



ISSN: 0975-833X

RESEARCH ARTICLE

WORK ABILITY INDEX AMONG EXPATRIATE WORKFORCE IN AJMAN AND SHARJAH, UAE

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ARTICLE INFO

Article History:

Received 25<sup>th</sup> December, 2014

Received in revised form

08<sup>th</sup> January, 2015

Accepted 25<sup>th</sup> February, 2015

Published online 17<sup>th</sup> March, 2015

Key words:

Work ability,  
Work Ability Index (WAI),  
Workforce,  
UAE.

ABSTRACT

**Introduction:** Work ability is "the ability of the workers to do work which can fit the demands of mental and physical health, and how good the worker can present currently and in the future". It can also help in understanding the balance between demands and resources of the workers'. This study aimed at assessing work ability index (WAI) as among expatriate in Sharjah and Ajman.

**Materials and Methods:** A cross-sectional study was conducted among 397 workers from different work sites in Sharjah and Ajman, United Arab Emirates (UAE). Among those who gave written consent, data was collected using WAI questionnaire in addition to their personal details. Data was entered into Microsoft Excel and analyzed on SPSS version 20.

**Results:** The sample had more male workers(61.5%); more than 80% were aged less than 40 years; most (65.5%) were service employees or technicians and in the current position for less than 5 years (75.3%). The study sample was mostly(56%) at good WAI level, no subject at poor level, and 16% at moderate level. Significantly higher WAI was seen in the married group and experts by job classification.

**Conclusion:** The proportion of poor-moderate WAI was 16% and no subject at poor level.

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INTRODUCTION

Work ability is "the ability of the workers to do work which can fit the demands of mental and physical health and how good the worker can present currently and in the future" (Ilmarinen and Tuomi K. Past, 2004). It can also help in understanding "the balance between demands and resources of the workers". The worker's knowledge, attitudes, skills and motivation with his functional and health abilities can contribute to his work ability as well as environment surrounding him, like work environment, social environment, and psychological factors (Hans, 2008). Work ability index (WAI) is a tool used for measuring work ability (Tuomi et al., 2011). Recently WAI questionnaire is being used widely in studies as an indicator for productivity, for monitoring work ability and identifying risk trends, to assess effect of intervention program, to predict work disability, and to screen for stress at work place (Hans, 2008). The economic effects of activities done for promotion and maintenance of work ability by Finnish scientists in the 1990s, found that the increase of productivity and decrease of premature retirement had been socio-economically very profitable for the workers (Tuomi et al., 1998). The study conducted in Finland among municipal employees aged 50 to 62 years with 10 years follow-up showed

46.3% were at poor-moderate WAI level (Tuomi et al., 1997). One study done in China (2006) among 10,218 workers in the general population aged 16-59 years found 36.8% with poor-moderate WAI, where as in Germany(2009) it was 31.6% among general population aged 30-59 years (Lin et al., 2006). In Iran, among petrochemical industry workers aged 25-66 years, a study in 2012 found that most of them were in good work ability followed by moderate, excellent and poor WAI, 34.3% had poor-moderate WAI (Mazloumi et al., 2012). The study in Luxembourg in 2013 among those with occupational health service in the age group 40 to 65 had the lowest percentage (19.1%) of poor-moderate WAI (El Fassi et al., 2013).

The United Arab Emirates (UAE) is a developed country where the population of workforce contributes to a big part of the whole population and mostly expatriates from Middle East and other Asian countries. From 2004 to 2008, the workforce has been increasing in the UAE, and at present it is steady. Workers are the most productive group and have a direct effect on the health and economic development of a country (United Arab Emirates Ministry of Labour, 2012). The aim of the study was to as investigate work ability of expatriate in Sharjah and Ajman, UAE using the WAI.

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## MATERIALS AND METHODS

This cross-sectional study was conducted among workers in Sharjah and Ajman, UAE. Workers who have been on the current job for at least one year at any work site in Sharjah or Ajman, and understood English were included in this study. Participants were recruited from different study settings like malls, manufacturing companies, and trading companies by convenient sampling method till the required sample size was obtained. The calculated minimum sample size was 384. The self-administered questionnaire used for data collection included socio-demographic profile and WAI questionnaire. Socio-demographic profile included age, gender, educational level, marital status, nationality, job class, job tenure, firm size and employment sector. The WAI questionnaire (Tuomi *et al.*, 2011) assesses perceived work ability, the scores calculated according to the standard method provided by Finnish Institute of Occupational Health (FIOH). It includes eight items: current work ability compared with the lifetime best, work ability in relation to the demands of the job, number of current diseases diagnosed by a physician, estimated work impairment due to diseases, sick leave during the past year, own prognosis of work ability 2 years from now, mental resources, impediments (used only for occupational health services, not in the total score). The total WAI score ranges from 7–50 points, and are categorized into 4 levels as (7-27) poor restore work ability, (28-36) moderate improve work ability, (37-43) good support work ability, (44-50) excellent maintain work ability.

After obtaining the ethical approval, several establishments were approached and permission sought to conduct this study. Self administered questionnaires were distributed to those who gave the written consent, and the researcher was available for any clarifications on consent form and questionnaire, and the completed questionnaires were collected for analysis.

The collected data was coded and entered into Microsoft Excel, and analyzed using SPSS version 20.0. Descriptive statistics like frequency, percentage, and median with minimum and maximum were used to describe the data. Chi-square test was used to find the association between demographic factors and work ability index categories. Mann Whitney U test and Kruskal Wallis test were used to identify difference in the median WAI by independent variables.

## RESULTS

This study was conducted among 397 workers from different work sites in Ajman and Sharjah, UAE.

The mean age of the respondents was 39 years (SD=7.9). Half of the respondents were in younger age group, less than 30 years. The study subjects were mainly male workers (61.5%), more than half the sample had graduate level education (54.1%), and over half of them were married (51.9%). The workers in the sample were from 19 countries, mostly Indians. Workers from private companies were more than those from government, most of them worked in firms with less than 50 employees.

**Table 1. Socio-demographic characteristics of the study sample**

Socio-demographic Characteristics	No.	%
Age (in years)*		
<30	202	50.9
30-39	121	30.5
>=40	59	14.9
Gender		
Male	244	61.5
Female	153	38.5
Education*		
Up to grade 12	131	33
Graduate	204	51.4
Post graduate	42	10.6
Marital status*		
Married	206	51.9
Not married	184	46.3
Country of origin*		
East Asia	99	24.9
Southeast Asia	92	23.2
South Asia	166	41.8
Africa	19	4.8
Middle East & Europe	11	2.8

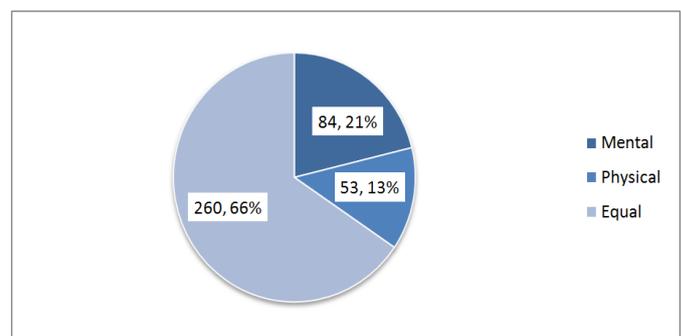
after Age (in years), Education, Marital status, Country of origin

The socio-demographic characteristics of the study sample are presented in Table 1.

**Table 2. Occupational profile of the study sample**

Occupational Profile	No.	%
Job		
Manager	63	15.9
Service employee and technician	260	65.5
Expert	14	3.5
Office worker	60	15.1
Job tenure (in years)		
<=5	299	75.3
6-10	51	12.8
>10	47	11.8
Firm size (number of employees)		
<50	331	83.4
>=50	66	16.6
Employment sector		
Government	48	12.1
Private	349	87.9

By reported job classification, service employees and technicians were more than managers, experts, office workers and others. Sales personnel were included in the service employees, nurses were included with technicians. Workers from private companies were more than those from government. Most of them worked in firms with less than 50 employees. The details are given in Table 2.



**Figure 1. Study sample according to perceived type of work (N=397)**

The Figure 1 depicts the distribution of study sample by their evaluation of the type of work they are engaged in, demanding physically, mentally or both. According to the participants' own perception, most of them (66%) had equal amount of mental and physical work demands, 21% mainly mental demands while those with physical demands was 13%.

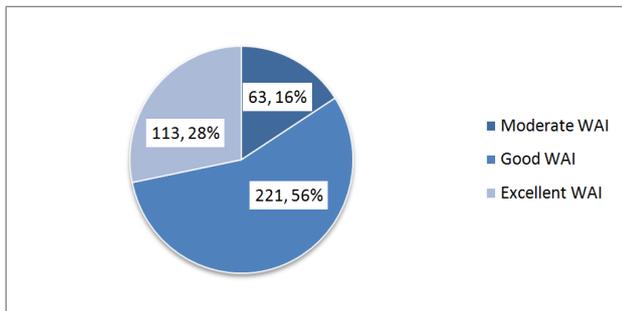


Figure 2. Distribution of study sample by WAI score (N=397)

Figure 2 shows the pattern of WAI in the study sample. The WAI was at good level for 56% and excellent for 27.5% of the respondents. There was no subject at the poor WAI level with score in the range 7-27 points, so the prevalence of poor-moderate WAI was 16%. The median score of WAI was 42.

Table 3. Distribution of respondents by WAI and demographic variables

Demographic factors	WAI score						P	
	Moderate		Good		Excellent			Total
	No.	%	No.	%	No.	%		
<b>Age (in years)</b>								
<30	35	17.3	117	57.9	50	24.8	202	NS
30-39	19	15.7	61	50.4	41	33.9	121	
>=40	7	11.9	36	61	16	27.1	59	
<b>Gender</b>								
Male	40	16.4	131	53.7	73	29.9	244	NS
Female	23	15	90	58.8	40	26	153	
<b>Education</b>								
Up to grade 12	22	16.8	71	54.2	38	29	131	NS
Graduate	34	16.7	116	56.9	54	26.5	204	
Post graduate	5	11.9	23	54.8	14	33.3	42	
<b>Marital status</b>								
Married	27	13.1	118	57.3	61	29.6	206	NS
Not married	34	18.5	98	53.3	52	28.3	184	
<b>Country of origin</b>								
East Asia	12	12.1	60	60.6	27	27.3	99	NS
Southeast Asia	12	13	62	67.4	18	19.6	92	
South Asia	31	18.5	80	47.6	57	33.9	168	
Others	6	20	16	53.3	8	26.7	30	
<b>Job classification</b>								
Expert	1	7.1	4	28.6	9	64.3	14	NS
Manager	11	17.5	36	57.1	16	25.4	63	
Service employee and technician	38	14.6	146	56.2	76	29.2	260	
Office worker	13	21.7	35	58.3	12	20	60	
<b>Job tenure</b>								
<=5	47	15.7	172	57.5	80	26.8	299	NS
6-10	10	19.6	23	45.1	18	35.3	51	
>10	6	12.8	26	55.3	14	31.9	47	
<b>Firm size</b>								
<50	52	15.7	185	55.9	94	28.4	331	NS
>=50	11	16.7	36	54.5	19	28.8	66	
<b>Employment sector</b>								
Government	11	22.9	27	54.2	11	22.9	48	NS
Private	52	14.9	195	55.9	102	29.2	349	

NS: Not Significant

Table 3 shows those aged 30-39 years had higher percentage of excellent WAI when compared to older and younger groups. Only 11.9% of the older age group had moderate WAI which was less than the other groups. Male workers reported slightly better work ability than female workers. According to educational level, those with post graduate level education had lowest percentage of moderate WAI, and had highest percentage in good and excellent WAI than the other two groups. Married and not married workers had almost the same distribution. South Asians had higher percentage of moderate WAI as well as excellent WAI. Experts had highest percentage in excellent WAI and lowest in moderate WAI when compared to other job groups, and they were mainly from South Asia. People who were working 6-10 years in the current job had higher percentage of moderate and excellent WAI compared to the others. Those working less than 6 years in the current position had the lowest proportion with excellent WAI. Both government and private employees were mainly at good WAI level but more private employees had excellent WAI. The distribution of moderate, good and excellent WAI among those who served in establishments with less than 50 (small firms) and more than 50 employees (large firms) were almost the same.

Table 4. WAI score in relation to demographic variables

Demographic factors	WAI score				
	No.	Median	Minimum	Maximum	P
<b>Age(in years)</b>					
<30	202	41	27.5	50	NS
30-39	121	42	29.5	50	
>=40	59	42	30	50	
<b>Gender</b>					
Male	244	42	28	50	NS
Female	153	42	27.5	50	
<b>Education</b>					
Up to grade 12	131	41.5	28	50	NS
Graduate	204	42	27.5	50	
Post graduate	42	43	34	49	
<b>Marital status</b>					
Married	206	42	30	50	<0.05
Single	184	41	27.5	50	
<b>Country of origin</b>					
East Asia	99	42	30	50	NS
Southeast Asia	92	42	29	50	
South Asia	168	42	28	50	
Others	30	39.5	27.5	49	
<b>Job</b>					
Expert	14	45	34	49	<0.01
Manager	63	42	27.5	50	
Service employee or technician	260	42	27.5	50	
Office workers	60	40.75	32	49	
<b>Job tenure</b>					
<=5 years	299	42	27.5	50	NS
6-10 years	51	43	32	50	
>10 years	47	42	33	49	
<b>Firm size</b>					
<50	331	42	27.5	50	NS
>=50	66	41	32	48	
<b>Employment sector</b>					
Government	48	40.75	32	50	NS
Private	349	42	27.5	50	

NS: Not Significant

Table 4 describes the role of socio-demographic factors on WAI score. Significant difference was found with only two variables job and marital status. By job classification experts

had higher median WAI when compared to the others like managers, office workers, service employees and technicians; and marital status, married had higher WAI when compared to single. There was no significant difference in WAI score among the variables gender, age, education, country of origin, job tenure and firm size. However, those in younger age group (<30 years), and those educated up to grade 12 level had minimally lower median WAI (41 and 41.5) compared to 42 in the other groups. Those who worked in the private sector had higher median WAI than those in government sector, also not significant but the former had a lower minimum. Those working in small firms (<50 employees) had lower median but higher minimal WAI score than those in large firms ( $\geq$ 50 employees). Workers who were in the current position for 6-10 years had higher median WAI than others.

## DISCUSSION

The present study assessed work ability among workers in Sharjah and Ajman, UAE, the first such study in this country. Among the 397 participants, 244 were males and 153 females. Majority were engaged in equally physically and mentally demanding jobs.

### Work Ability Index in the study group

The median score of WAI was 42 and majority of the sample was at good WAI level (56%); the proportion of poor-moderate WAI was 16%, and there was no respondent at the poor WAI level. This was much better situation when compared to findings in other countries like China (36.8%) (Lin *et al.*, 2006), Iran (34.3%) (Mazloumi *et al.*, 2012), Germany (31.6%) (Bethge and Radoschewski, 2010), Luxembourg (19.1%) (El Fassi *et al.*, 2013) and Finland (46.3%) (Tuomi *et al.*, 1997). Finland had relatively higher proportion of poor-moderate WAI probably because the study was conducted as early as in 1995 and study subjects were aged 55-62 years. Luxembourg had lower proportion, might have been because all the participants recruited were under occupational health service so that their overall health status was relatively better. In the current study the proportion with poor to moderate WAI was low, probably because two third of workers included in the sample were in jobs with equal physical and mental demand but much less engaged in predominantly physically demanding work. Moreover, half the study sample was aged less than 30 years, only 11 participants aged more than 50 years when compared to other studies which included the participants with larger age range.

### WAI in relation to demographic factors

WAI was analyzed in relation to demographic factors like age, gender, education, marital status, country of origin, and job related factors like job classification, job tenure, firm size and employment sector. In the current study, age was not found to be a significant influencing factor of WAI. But from table 3 and table 4 we can see participants aged less than 30 years had lower median WAI score than those aged over 30 years. In another study, conducted among female healthcare workers aged less than 35 years, work ability was less at younger age (Fischer *et al.*, 2006); as age increased, probably with higher

job position, more job experience and social support of marriage, there was an increase in work ability. Other studies have found that WAI decreased with increasing age, however in different study groups, among general population aged 16-69 years in China, institution workers aged 20-69 years in Brazil, and homecare aids and nurses aged 32-56 years in Sweden (Yujeong and SeongRok, 2012; Monteiro *et al.*, 2006; Larsson *et al.*, 2012). In this study, also the group aged more than 40 years had lower WAI score than the middle age group of 30-39 years.

Male workers had higher WAI than female workers in the current study, though not significant. Significant gender difference was observed in the study from Luxemburg, with higher proportion of female workers having poor or low work ability compared to male workers, probably because female workers had more days of sickness absence and less psychological resource (El Fassi *et al.*, 2013). In contrast, the study done in China had opposite finding that females had significantly higher WAI than males and they explained that it was because male workers had heavier social role with more tension than female workers (Lin *et al.*, 2006).

Higher proportion of post graduate subjects were in excellent WAI and less in moderate WAI and had a higher median WAI score compared to those whose educational level were lower, but the trend was not significant. Same trend but at significant level was found in studies done among different populations in Brazil and Finland (Monteiro *et al.*, 2006; Laitinen *et al.*, 2005). The authors proposed that workers with higher education had better social, economic and job opportunities, and so enjoyed better work ability and greater health. On the other hand, a low level of education was related to occupations with predominantly physical or mixed (physical and mental) job demands. But for the current study, many participants were at graduate educational level, and they were sharing the same job as those whose educational level was up to grade 12. This could have lowered their work ability. A small but significant difference was seen in the distribution of WAI among married and unmarried workers. All of the subjects were expatriates and mostly stayed in UAE without family, they shared room with colleagues or other friends, so the support from husband/wife and children was not as much as those who stayed with families. A study conducted among workers with chronic non-specific musculoskeletal pain (deVries *et al.*, 2013), WAI had no association with marital status, but study among Chinese private company employees found depression more among the divorced or unmarried (Sun *et al.*, 2013), which could have led to impaired work ability, and in Brazil higher proportion of divorced or widowed workers in public health institutions had poor and moderate WAI (Monteiro *et al.*, 2006).

The resident population of UAE is mostly expatriates (88.5%) many immigrating for work (Country summary, 2012). The present study had participants from 19 countries, highest proportion, more than one fourth, was from India. The distribution of participants by WAI among these workers from different nations was not statistically significant. There was no reported study comparing WAI among workers of different nationalities within the same country but the studies from

different countries did show wide variation due to variation in study groups, methodology and may be cultural differences (Tuomi *et al.*, 1997; Lin *et al.*, 2006; Mazloumi *et al.*, 2012; El Fassi *et al.*, 2013; Bethge and Radoschewski, 2010). According to table 4, experts had higher median and minimum WAI than other job groups like managers, office workers, service employees and technicians. It could mainly be because experts were at a higher working position, and had feeling of self achievement, so they were more satisfied with work and work environment. For managers, they are also at higher position, but with higher tension at the same time, which could also have a negative influence on the work ability outcome. This finding was supported by the studies done in general working population, workers with occupational health services, oil industry workers and those with asthma.

The participants who reported having mainly mentally demanding work had higher WAI than those in physically demanding or jobs with equal mental and physical demand. The study conducted in Western China found semi-skilled workers had the highest WAI, followed by professional and clerical workers, the lowest group being manual workers, and the mean WAI dropped rapidly among manual workers who were more than 35 years old while the professional workers were more than 45 years old. These workers included street sweepers, cleaners, sanitation workers, hospital aids and construction workers as manual group, guards, nurses, drivers, salespeople, dental technicians, storage keepers, traffic and crime policemen, shop clerks as the semi-skilled group, senior nurses, accountants, doctors, secretaries, engineers, technicians and office workers as professional group (Lin *et al.*, 2006). A recent study (2013) found people who were mainly mental workers had higher WAI than the workers who mainly did physically demanding work (El Fassi *et al.*, 2013). In the study in oil industry, oil-field workers were found to have the lowest WAI, followed by laboratory workers, and office workers got the highest WAI (Bresic *et al.*, 2007). In this study, subjects who worked in the current job for 6 to 10 years had higher proportion in excellent WAI than those who worked less than 6 years or more than 10 years, and higher median WAI score, though not significant. The studies done among petrochemical industry workers and public health institution workers found that work ability decreased with increasing job tenure (Mazloumi *et al.*, 2013; Monteiro *et al.*, 2006). Participants working in firms with less than 50 employees had higher WAI than those working in firms with more than 50 employees. But the difference was not significant. The study done in Luxemburg found that workers who worked in the firm with less than 50 employees had lower WAI compared to those who worked in the firm with more than 50 employees (El Fassi *et al.*, 2013). Higher proportion of participants in private sector had excellent WAI and lower proportion in moderate WAI compared to government sector workers and they had higher median WAI score as well. However, the difference was not significant. No published literature could be found related to this factor.

A few limitations have to be noted while considering the results of the present study. Being cross-sectional study causal relationship is not established between the independent and dependent variables. Since workers who could not understand

English were excluded from the research, there was limited reach to the labor class in predominantly physically demanding jobs. The study group had limited number of workers from older age group to elicit any difference in work ability in this group.

## Conclusion

The proportion of poor-moderate WAI among the expatriate workers in the study is 16% with no subject in poor WAI level, most of them were in good WAI level. Married workers and experts by job class had significantly higher WAI. Further studies are required to determine the work ability in different groups not included in the present study to identify risk groups requiring special attention in the occupational health services.

## Acknowledgement

We are grateful to the authorities of the Institution and the establishments and all the participants for their co-operation. We thank Dr. Jayakumary MuttappalliMyalil for all the expert advice.

## REFERENCES

- Bethge M. and Radoschewski FM. 2010. Physical and psychosocial work stressors, health-related control beliefs and work ability: Cross-sectional findings from the German sociomedical panel of employees. *Arch Environ Occup Health* [serial online] 2010 [cited 2013 May 14]; 83(3):241-50. Available from URL: <http://dx.doi.org/10.1007/s00420-009-0442-5>
- Bresic J., Knezevic B., Milosevic M. *et al.* 2013. Stress and work ability in oil industry workers. *ArhivZa Higijenu Rada i Toksikologiju* [serial online] 2007 [cited 2013 Apr 24]; 58(4):399-405. Available from URL: <http://search.proquest.com/docview/521747643?accountid=41150>
- Country summary, United Arab Emirates. 2012 Jan [cited 2013 Oct 30]. Available from URL: [http://www.hrw.org/sites/default/files/related\\_material/uae\\_2012.pdf](http://www.hrw.org/sites/default/files/related_material/uae_2012.pdf)
- deVries H.J., Reneman M.F., Groothoff J.W. *et al.* 2013. Self-reported work ability and work performance in workers with chronic nonspecific musculoskeletal pain. *J Occup Rehabil.* [serial online] 2013 [cited 2013 Feb 21]; 23(1):1-10. Available from URL: <http://dx.doi.org/10.1007/s10926-012-9373-1>
- El Fassi M., Bocquet V., Majery N. *et al.* 2012. Work ability assessment in a worker population: comparison and determinants of work ability index and work ability score. *BMC Public Health* [serial online] 2013 [cited 2013 Apr 5]; 13(1):305. Available from URL: <http://dx.doi.org/10.1186/1471-2458-13-305>
- Fischer F.M., Borges FN., Rotenberg L. *et al.* 2006. Work ability of health care shift workers: What matters? *ChronobiolInt*, 23:1165–79.
- Hans M.H. 2008. Work Ability - Concept and Assessment. Enterprise for Health Management Conference' in London, Conference Guide [online]. 2008 Aug 22 [cited 2012 Dec 28]; Available from URL: [http://www.arbeitsfaehigkeit.uniwuppertal.de/picture/upload/file/Concept\\_and\\_Assessment.pdf](http://www.arbeitsfaehigkeit.uniwuppertal.de/picture/upload/file/Concept_and_Assessment.pdf)

- Ilmarinen J. and Tuomi K. 2004. Past, Present and Future of Work Ability. In: Ilmarinen J, Lehtinen S, Eds. Past, Present and Future of Work Ability. People and Work – Research Reports 65. *Finnish Institute of Occupational Health*.
- Laitinen J., Näyhä S. and Kujala V. 2005. Body mass index and weight change from adolescence into adulthood, waist-to-hip ratio and perceived work ability among young adults. *International Journal of Obesity* [serial online] 2005 [cited 2013 June 30]; 29(6):697-702. Available from URL: <http://dx.doi.org/10.1038/sj.ijo.0802936>
- Larsson A., Karlqvist L., Westerberg M. et al. 2012. Identifying work ability promoting factors for home care aides and assistant nurses. *BMC Musculoskeletal Disorders* [serial online] 2012 [cited 2013 June 30]; 13(1):1. Available from URL: <http://dx.doi.org/10.1186/1471-2474-13-1>
- Lin S., Wang Z. and Wang M. 2006. Work ability of workers in western China: reference data. *J Occup Med.*, [serial online] 2006 [cited 2013 Feb 21]; 56(2):89-93. Available from URL: <http://search.proquest.com/docview/195271113?accountid=41150>
- Mazloumi A., Rostamabadi A., Saraji G.N. et al. 2012. Work ability index (WAI) and its association with psychosocial factors in one of the petrochemical industries in Iran. *J Occup Health* [serial online] 2012 [cited 2013 Feb 22]; 54(2):112-8. Available from URL: [http://www.nes2012.se/documents/Proceedings/Scientific/Mazloumi\\_A.pdf](http://www.nes2012.se/documents/Proceedings/Scientific/Mazloumi_A.pdf)
- Monteiro M.S., Ilmarinen J. and CorraaFilho H.R. 2006. Work ability of workers in different age groups in a public health institution in Brazil. *Int J Occup Saf Ergon.*, 12:417–27.
- Sun J., Buys N. and Wang X. 2013. Depression in employees in privately owned enterprises in China: Is it related to work environment and work ability? *International Journal of Environmental Research and Public Health* [serial online] 2013 [cited 2013 June 30]; 10(4):1152-1167. Available from URL: <http://search.proquest.com/docview/1355251045?accountid=41150>
- Tuomi K., Ilmarinen J., Jahkola A. et al. 1998. *Work Ability Index (2nd Edition)*. Helsinki: Finnish Institute of Occupational Health 1998
- Tuomi K., Ilmarinen J., Jahkola A. et al. *Work Ability Index* [online]. 2011 Dec 2 [cited 2012 Dec 28]; Available from URL: <http://www.ttl.fi/en/health/wai/pages/default.aspx>
- Tuomi K., Ilmarinen J., Martikainen R. et al. 1997. Aging, Work, Life style and Work Ability Index among Finnish municipal workers in 1981–1992. *Scand J Work Environ Health*, 23: 58–65.
- United Arab Emirates Ministry of Labour. Distribution of the Workforce in the Ministry of Labour from 2004 to 2010.[online]. 2012 [cited 2012 Dec 29];[10 screens]. Available from URL: <http://www.mol.gov.ae/newcontrolpanel2010/Attachments/public/Distribution%20of%20the%20Workforce%20in%20the%20Ministry%20of%20Labour%20from%202004%20to%202010.png>
- Yujeong L. and Seong Rok C. 2013. Assessment of work ability of Korean workers in the shipbuilding industry using FIOH questionnaire. *Journal of the Ergonomics Society of Korea* [serial online] 2012 [cited 2013 June 20]; 31(1):171-6. Available from URL: <http://dx.doi.org/10.5143/JESK.2012.31.1.171>

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