

Original Article

Investigation into the musculoskeletal disorders prevalence and postural assessment among barbers in Sari-2016Siavash Etemadinezhad¹ **Fateme Ranjbar**^{2*} Jamshid Yazdani Charati³

1. Associate professor, Occupational medicine specialist, Health Sciences Research Center, Addiction Institute, Mazandaran University of Medical Sciences, Sari, Iran
2. BSc. of Occupational Hygiene, Mazandaran University of Medical Sciences, Sari, Iran
3. Associate professor, Department of Biostatistics, School Health Sciences, Mazandaran University of Medical Sciences, Sari, Iran

*Correspondence to: Fateme Ranjbar
Fatemeranjbar6864@yahoo.com

(Received: 7 Jun. 2018; Revised: 14 Aug. 2018; Accepted: 20 Nov. 2018)

Abstract

Background and Purpose: Work-related musculoskeletal disorders usually entangle back spines, neck and upper limbs. Working as a barber paves the ground for probable high prevalence of musculoskeletal disorders. This study was designed to evaluate the working postures of sari male barbers by Rapid Entire Body Assessment method and determining the prevalence of musculoskeletal disorders using NORDIC questionnaire.

Materials and Methods: In the present research, 108 Sari barbers working conditions were evaluated using Rapid Entire Body Assessment (REBA) tool, and the data on the prevalence of musculoskeletal disorders was collected using Nordic questionnaire. Microsoft Excel and SPSS were then applied to analyze the data. Quantitative variables were analyzed using the descriptive statistical methods including mean and standard deviation. Chi-square test and ordinal regression have also been applied to analyze the relationship between different variables and musculoskeletal disorders' prevalence.

Results: The mean age the participants was 33.11 ± 8.2 and the mean of work experience was 12 ± 3.7 years. According to the results of the Nordic questionnaire, during 12 past months, 78% of the studied subjects have come up with pain and discomfort at least in one of their 9 body regions. Complaints of musculoskeletal pains in the wrist were also most prevalent (72.1%), followed by the neck (49%) and elbow pains (46.2%). Through REBA Method, the highest frequency of corrective measures was at level 2 (73.9%).

Conclusions: The results of the present study indicated that the evaluated subjects working postures required correction. Also, it was found essential to train barbers in what way to identify the biomechanical and ergonomic risk factors and correct working postures.

Keywords: musculoskeletal disorders; Nordic questionnaire; REBA Method; barbers

Citation: Etemadinezhad S, **Ranjbar F***, YazdaniCharati J. Investigation into the musculoskeletal disorders prevalence and postural assessment among barbers in Sari-2016 . Iran J Health Sci. 2018; 6 (4): 40-46.

1. Introduction

The day-to-day development of modern technology and knowledge in human life increases the work pace and productivity. On the other hand, some complications such as immobility, fatigue, psychological stress, and increased incidence of musculoskeletal disorders have been imposed on human (1). Musculoskeletal disorders are of the most common occupational injuries and diseases in both developed and developing countries (2). These are owing to the muscles, bones, joints, nerves and blood vessels (3). Work-related musculoskeletal disorders typically entangle low back, neck, and upper limbs (4). Based on the US Bureau of Labor Statistics (BLS), musculoskeletal disorders compose approximately two-thirds of the work-related disorders (5). According to another available statistics, the occupational musculoskeletal disorders were found to be 31% in Finland and 44% in the US of work-related disorders (6). Various risk factors play role in the injuries development that can be classified as physical risk factors (such as awkward posture, lifting and carrying heavy objects, repeated movements), as well as psychological, organizational, and individual factors (9). Working as barber is accompanied with the probability of occurrence of musculoskeletal disorders due to the repeated movements, working in static position for a long time, and awkward postures. Preventing such consequences requires task analysis using standard ergonomic methods and then modifying the working postures (10). Manual working as arms are at or above the shoulder height is usually associated with pain in neck and shoulder, which has been shown by several systematic review articles (11-15). Since there was found no study conducted in this

regard in Sari city, Mazandaran, this study was designed to evaluate working postures of sari male barbers by REBA Method. The main aim was to determine the prevalence of musculoskeletal disorders using NORDIC questionnaire.

2. Materials and Methods

The present study was a descriptive and cross-sectional research in which 108 barbers from 200 Sari barbershops were selected using random number table and evaluated through REBA Method. This approach is a suitable method to evaluate the jobs in which their working posture is statistic or dynamic, and many changes happen in their posture and working position.

REBA has been introduced by McAtanemi and Hignet. This method, at first, selects the posture that has to be evaluated, then through the designed diagrams, the posture of different organs are encoded, the score of the organ's posture is summed with the applied force and the type of activity, and finally, the overall score of musculoskeletal disorders risk is determined. The priority levels of the corrective measures suggested in this method determines the necessity behind the implementation of ergonomic intervention programs (16).

The prevalence of musculoskeletal problems was obtained via Nordic Musculoskeletal Questionnaire (17). Nordic questionnaire is developed by an occupational hygienist through interviewing the workers. It divides the human body into 9 areas, as neck, elbows, wrists/arms, back, hips /thighs, knees, and ankles/legs, and analyzes the history of pain in these 9 body parts using a few filtered questions.

Quantitative variables, such as age, weight, height, and work background were

analyzed using the descriptive statistical methods including mean and \pm S.D. Frequency table was also applied in order to describe various ratings of musculoskeletal problems. To analyze the relationship between different variables and musculoskeletal disorders' prevalence, logistic regression were applied. Excel

Software was used for data entry, and then the data were analyzed by SPSS Software. Code of ethics is 16/2/1394.

3. Results

The mean of barbers' age was 33.11 ± 8.2 , and the mean of work experience was 12 ± 7.3 . The results of descriptive and analytical tests are shown in Table 1.

Table 1. The results of logistic regression test (N=108)

	Mean	SD	P-Value	Exp(B)
Height	173.9	5.1	0.599	1.018
Weight	70.4	6.7	0.351	0.585
Work experience	12	7.3	0.032	3.538
BMI	23	3.2	0.719	1.016

According to the results of Nordic questionnaire, 78% of the subjects have come up with pain and discomfort at least in one of their 9 parts of musculoskeletal

system during 12 last months. The highest incidence of such disorders has been related to wrist (72.1%), neck (49%), and elbow (46.2%) (Diagram 1).

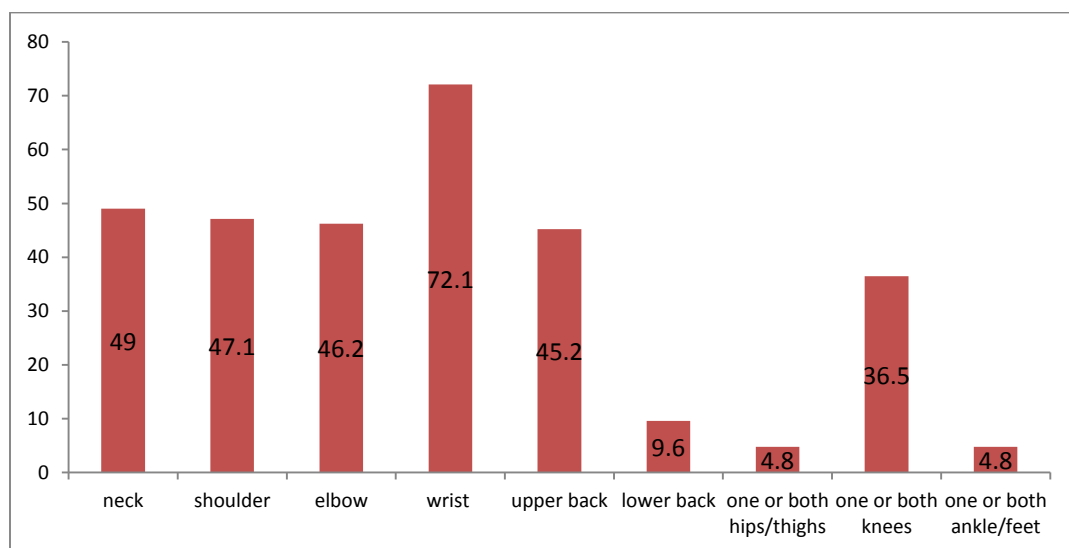


Diagram1. Frequency of musculoskeletal disorders in 9 body regions during a year

A meaningful relationship was found between pain in thigh and age ($P < 0.001$). A significant relationship also existed between pain in neck and work experience ($P < 0.001$). Moreover, there was observed a meaningful relationship between pain in leg and age, and work experience and weight ($P < 0.001$). Posture analysis by REBA

revealed that most of the subjects were grouped as level 3 in terms of the trunk ($n=54$) and arms ($n=82$). For neck, leg, and forearm, they were in level 2, and the wrists were most frequently in level 1 (Table 2).

Table 2. The risk levels resulted by REBA (N=111)

Body part	Posture	Frequency	%Frequency
Trunk	1	10	9
	2	52	46.8
	3	54	49.6
	4	5	4.5
Neck	1	4	4.6
	2	54	48.6
	3	3	2.7
Legs	1	34	90.6
	2	72	64.9
	3	5	4.5
Arms	1	0	0
	2	27	24.3
	3	82	73.9
	4	2	1.8
Forearm	1	2	1.8
	2	109	98.2
Wrist	1	53	47.7
	2	43	38.7
	3	15	13.5

The highest frequency of corrective measures is related to level 2(73.9%), which is necessary to be corrected,

followed by level 3 (15.3%), which means “necessary as soon as possible”, and level 1, maybe necessary, (10.8%) (Table 3).

Table 3. Frequency of different body postures by REBA evaluation

REBA score	Risk level	Frequency%	Frequency
1	0	0	0
2-3	1	10.8	12
4-7	2	73.9	82
8-10	3	15.3	17
11-15	4	0	0

It was documented that the overall score of REBA had meaningful relationship with work experience and age ($P<0.001$). There was also no significant relationship between the final score of REBA and BMI.

4. Discussion

The results of this research showed that the prevalence of musculoskeletal disorders in barbers of Sari was so high that 78% of them have experienced musculoskeletal problems during the last year. The results of Nordic questionnaire indicated that the major prevalence of such problems was in

wrist (72.1%), followed by neck (49%) and elbow (46.2%). Based on the results of posture assessment, the most frequent improvement actions were related to level 2 (73.9%), level 3(15.3%) and level 1 (10.8%). The results of Hokmabadi, et al. and Mazlumi, et al. were then not consistent with the findings of the current study. Hokmabadi et al. found that the prevalence of problems of Esfarayenian barbers was 8% in wrist, 20% in neck, 36% in shoulder, 46% in back, and 84% in leg. Also, 4% of the subjects were grouped as low risk, 56% were in medium, 30% had high and 10% had very high risk in the right side of the

body. Additionally, for the left side of the body, 4%, 76%, 16%, and 4% of the subjects were classified to be in low, medium, high, and very high risk levels, respectively (16). The results exhibited that musculoskeletal disorders' prevalence was higher in Sari barbers, and they were exposed to high risk of musculoskeletal disorders. In the study of Mazloomi et al., in which 42.9% of the subjects were men and 57.1% were women, the most musculoskeletal disorder prevalence was related to elbow by 90%, followed by neck (71%), and wrist (70%). Regarding the conducted posture evaluation, 27.6% of the subjects have come up with medium to high risk level of developing musculoskeletal disorders (17). The differences of the results might be because both male and female genders were evaluated in the study of Mazlumi, while the researchers evaluated only men in the present study. In another research by Hosseini on 150 subjects, 39% of the participants were barbers, and 61% were hairdressers. The discomfort prevalence of various body parts included neck (21%), shoulders (31%), wrists (6%), back (54%), and legs (69%). A significant relationship was achieved between wrists and legs pain and gender, pain in legs and working period, as well as pain in wrists and legs and the score of REBA ($P \leq 0.05$) (18). In the study of Hosseini, both genders have been investigated the results of which were different from the current study, and it seems that Sari barbers were exposed to higher risk of musculoskeletal disorders. The results of another study by Hokmabadi et al., on 60 subjects, showed that 78.3% were in medium risk level and 21.7% were in high risk.

The prevalence of musculoskeletal disorders was also evaluated in nine parts as

in neck (27%), shoulder (40%), elbow (20%), arm (25%), upper back (30%), lower back (46.7%), and knee (25%). The prevalence of musculoskeletal disorders in women was higher than that of men. Also, the relationship between musculoskeletal disorders and age, work experience and work positions were found to be significant ($P < 0.005$) (19). In line with our study, their findings revealed that the prevalence of musculoskeletal disorders was higher in Sari barbers, and they were also exposed to higher risk of developing musculoskeletal disorders. In another research by Nasl-e-Seraji et al. on 48 subjects, the prevalence of neck, lower back, shoulder, and wrist problems were 65%, 60%, 38%, and 31%, respectively. The prevalence of musculoskeletal disorders of the neck, shoulder, and wrist was also found to be higher in women than that of men. The relationship between thigh and shin discomfort and work experience, the association between ankle and foot discomfort and MBI, and also the relationship between musculoskeletal disorders and working conditions of the studied subjects were also significant ($p < 0.05$). Comparing the dentists and barbers in Sari, we came to this conclusion that Sari barbers were exposed to higher risk of developing musculoskeletal disorders than dentists (20).

The results of the current study showed that the prevalence of musculoskeletal disorders was high among barbers, and the most musculoskeletal pain was observed in wrist. The results also revealed that the risk level of musculoskeletal disorders was high, so some measures, such as training barbers to be aware of the risks and the ways of stretching exercises, taking appropriate work postures, preventing awkward and repeated movements of wrist, and avoiding

continuous and repetitive tasks, having break periods, and adopting corrective measures were recommended to reduce musculoskeletal disorders.

Limitation: Some barbers did not agree to participate in this project and were excluded from the study.

Acknowledgments

The authors are thankful to and appreciate the research deputy of Mazandaran University of Medical Sciences for financial support. They are also grateful to all participants of the study. The research project number is 1359.

Conflicts of interest

The researcher claims no conflicts of interest.

Reference

1. Bathaei A, Khalili K. Diseases due to computer work, work and environment center. Ministry of health. 2005:29-36.
2. Smith DR, Sato M, Miyajima T, Mizutani T, Yamagata Z. Musculoskeletal disorders self-reported by female nursing students in central Japan: a complete cross-sectional survey. *International journal of nursing studies*. 2003 Sep 1;40(7):725-9. PMID: 12965164; [https://doi.org/10.1016/S0020-7489\(03\)00012-9](https://doi.org/10.1016/S0020-7489(03)00012-9).
3. World Health Organization. Identification and Control of work-related disease Report of a WHO Export committee. 1985;714:1-71
4. Aghilinejad M, Farshad AA, Mostafaei M, Ghafari M, Occupational Medicine Practice, Arjmand Press 2007 [In Persian].
5. Levy B S, Wegman DH. Occupational health and recognizing and preventing work-related diseases and injury. Lippincott Williams & Wilkins, Fourth Edition Chapter 26, 2000.
6. Mattila M, Vilkki M. OWAS method. In: Marras WS, Karwowski W, editors. *The occupational ergonomics handbook*. Philadelphia, PA: Taylor and Francis; 2006. 447-59.
7. Kee D, LUBA: An Assessment Technique for Postural Loading on the Upper Body Based on Joint Motion Discomfort and Maximum Holding Time: *Applied Ergonomics*; 2001; 32(4):357-66. PMID: 11461037; [https://doi.org/10.1016/S0003-6870\(01\)00006-0](https://doi.org/10.1016/S0003-6870(01)00006-0).
8. Malone RE. Ergonomics, policy, and the ED nurse. *Journal of Emergency Nursing*. 2000; 26(5):514-5. PMID: 11015075
DOI: <https://doi.org/10.1067/men.2000.109870>
9. Caren M. Ergonomics – A BUZZ word. *The Preventive Angle* 2002; 1(1): 1-5
10. Hamberg-van Reenen HH, Ariëns GA, Blatter BM, van Mechelen W, Bongers PM. A systematic review of the relation between physical capacity and future low back and neck/shoulder pain. *Pain*. 2007; 130(1-2):93-107. PMID: 17222512; <https://doi.org/10.1016/j.pain.2006.11.004>
11. Best M, French Gm, Ciantar J. Work-related musculoskeletal disorders in hairdressers. *Journal of Occupational Health and Safety* .2002; 1(18): 66-7. <http://hdl.handle.net/1959.9/329341>
12. SOLTANY AR, AZOJI S, OGHLIDI J, SYADLY S. Causes of work-related neck and back disorders in barber and hairdressers. *Salamatekare Iran*, 1999; 3(4):45-53. URL: <http://ioh.iiums.ac.ir/article-1-146-fa.html>.
13. Kang M, Lee T, Kang S, Park H, URM S. Prevalence on dermatologic respiratory and musculoskeletal symptoms among hairdressers. *Korean Journal of Occupational and Environmental Medicine*. 1999; 11(3): 385-392.
14. Veiersted B, Gould S, Qsteas N, Hassan GÅ. Effect of an intervention addressing working technique on the biomechanical load of the neck and shoulders among hairdressers. *Applied ergonomics*. 2008; 39(2):183-190. PMID: 17678613; DOI: 10.1016/j.apergo.2007.05.007.
15. Kurinka I, Jonsson B, Kilbom A, Vinterberg H, Biering-sorensen F, Anderon G and Jorgensen. Standardized Nordic Questionnaires for the analysis of musculoskeletal symptoms .*Applied Ergonomics* 1987; 18(3), 233-7. PMID: 15676628; [https://doi.org/10.1016/0003-6870\(87\)90010-X](https://doi.org/10.1016/0003-6870(87)90010-X).

16. Hokmabadi R, Esmailzade M. Ergonomic evaluation of the status of work in a barber rapid assessment body. *Journal of North Khorasan University of Medical Sciences*, 2012; 3(4):49-54. DOI: 10.29252/jnkums.3.4.49.
17. Mazloomi A, Forozesh A. Ergonomic evaluation of working conditions and factors affecting musculoskeletal disorders Barber of Sardasht. *Journal of health and safety work*. 2012; 2(2):45-50. URL: <http://jhs.w.tums.ac.ir/article-1-23-fa.html>.
18. Miri M, Hosseini M, Sharifzade GHR, evaluation of ergonomic postures of hairdressers by reba in birjand. *Ofogh-e-Danesh*. 2008; 14(2):39-44. DOI: 10.29252/jnkums.3.4.49.
19. Ebrahimian H, Hokmabadi R, Shoja E. Evaluation of ergonomic postures of dental professions by rapid entire body assessment (REBA) in North Khorasan, Iran. *Journal of North Khorasan University of Medical Sciences*. 2014; 5(5):961-967. DOI: 10.29252/jnkums.5.5.S5.961.
20. Nasl Saraji J, Hosseini MH, Shahtaheri SJ, Golbabaei F, Ghasemkhani M. Evaluation of ergonomic postures of dental professions by Rapid Entire Body Assessment (REBA), in Birjand, Iran. *Journal of Dental Medicine*. 2005 Mar 15; 18(1):61-7.