



## Effect of job and individual factors on Work Ability Index (WAI) in a dairy company

**Haji Omid Kalte** \*, Occupational Health Engineering, Tarbiat Modares University, Tehran, Iran.

**Mohammad Ali Mirzaei**, Occupational Health Engineering, Department of Occupational Health Engineering, School of Public Health, Mazandaran University of Medical Sciences, Sari, Iran.

**Jamshid Yazdani Cherati**, Biostatistics, Department of Biostatistics and Epidemiology, School of Public Health, Mazandaran University of Medical Sciences, Sari, Iran.

### Suggested Citation:

Kalte, H., O., Mirzaei, M., A. & Cherati, J. Y. (2016). Effect of job and individual factors on Work Ability Index (WAI) in a dairy company, *Global Journal on Advances in Pure & Applied Sciences*. [Online]. 07, pp 34-39. Available from: [www.propaas.eu](http://www.propaas.eu)

Received November 12, 2014; revised December 07, 2014; accepted February 08, 2015.

Selection and peer review under responsibility of Prof. Dr. Fahrettin Sadikoglu, Near East University.

©2016 Academic World Education & Research Center. All rights reserved.

### Abstract

**Background:** The work ability index (WAI) is one the most widely used instruments for measuring perceived work ability. However, very few studies have used this instrument in Iran. The present study is designed to assess effect of individual and work-related risk factors on the WAI in one dairy factory. **Methods:** This cross-sectional study was designed among 117 workers. Work ability was measured by the Persian versions of Work Ability Index (P-WAI). An author-developed measure was used to assess individual and work-related factors. All Statistical analyses were performed using IBM SPSS Statistics 21 (USA, SPSS Inc.). **Results:** The mean age of participants was  $32.38 \pm 7.3$  and the Mean score of the WAI was  $44.92 \pm 5.56$ . According to the categorical classification of WAI score, 10.9, 35.6, and 53.5 % of participants had moderate, good and excellent work ability, respectively. The results of statistical analyses showed that mean WAI significantly differed with age (0.049), sleep quality ( $p= 0.035$ ) and employment status ( $p= 0.014$ ). **Conclusion:** To improve the workers' work ability, intervention programs should focus on improving sleep quality and exercise. Also, we suggest that increasing job insecurity should be considered an important intervention in promoting worker's work ability.

**Keywords:** Work Ability Index (WAI), Sleep Quality, Job Insecurity

---

\* ADDRESS FOR CORRESPONDENCE: **Haji Omid Kalte**, Occupational Health Engineering, Tarbiat Modares University, Tehran, Iran. E-mail address: [o.kalte@modares.ac.ir](mailto:o.kalte@modares.ac.ir)

## 1. Introduction

Correct assessment of work ability among staff is economically very important for managers and its improvement is considered as one of the efficiency improvement in organizations and industries [1]. The equilibrium model which is used for evaluating work ability among individuals is based on stress-strain model [2]. According to this model, job stress creates strain and pressure on individual. The quality and level of strain is different based on individuals' variables [3].

In recent years, increasing work ability is being considered as one way to prevent reduction of work ability (due to aging and premature retirement). Recent researches on the quality of work provide a better understanding on work ability [4]. Work ability is defined as one's ability to perform the job according to physical and mental job requirements.

Work Ability Index (WAI) is widely applied in occupational health questionnaires and those studies which have been designed to assess the job requirements and workers' health status and resources [5]. This questionnaire consists of seven parts and includes a multi-faceted picture of the health status of employees, number of diseases, work disorders, absenteeism, participants' abilities and factors related to work ability. Work ability index (WAI) is a simple index to evaluate work ability among workers which objectively evaluates the equilibrium between need for work and ability to do work among staff. This index may use to assess the effectiveness of occupational health's interventions and also to identify work-related risks and workers at risk [6, 7].

According to researches which were done in Finland occupational health institute about work ability index, it has been recognized that this tool may accurately anticipate work ability differences among several job groups. Also it must be noted that WAI defines the quality and amount of interactions between work and worker and it should not be interpreted as the health index [8, 9].

Our study shows that a few researches have been conducted in Iran using WAI. So, this tool should be applied among different job groups around the country and thereby effective factors on it may be recognized and it could be applied for intervention programs. Therefore, considering above mentioned descriptions, present study was designed to evaluate WAI among workers in a dairy company. In this study, the effect of individual and occupational factors such as age, education level, marital status, job kind and type of activity were evaluated on WAI among workers.

## 2. Methods

This is an analytical cross-sectional study and studied population includes 107 workers in Golestan Pegah dairy company who randomly selected. To collect data, a Persian version of Work Ability Index (WAI) was applied. Validity and reliability of this questionnaire has been previously confirmed by Mazlumi et al. and related Cronbach's alpha coefficient for work ability, current diagnosed diseases (by physician) and mental abilities were obtained equal to 0.777 and 0.521 and 0.829, respectively which indicate on a high validity for questionnaire [10].

First part of the WAI questionnaire includes demographic information such as gender, age, educational level, job task, the name and nature of work (mental or physical). The second part deals with 7 items including comparing current work ability with best status during participant's life (0-10), work ability related to physical or mental nature of job (2-10), the number of current diseases which were recognized by physician (1-7), last year's diseases (1-5), Individual estimation about work ability for next two years (1-4) and mental resources pertaining to work and break time and both (1-4) [11, 12].

The highest possible score in this questionnaire was 49 and the least was 7 and lastly, according to final score, scores are divided into four groups i.e. weak (7-27), average (28-36), well (37-44) and (more than 44) excellent [13].

Statistical analyze for data was done using SPSS (version 21). To evaluate relationship between work ability index with participants and occupational factors, T-test and ANOVA and linear regression was applied.

Table 1. Seven items in WAI questionnaire

Items	Score
comparing current work ability with best status during participant's life	1-10
work ability related to physical r mental nature of job	2-10
number of current diseases which were recognized by physician	1-7
Individual estimation about work-related disorders due to disase	1-6
Sick leave during the past 12 months	1-5
Individual estimation about work ability for next two years	7-4-1
Mental abilities	1-7

### 3. Results

All participants in the study were men who employed in Pegah Golestan dairy industry. Mean Age of participant in this study were in the range of 21-55 years and the average age was equal to  $32.38 \pm 7.3$  years. Of the employees, 15 participants were single (14%) and 92 participants were married (86%), respectively. Totally 19 participants had government employee status (17.8 %), one participant had trial period for government employee (0.9%), 38 participants had contract employment status (35.5 %) and 49 participants temporary contract status (45.8 %). Totally 59 participants (55.1%) worked in persistent day shift, 31 participants (29%) in two shift (day-night) work and 15 participants (14%) in three-shift work (morning-evening-night) and 2 participants (1.9%) in night shift. Based on our findings, average work ability index was equal to  $44.92 \pm 5.65$  which 10.9% were classified as average group, 53.6% as good group and 35.5% as excellent group.

To investigate the relationship between employment status and work ability index, T-Test experiment was used but this relationship was not significant ( $P=0.145$ ). Also, using ANOVA test for relationship between employment status and work ability index showed a significant correlation between these two variables, but it was negligible ( $P=0.014$ ).

According to present study, 6 participants had a very good sleep quality (5.6%), 60 participants with relatively good sleep quality (56.1%), 31 participants with relatively poor sleep quality (29%) and 10 participants with very bad sleep quality (9.3%), respectively.

Effects of sleep quality on WAI (using regression analysis) showed that the relationship between these two variables was significant ( $P = 0.035$ ). The effect of aging on WAI was analyzed using ANOVA test.

According to this study, a significant relationship was found between age and work ability index, but the this correlation was low, so that for each year increase, the amount of the WAI was increased equal to 0.2 ( $P=0.049$ ). Based on the results of present study, 24.1% of participants did not exercise during the week, 52.2% one time and 29.9% of participants 2-3 times per week and 2.8% exercise on a daily basis. The relationship between exercise activities and work ability (using linear regression) it was found that there is a significant correlation between these two variables ( $P < 0.001$ ). Other demographic information extracted from the subjects are presented in Table 2.

Table 2. Demographic characteristics of subjects

items	number	percent
<b>Age</b>		
Less than 31 years	53	49.5
31-45 years	48	44.8
More than 45 years	6	5.7
<b>Work history</b>		
Less than 5 years	39	36.4
5-11 years	46	42.9
More than 11 years	22	20.7
<b>Education level</b>		
Under high school	1	0.9
High school diploma	54	50.5
Technician	19	17.8
B.A or higher	33	30.8
<b>BMI(kg/m<sup>2</sup>)</b>		
Less than 25	48	44.8
25-30	45	42.2
More than 30	14	13
<b>Activity type</b>		
Physical	22	20.5
Mental	6	5.7
Physical& Mental	79	73.8
<b>Marital status</b>		
Single	15	14
Married	92	86
<b>Exercise activity</b>		
Yes	62	42.1
No	45	57.9
<b>Shift work</b>		
No	59	55.1
Yes	48	44.9

#### 4. Discussion

Because men constituted the majority of studied population, to avoid sampling errors, only men were selected as the sample population. The average WAI in present study was equal to  $44.92 \pm 5.56$  which is at the acceptable range. Bugasska et al. proposed average Acceptable WAI for food stuffs workers, equal to  $41.70 \pm 5.00$  [14]. Several studies have been evaluated WAI among different jobs and this index was acceptable in most of them. For example, WAI value were reported for Netherland building workers, Finland police officers, and Belgian firefighters equal to 40.9, 39 and 40.6 respectively [15].

In our collected data, sleep quality was classified in 4 groups as very well, relatively good, relatively bad and very bad. Mazlumi et al. in their study on petrochemical workers reported a positive relationship between sleep quality and WAI value. According to their research, poor sleep quality which can be caused by irregular work shifts and irregular working hours may results in chronic fatigue and loss of consciousness and increase the risk of accidents [13].

According to the study, WAI score will be increased with increasing age of the participants. Some studies indicate that age is inversely related to WAI. But, a study on a group of electric industry workers has shown that the average age of persons under 35 years old was directly related to mean WAI value [16].

WAI score varies according to different levels of education, which may be related to differences in job skills. In addition, socio-economic status may also affect the ability of individuals. In addition, socio-economic status may also affect the ability of individuals. People who have a higher education (who possibly have better economic and job conditions) have higher work ability.

Finnish occupational health (FIOH) acknowledges that people with less education have typically lower job positions which require less physical or physical-mental abilities [17]. Based on their studies, these items can reduce the ability to work and cause early retirement [18]. Among the other results of this study, is the effect of shift work on the WAI. Average WAI in the morning shift is higher than the average of those involved in the other shifts. Among the reasons for this subject may be the presence of the majority of personnel in the morning shift and its physiological and psychological effects.  The findings of some researchers indicate on negative effect of night shift work on work ability and they related it to psychological and physiological effects caused by lack of sleep and they suggest that people over 45 years should not be engaged in shift work [19].

In this study, the average WAI for people who described their work load as heavy load work was less than people who described their work load as moderate or relatively heavy load work.

The findings of the study is consistent with Alavinia et al. who studied effect of workload on WAI for construction workers and they found that increasing work load creates a reduction on WAI index [20]. To determine WAI score, both physical and mental aspects were considered. In this study, the effect of individual factors such as age, quality of sleep, exercise and educational and occupational factors such as workload, shift work and kind of activity were studied. According to previous studies, the obtained WAI score is at acceptable range.

Based on the findings of this study, it can be concluded that factors such as quality of sleep, shift work and kind of activity which are regarded as the psycho-physiological items, may affect on the work ability among staff. So, the control of these factors can be effective for preventing decrease in the ability of those persons who are involved in the work. To improve the ability of work among the staff, intervention programs should be focused on improving the quality of sleep and exercise. It is also recommended that increasing job security should be considered as one of the most important intervention for improving the ability of work among employees. In addition, it is recommended that older people are employed in non-shift and mental tasks.

## Reference

- [1] Habibi, E., Dehghan, H., Zeinodini, M., Yousefi, H., & Hasanzadeh, A. (2012). A study on work ability index and physical work capacity on the base of fax equation VO2 max in male nursing hospital staff in Isfahan, Iran. *International journal of preventive medicine*, 3(11), 776.
- [2] Ilmarinen, J., Tuomi, K., & Seitsamo, J. (2005, June). New dimensions of work ability. In *International Congress Series* (Vol. 1280, pp. 3-7). Elsevier.
- [3] Ilmarinen, J. (2001). Ageing workers in Finland and in the European Union: their situation and the promotion of their working ability, employability and employment. *Geneva Papers on Risk and Insurance. Issues and Practice*, 623-641.
- [4] Sugimura, H., & Theriault, G. (2010). Impact of supervisor support on work ability in an IT company. *Occupational medicine*, kqq053.
- [5] Martus, P., Jakob, O., Rose, U., Seibt, R., & Freude, G. (2010). A comparative analysis of the Work Ability Index. *Occupational medicine*, kqq093.

- [6] Ilmarinen, J., Tuomi, K., & Seitsamo, J. (2005, June). New dimensions of work ability. In *International Congress Series* (Vol. 1280, pp. 3-7). Elsevier.
- [7] Rutanen, R., Nygård, C. H., Moilanen, J., Mikkola, T., Raitanen, J., Tomas, E., & Luoto, R. (2013). Effect of physical exercise on work ability and daily strain in symptomatic menopausal women: a randomized controlled trial. *Work (Reading, Mass.)*, 47(2), 281-286.
- [8] Hasselhorn, H. M. (2008). Work ability-concept and assessment. *Germany: University of Wuppertal*.
- [9] Ilmarinen, J. (2009). Work ability—a comprehensive concept for occupational health research and prevention. *Scandinavian journal of work, environment & health*, 1-5.
- [10] Mazlumi, A., Kazemi, Z., & Eivazlou, M. (2014). Validation and Reliability Study of Farsi Version of Work Ability Index Questionnaire. *Journal of School of Public Health and Institute of Public Health Research*, 12(1), 61-74.
- [11] Brešić, J., Knežević, B., Milošević, M., Tomljanović, T., Golubović, R., & Mustajbegović, J. (2007). Stress and work ability in oil industry workers. *Archives of Industrial Hygiene and Toxicology*, 58(4), 399-405.
- [12] Kiss, P., Walgraeve, M., & Vanhoorne, M. (2002). Assessment of work ability in aging fire fighters by means of the Work Ability Index Preliminary results. *Archives of public health*, 60(3-4), 233-243.
- [13] Mazlumi, A., Rostamabadi, A., Saraji, G. N., & Foroushani, A. R. (2012). Work ability index (WAI) and its association with psychosocial factors in one of the petrochemical industries in Iran. *Journal of occupational health*, 54(2), 112-118.
- [14] Bugajska, J., Makowiec-Dąbrowska, T., Jegier, A., & Marszałek, A. (2005, June). Physical work capacity (VO 2 max) and work ability (WAI) of active employees (men and women) in Poland. In *International Congress Series* (Vol. 1280, pp. 156-160). Elsevier.
- [15] Alavinia, S. M., De Boer, A. G. E. M., Van Duivenbooden, J. C., Frings-Dresen, M. H. W., & Burdorf, A. (2009). Determinants of work ability and its predictive value for disability. *Occupational Medicine*, 59(1), 32-37.
- [16] Bugajska, J., & Łastowiecka, E. (2005, June). Life style, work environment factors and work ability in different occupations. In *International Congress Series* (Vol. 1280, pp. 247-252). Elsevier.
- [17] Monteiro, M. S., Ilmarinen, J., & Filho, H. R. C. (2006). Work ability of workers in different age groups in a public health institution in Brazil. *International Journal of Occupational Safety and Ergonomics*, 12(4), 417-427.
- [18] Sallinen, M., HÄRMÄ, M., Mutanen, P., RANTA, R., Virkkala, J., & MÜLLER, K. (2005). Sleepiness in various shift combinations of irregular shift systems. *Industrial health*, 43(1), 114-122.
- [19] Costa, G. (2003). Factors influencing health of workers and tolerance to shift work. *Theoretical Issues in Ergonomics Science*, 4(3-4), 263-288.
- [20] Alavinia, S. M., van Duivenbooden, C., & Burdorf, A. (2007). Influence of work-related factors and individual characteristics on work ability among Dutch construction workers. *Scandinavian journal of work, environment & health*, 351-357.