

## Co-Relation between Work Ability and Severity of Musculoskeletal Discomfort in Middle Aged Persons

Drashti H Trivedi<sup>1</sup>, Megha S Sheth<sup>2</sup>

**Financial Support:** None declared  
**Conflict of Interest:** None declared  
**Copy Right:** The Journal retains the copyrights of this article. However, reproduction of this article in the part or total in any form is permissible with due acknowledgement of the source.

### How to cite this article:

Trivedi DH, Sheth MS. Co-Relation between Work Ability and Severity of Musculoskeletal Discomfort in Middle Aged Persons. Natl J Community Med 2018; 9(1): 42-45.

### Author's Affiliation:

<sup>1</sup>Post graduate student; <sup>2</sup>Lecturer, Dept of Physiotherapy, S.B.B College Of Physiotherapy, Ahmedabad

### Correspondence

Drashti Harivadan Trivedi  
drashtitrivedi93@gmail.com

**Date of Submission:** 13-08-17

**Date of Acceptance:** 18-01-18

**Date of Publication:** 31-01-18

## ABSTRACT

**Introduction:** Work ability is an acquired or natural capacity that enables an individual to perform a particular job or task successfully. Work ability index is a tool to record the working ability of employees. The objective of the study was to correlate work ability with severity of musculoskeletal disorders in middle aged person.

**Methods:** A cross-sectional study was conducted on fifty subjects who were included by convenience sampling. Both males and females between 30 to 55 years of age were included, who were working and had musculoskeletal discomfort. A self-administered questionnaire concerning musculoskeletal discomfort and work ability was filled by all participants.

**Results:** Mean work ability index was  $42.6 \pm 4.65$ . Mean Cornell musculoskeletal discomfort questionnaire score was  $1.26 \pm 115.01$ . Correlation between Work ability index and Cornell musculoskeletal discomfort questionnaire score was found using Spearman correlation coefficient ( $r = -0.721$   $p < 0.001$ ).

**Conclusion:** There is a strong and statistically significant correlation between work ability and severity of musculoskeletal discomfort in middle aged persons.

**Key words:** Work ability index, Cornell musculoskeletal discomfort questionnaire, musculoskeletal disorders

## INTRODUCTION

The injuries and disorders of the musculoskeletal system including nerves, tendons, ligaments, joints, cartilage and spinal disc are defined as musculoskeletal disorders.<sup>1</sup> Awkward position, strenuous forces and repetitive work are the main causes of musculoskeletal discomfort.<sup>2</sup> Musculoskeletal discomfort (MSD) is pain or discomfort that can be felt in a joint or muscle or any soft tissue of the musculoskeletal system. In the world nearly two-thirds of them are due to work-related diseases and disorders. Musculoskeletal disorders are only second largest health problems caused due to work-related diseases and disorders. These disorders are only second frequent traumas suffered on a worldwide basis.<sup>3</sup> Acquired or natural capacity to

work is the work ability that enables an individual to perform a particular job or task successfully.<sup>4</sup>

Work capacity decreases in middle aged persons due to many reasons of which pain may be one. Attention has been focused on changes in work, life-style, health, stress symptoms and work ability and on the causes of such changes. Changes in work ability have been studied in the light of age, sex and work profile. Researchers came to the conclusion that above factors were associated with good health and work ability and poor and deteriorated health decreased the work ability. They also tried to study how this deterioration could be prevented.<sup>5</sup>

As the ageing population is rapidly increasing it is of utmost importance to prevent disability and

early retirement so that everybody can remain in their profession as long as possible. Promoting work ability is one of the effective ways to cope with the challenges to sustainability of workforce presented by population ageing. Work ability index is an instrument used in clinical occupational health and research to assess the work ability and the risk of early exit due to disability or early retirement which is known by a low score on Work ability index. Work ability index is a tool to record the working ability of employees. It aims at identifying at an early stage health risks of the employees and risks of early retirement and ways to counteracting them.<sup>4, 6, 7</sup>

Helena Met al<sup>8</sup> reviewed that musculoskeletal pain often occurs at multiple sites concurrently. A recent systemic review about the work-ability index summarised the individual and work related determinates of work ability and it showed that poor musculoskeletal capacity is related to poorer work ability.<sup>9</sup> As the pain and discomfort increases in a joint or soft tissue, ability to carry out work get affected. Middle aged persons are more involved in their working activity and therefore may be more susceptible for MSD. Studies to find the issues at work occurring among middle aged persons, about work related musculoskeletal discomfort in India are less. So the present study aims to highlight the potential of work ability due to musculoskeletal discomfort. The aim of the study was to find correlation between work ability and severity of musculoskeletal disorders in middle aged persons.

## MATERIALS AND METHODOLOGY

A Cross sectional survey study was conducted at General Hospital, Ahmedabad. Fifty subjects were included using convenience sampling. Study was carried out in June 2016 for a period of one month. Middle aged males and females aged 30 to 55 years of age who were working at present and had a complaint of musculoskeletal discomfort were included in the study. Subjects with a history of major trauma or congenital or acquired musculoskeletal, neurological or cardiovascular disorders and individuals who were not willing to participate were excluded from the study. Nature and purpose of study was explained to the participants. The questionnaire was explained to the participants. Informed oral consent was taken. The outcome measures were Work Ability Index and Cornell Musculoskeletal Discomfort.

A self-administered questionnaire concerning musculoskeletal disorder and work ability index was made based on previous studies. The questionnaire included demographic data, work related questions and two outcome measures Work Ability

Index and Cornell Musculoskeletal discomfort. Work ability index is a tool to record the work ability of employees. It aims at identifying at an early stage health risks of the employees and risks of early retirement and counteracting them. This tool involves a questionnaire which serves to conduct a self-assessment. The Work ability index questionnaire covers the dimensions of individuals like: their current work ability compared with their lifetime best; their work ability in relation to the demands of the job; the number of diagnosed illness or limiting conditions from which they suffer; their estimated impairment owing to diseases/illness or limiting conditions; the amount of sick leave they have taken during the last year and their own prognosis of their work ability in 2 years' time. The questions are aimed at evaluating the estimated current and future work ability, any diagnosed illness and the number of absenteeism days in the previous year, the estimated sickness-related deterioration in the work performance mental ability reserves. The time involved for the questionnaire is between ten to fifteen minutes; three to five minutes are needed to evaluate each questionnaire. Completion of the questionnaire results in a score which lies between seven and forty-nine. A high value indicates good work ability, a lower value an unsatisfactory work ability.<sup>10</sup>

The Cornell Musculoskeletal Discomfort Questionnaires (CMDQ) consists of three parts, namely personal information, job tasks and other information as well as the body discomfort checklist. CMDQ can be used to make assessments of musculoskeletal disorders. The purpose of this questionnaire is to document whether there is a trend in discomfort, pain and injury among working population.<sup>11</sup>

## Statistical Analysis

Statistical analysis was done using IBM SPSS version 16 and Microsoft Excel 2007. Data did not follow normal distribution so non parametric tests were used to analyse the data. Level of significance was kept at 5%.

## RESULTS

Thirty five males and 15 females with mean age of  $42.9 \pm 7.61$  years were included in the study. The mean score of work disability index was  $42.6 \pm 4.65$  and Cornell musculoskeletal discomfort was  $126.48 \pm 115.015$  shown in table-1. Table 2 shows the mean and standard deviation of outcome measures with region wise CMDQ scores. It shows that highest score of musculoskeletal discomfort was found in lower back ( $26.15 \pm 33.08$ ), neck ( $17.03 \pm 29.54$ ) and foot ( $10.87 \pm 24.52$ ).

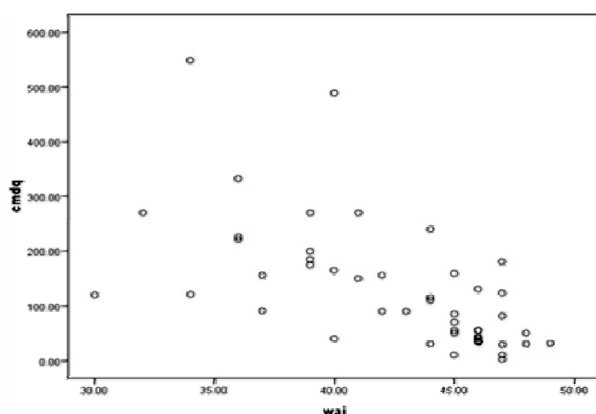
**Table: 1 Mean Work ability index and Cornell musculoskeletal discomfort scores**

Outcome measures	Mean $\pm$ SD	Median
Work ability index	42.6 $\pm$ 4.65	44.5
Cornell musculoskeletal discomfort	126.48 $\pm$ 115.02	90

SD=Standard deviation

**Table: 2 - Region wise CMDQ scores Mean  $\pm$  SD**

Region affected	Mean $\pm$ SD	
Neck	17.03 $\pm$ 29.54	
Upper back	7.5 $\pm$ 19	
Hips	3.18 $\pm$ 6.07	
Low back	26.15 $\pm$ 33.08	
	Right	Left
Shoulder	4.561 $\pm$ 17.35	2.4 $\pm$ 7.9
Upper arm	0.99 $\pm$ 1.945	0.9 $\pm$ 2.2
Forearm	0.89 $\pm$ 3.82	0.6 $\pm$ 2.8
Wrist	1.79 $\pm$ 5.28	1.3 $\pm$ 4.5
Thigh	1.44 $\pm$ 4.01	1.6 $\pm$ 3.5
Knee	6.9 $\pm$ 19.97	7 $\pm$ 20
Lower leg	3.90 $\pm$ 5.95	4 $\pm$ 6
Foot	10.87 $\pm$ 24.52	8.4 $\pm$ 19

**Graph-1 Correlation between Work ability index and Cornell musculoskeletal discomfort**

Graph-1 shows the correlation between Work ability index and Cornell musculoskeletal discomfort questionnaire ( $r = -0.721$ ,  $p < 0.001$ ). This shows there is statistically significant negative correlation between the two.

## DISCUSSION

The result of present study indicates that work ability is reduced in the middle aged subjects. The mean CMDQ score for low back pain is high amongst all regions and also there is strong negative correlation between work ability index and Cornell musculoskeletal discomfort score which was statistically significant.

The result of present study indicates that work ability ( $42.6 \pm 4.65$ ) is reduced. This is in accordance with a systematic review by T I J van den Berg<sup>9</sup> which studied effects of individual and work-related factors on the Work Ability Index

(WAI). They concluded that poor work ability increased the risk of early retirement, long-term sickness absence, and work disability. They identified the individual and work-related determinates of work ability, measured with the WAI among occupational populations. Important factors associated with a poor Work Ability Index (WAI) were lack of leisure-time vigorous physical activity, poor musculoskeletal capacity, old age, obesity, high mental work demands, lack of autonomy, poor physical work environment, and high physical work load.

Several other published studies also explored the association between work ability in the general workforce (i.e. not within workers with specific disorders) and health care use. A longitudinal study from Germany<sup>12</sup> and two Scandinavian studies<sup>13, 14</sup> observed an association between poor work ability as measured with the WAI and health care use. A recent study among employees from a large Dutch railway company, by Lamminpaa A et al, reported about workers with musculoskeletal complaints. Among them about 50% experienced work impairments due to these complaints<sup>15</sup>. Among workers with common disorders the perceived impairments while performing their regular activities at work prompted seeking health care<sup>16</sup>. Reeuwijk et al found that for most disorders the severity of impairments did seem to increase health care use, but only for MSD a statistically significant trend was observed for degree of severity and likelihood of having visited a specialist or physiotherapist<sup>17</sup>. Unfavourable psychosocial work-related factors seem to be a generic risk factor and are strongly related to low work ability<sup>18</sup>.

The present study found the scores of low back pain ( $26.15 \pm 33.08$ ) and neck pain ( $17.03 \pm 29.54$ ) to be high. Cote P et al studied the burden and determinants of neck pain in workers. They found that the neck disorders are a significant source of pain and activity limitations in workers.<sup>19</sup> Hakala PT et al<sup>20</sup> found that frequent computer-related activities increase the risk of neck-shoulder and low back pain in adolescents and found frequent computer use an independent risk factor for neck-shoulder pain and low back pain. Daily use of computers exceeding two- three hours seems to be a threshold for neck shoulder pain and exceeding five hours for low back pain.

The present study found that there is strong positive correlation between work ability index and Cornell musculoskeletal discomfort score which was statistically significant. Miranda H et al<sup>8</sup> in 2016 studied effect of musculoskeletal pain at multiple sites and its effects on work ability in a general working population and found co-occurring pain is a considerable threat to work ability. Work-

ers with multi-site pain may benefit from targeted preventive measures to sustain their work ability. In their study, the risks of decreased workability still remained elevated after self-rated health was included in the analyses. Also, other studies have reported widespread pain affecting everyday functioning and quality of life.

Gender related correlation was not found and correlation of multiple sites and chronicity was not checked in the present study. Also occupation was not considered. Future studies can consider multi-site pain as a risk factor for reduced work ability. Future studies can also consider focusing on a broader perspective of work determinants at the individual or job level.

## CONCLUSION

There is a strong and statistically significant correlation between work ability and severity of musculoskeletal discomfort in middle aged persons. Therefore, MSDs need to be treated to improve work ability in middle aged persons.

**Acknowledgements:** I am grateful to my post-graduation for giving me an opportunity to do this study. I want to Dr. Nehal Shah for allowing me to do this study in the institute. I would like to acknowledge the Human Factors and Ergonomics Laboratory at Cornell University as the source of the instrument for my study.

## REFERENCES

1. Gangopadhyay S, Ghosh T, Das T et al. Prevalence of upper limb musculoskeletal disorders among brass metal workers in West Bengal, India. *Ind Health*. 2007;45(2): 365-70.
2. Kang S, Skim EA: Occupational diseases in Korea: *J Korean Med Sci*. 2010;25(1): 4-12.
3. Zigheimat F, Ebadi A, Najarkolaei F et al. Mental health levels and incidence of musculoskeletal complaints among Speed Boat Crew members: *Journal of Trauma and Medicine* 2013; 17(4): 373-76.
4. Martina Morschhauser, Reinhold Sochert. Healthy work in an Ageing Europe: Strategies and Instruments for prolonging Working Life. Federal Association of Company Health Insurance Funds. 2006; www.enwp.org.
5. Tuomi K, Ilmarinen J, Klockars M et al. Finnish research project on aging workers in 1981-1992. *Scand J Work Environ* 1997;23 1:7-11 suppl 1:7-11.
6. Roelen CA, Heymans MW, Twisk JWR et al. **Work ability index as tool to identify workers at risk of premature work exit.** *J Occup Rehabil*. 2014; 24:747-754.

7. Salonen P, Arola H, Nygard CH et al. **Factors associated with premature departure from working life among ageing food industry employees.** *Occup Med*. 2003; 53:65-68.
8. Helena Miranda, Kaila-kangas, Heliovaara M et al: Musculoskeletal pain at multiple sites and its effect on work ability in a general working population. *Occup Environ Med*. 2010. Jul;67(7):449-55.
9. Van den Berg TI, Elders LA, de Zwart BC, et al the effects of work-related and individual factors on the Work Ability Index: a systematic review. *Occup Environ Med* 2009; 66:211-20.
10. Hedge A, Morimoto, S And McCrobie, D. Effects of keyboard tray geometry on upper body posture and comfort *Ergonomics*. 1999 42(10), 1333-1349.
11. B.C.H. de Zwar, M.H.Frings-Dresen and J.C. van Duivenbooden. Test-retest reliability of the Work Ability Questionnaire Coronel Institute for Occupational and Environmental Health, Academic Medical Center, University of Amsterdam, Amsterdam; and Arbouw, Amsterdam, The Netherlands. 2016, 67(1):13-19.
12. Leijten FR, Van den Heuvel SG, Ybema JF, Robroek SJ, Burdorf A Do work factors modify the association between chronic health problems and sickness absence among older employees? *Scand J Work Environ Health*. 2013, 39(5):477-485.
13. Ikonen A, Rasanen K, Manninen P, Raurio M, Husman P, Ojajarvi A, et al. Use of health services by Finnish employees in regard to health-related factors: the population-based health 2000 study. *Int Arch Occup Environ Health*. 2013;86(4):451-62.
14. Bethge M, Radoschewski FM, Gutenbrunner C. The work ability index as a screening tool to identify the need for rehabilitation: longitudinal findings from the second German sociomedical panel of employees. *J Rehabil Med*; 2013.doi:10.2340/16501977-1063.
15. Lamminpaa A, Kuoppala J, Vaaranen-Tomppo I, Hinkka K. Employee and work-related predictors for entering rehabilitation a cohort study of civil servants. *J Rehabil Med*. 2012; 44(8): 669-76.
16. Zoer I, Frings-Dresen MHW, Sluiter JK. Are musculoskeletal complaints, related work impairment and desirable adjustments in work age-specific? *Int Arch Occup Environ Health*; 2014 Aug; 87(6): 647-54.Doi: 10.1007/s00420-013-0903-8.
17. Kerstin G. Reeuwijk, Suzan J. W. Robroek .How Work Impairments and Reduced Work Ability are Associated with Health Care Use in Workers with Musculoskeletal Disorders, Cardiovascular Disorders or Mental Disorders.*J Occup Rehabil* (2014) 24:631-639.
18. Leijten FR, Van den Heuvel SG, Ybema JF, Robroek SJ, Burdorf A (2013) Do work factors modify the association between chronic health problems and sickness absence among older employees? *Scand J Work Environ Health* 39(5):477-485.
19. Pierre Cote, Gabrielle van der Velde, J. David Cassidy et al. the burden and determinants of neck pain in workers. *European spine journal* 2008 17, supplement1: 60-74.
20. Paula T. Hakala, Arja H. Rimpela Lea A. Saarni et al. Frequent computer-related activities increase the risk of neck-shoulder and low back pain in adolescents. *Eur J Public Health* 2006 16 (5): 536-541.