime best,
- Work ability in relation to the demands of the job,
- Number of current diseases diagnosed by physician,
- Estimated work impairment due to diseases,
- Sick leave during the past year (12 months),
- Own prognosis of work ability two years from now, and
- Mental resources

The total WAI score of these seven items ranges from 7 to 49 points. In addition, the total WAI score is divided in four groups, namely poor (7-27), moderate (28-36), good (37-43), and excellent (44-49). The reliability and validity of Iranian edition of this questionnaire have been approved by other studies [8]. The WAI questionnaire was distributed among the workers with at least one year of work experience, who volunteered to participate in the study. The conduction of this study, was approved by the Ethical Committee of Iran University of Medical Sciences.

Statistical Analysis

In this study, WAI was the dependent variable and the independent variables included occupational and demographic characteristics. The Chi-square test was used to investigate the relationship of qualitative variables, the t-test was employed to compare quantitative variables, and regression analysis was utilized to investigate WAI scores among manual and office workers by moderating independent variables. In all test, the significance level was considered as 0.05 with CI=95%. The statistical analysis was done using SPSS16.

Results

In total, 817 out of 968 workers completed the questionnaire and the response rate was 84.40%. After the exclusion of ineligible subjects, data of 784 workers were analyzed. The age range of the subjects was between 20 and 62 years, with the mean of 35.02 ± 6.79 years. All subjects were male. The mean BMI of the research population was 25.60 ± 2.70 , and 6.1% of the subjects had BMI>30. The subjects had the average work experience of 7.51 ± 4.79 years in this industry. More than half of them had average educational level, 27.2% had low educational level, and 18.8% had high educational level. In addition, 88.6% of them were married. Twenty percent of the populations were

smokers and 75.9 of subjects were shift worker (Table 1). In addition, 76.9% and 23.1% of the subjects were manual and office workers, respectively. According to data, manual workers were younger and had lower BMI.

Table 1: Characteristics of the participants based on the work ability index (n=784).

	WAI	
	(Pvalue)	(Pvalue)
Age		
<34y	42.99 ± 3.71	<0.001
$\geq 34y$	41.96 ± 4.12	
Marital status		
Single	43.76 ± 3.47	0.001
0.001	42.30 ± 3.99	
BMI		
<25	43.16 ± 3.63	<0.001
≥ 25	42.08 ± 4.08	
Education		
Low	42.63 ± 3.96	0.507
Medium	42.31 ± 4.12	
High	42.65 ± 3.44	
Work experience		
<7y	42.56 ± 4.11	0.461
$\geq 7y$	42.35 ± 3.78	
Smoking status		
Smoker	42.78 ± 3.70	<0.001
Non smoker	41.17 ± 4.63	
Shift work		
Yes	42.60 ± 3.74	0.088
No	42.03 ± 4.55	
Work group		
Manual worker	42.67 ± 3.75	0.008
Office worker	41.78 ± 4.51	

The mean WAI score of the research population was 42.46 ± 3.96 with 40.7% of the subjects in excellent, 50.9% in good, 8% in moderate, and 0.4% in poor groups. The mean WAI score of manual workers (42.67 ± 3.75) was significantly higher than that of office workers (41.78 ± 4.51), $p=0.008$ (Table 2). The mean WAI score of subjects younger than 34 years was 42.99 ± 3.71 ; whereas, the mean WAI score of subjects ≥ 34 years was 41.96 ± 4.12 . This difference was statistically significant ($p<0.001$). The mean WAI score of smokers and non-smokers were 41.17 ± 4.63 and 42.78 ± 3.70 , respectively. This difference was statistically significant ($p<0.001$). The mean WAI scores of subjects with BMI<25 and BMI ≥ 25 were 43.16 ± 3.63 and 42.08 ± 4.08 , respectively ($p<0.001$). Moreover, the mean WAI score of single subjects was higher than that of the married subjects (43.74 ± 3.47 versus 42.30 ± 3.99). This difference was

statistically significant ($p=0.001$). According to statistics, the WAI scores of shift workers & non-shift workers were 42.60 ± 3.74 and 42.03 ± 4.55 , respectively. This difference was not statistically significant. The WAI score of the subjects was not significantly different in terms of work experience and educational level (Table 1). Based on the WAI score, subjects were divided in the Low (7-36) and High (37-49) groups. Results of the Chi-square test from the comparison of demographic and occupational factors between these two groups were almost similar to the t-test results, as follows: The WAI score was negatively correlated with age [OR=3.36 (95% CI: 1.77-6.35), $p<0.001$] and BMI [OR=2.68 (95% CI: 1.33-5.39), $p=0.004$], and decreased with increased

BMI and aging. Manual [OR=1.79 (95% CI: 1.00- 3.20), $p=0.049$] and shift workers [OR=1.83 (95% CI: 1.03-3.25), $p=0.049$] were categorized in high group with a higher probability. On the other hand, smokers obtained lower WAI score [OR=2.84 (95% CI: 1.61-5.01), $p=0.001$]. The numbers of single and married subjects were higher in the high and low groups, respectively; however, this difference was not statistically significant (Table 3). Linear regression analysis showed that the WAI score was significantly higher among manual workers after modifying the effect of independent variables, such as age, marital status, BMI, and smoking status (Table 4).

Table 2: work ability index and individual factors in office and manual workers (n=784).

	Office workers		Manual workers		
	Mean $\pm$ SD	Number (%)	Mean $\pm$ SD	Number(%)	Pvalue(OR)
WAI	41.78 $\pm$ 4.51		42.67 $\pm$ 3.75		0.008
Current work ability (0-10)	8.48 $\pm$ 1.41		8.84 $\pm$ 1.19		0.001
Work ability in relation to demands of work(2-10)	7.46 $\pm$ 1.94		7.71 $\pm$ 1.96		0.134
number of diagnosed diseases (1-7)	6.20 $\pm$ 1.51		6.10 $\pm$ 1.59		0.418
work impairment due to diseases(1-6)	5.48 $\pm$ 0.94		5.59 $\pm$ 0.74		0.093
Sickness absence in the past yea(1-5)	4.44 $\pm$ 0.80		4.41 $\pm$ 0.54		0.585
Work ability in the forthcoming two years(1,4,7)	6.49 $\pm$ 1.33		6.44 $\pm$ 1.43		0.686
Psychological resources(1-4)	3.24 $\pm$ 0.69		3.40 $\pm$ 0.68		0.004
Age	36.22 $\pm$ 6.89		34.66 $\pm$ 6.72		0.007
BMI	26.11 $\pm$ 2.74		25.45 $\pm$ 2.68		0.004
Work experience	7.25 $\pm$ 5.07		7.58 $\pm$ 4.70		0.410
Marital status					
Single		22(12.15)		67(11.11)	0.690(1.10)
Married		159(87.84)		536(88.88)	
Smoking status					
Smoker		53(29.28)		104(17.24)	0.001(1.98)
Non smoker		128(70.71)		499(82.75)	
Shift work					
yes		90(49.27)		505(83.74)	<0.001(5.21)
No		91(50.27)		98(16.25)	

Table 3: Chi-square analysis of work ability index and individual factors of the participants (n=784).

	Number (%)			
	High WAI	Low WAI	OR(95%CI)	(Pvalue)
Age				
<34y	367(96.5)	13(3.4)	3.36 (1.77 -6.35)	0.000
$\geq 34y$	361(89.3)	43(10.6)		
Marital status				
Single	86(96.6)	3(3.3)	2.36 (0.724-7.73)	0.189
Married	642(92.3)	53(7.6)		
BMI				
<25	268(96.4)	10(3.5)	2.68 (1.33-5.39)	0.004
≥ 25	460(90.9)	46(9.09)		

Work experience				
<7y	394(94.4)	23(5.5)	1.69 (0.97 – 2.93)	0.071
≥7y	334(91)	33(9)		
Smoking status				
Smoker	593(94.57)	34(5.42)	2.84 (1.61-5.01)	0.001
Non smoker	135(85.98)	22(14.01)		
Shift work				
Yes	559(93.9)	36(6.05)	1.83(1.036-3.25)	0.049
No	169(89.4)	20(10.5)		
Work group				
Manual worker	566(93.8)	37(6.13)	1.79 (1.004-3.20)	0.049
Office worker	162(90)	19(10)		

Table 4: linear regression analysis of work ability index and individual factors of the participants.

Work ability index			
	Pvalue	B	B Coefficient
Work group	0.037	-0.696	-0.074
Age	0.043	-0.044	-0.076
Marital status	0.007	1.227	0.098
BMI	0.224	0.064	0.043
Smoking status	0.000	-1.458	- 0.147

Discussion

In this study, the WAI score of workers in a manufacturing industry was investigated, and a comparison was made between the manual and office workers in this regard. In addition, the effect of personal and occupational factors on WAI was assessed. The total WAI score of the subjects was 42.46 ± 3.96 , on average, with almost 50% of them in the good category and more than 90% in the good and excellent categories. In a study by Alavinia et al. in Holland on office workers, a slightly lower mean score was obtained (41.1 ± 5.1). This difference from our findings may be due to the age of participants, which was higher in their study (35.7 years versus 34 years). In addition, the categorization of their subjects based on WAI score was largely similar to that of our subjects [9], with 42.8%, 45.4%, 9.7%, and 2.1% of subjects in the excellent, good, moderate and poor work ability categories, respectively.

According to our research findings, the total WAI score of manual workers was higher than that of office workers. Results of a study conducted by van der Gulden et al. were different from our findings. In their study, office workers obtained higher WAI score than manual workers [10]. Reasons that explain this difference are as follows: First, given the work and recruitment conditions in Iran, there is far greater chance of employment for workers at higher health level. In addition, the employment terms are much stricter for manual workers than office workers. Therefore, manual workers are usually recruited from completely healthy people, which are less prone to work-

related disabilities in future (effect of healthy worker). Second, the mean age of office workers was significantly higher than that of manual workers in our study. This difference can justify higher WAI score among the latter group. In addition, the WAI score in our study was inversely correlated with age. Some other studies also reported this inverse correlation of age with WAI score [11-15]. Nevertheless, a study into the health-care shift workers showed lower WAI score among younger workers [16]. In our study, the mean WAI score of smokers was lower than that of non-smokers, which was consistent with the findings of Tuomi et al. and Mohammadi et al. [4,17]. Kaleta et al. [18] also reported a statistically significant correlation between smoking and weak WAI among women. Subject with higher BMI obtained lower WAI score. This finding was consistent with results of previous studies including Tuomi et al. Kaleta et al. and Fischer et al. [4,18,19] who reported a correlation between increased BMI and lower work ability. In our study, single subjects obtained significantly higher WAI scores than married subjects. In a study by Monteiro et al. [20] the excellent and moderate scores were more common among single and married subjects, respectively.

Conclusion

According to the findings of this study, the WAI score, as a helpful index for establishing workplace objectives to preserve work ability throughout the working life and to identify workers prone to work-related disabilities or disability-related early retirement, is affected by demographic and occupational factors. As a result, attempts should be made for correcting these factors to preserve WAI score at a desirable level. Moreover, our study showed that the recruitment conditions for workers are very strict, specifically among manual workers. Therefore, employment terms should be moderated in favor of employing people with moderate and even weak work ability. In this way, the work potential of all people with different levels of ability can be exploited.

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