Frequency of Upper Limb Musculoskeletal Disorders among Architects of Lahore

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Highlights:

- Frequency of common upper limb musculoskeletal problems in architectures was found.
- Total 138 participants were included
- It was found that there was neck (65.9%) and wrist/hand (49.3%) pain

Abstract

Objective:

To determine the frequency of common upper limb musculoskeletal problems in architectures.

Methodology:

The sample size was 138. A cross sectional survey was conducted among architects of Lahore, convenient sampling technique was used. Architects community in Lahore like NCA were included. Study duration was 6 months after the approval of synopsis was completed in 6 months. Inclusion Criteria was architects working more than a year in the field. Both genders are equally inclusive. Age 24 plus. Exclusion Criteria was participants having systemic disorders. Having neurological conditions and recent trauma. A modified Nordiac questionnaire and upper extremity functional index was used. Questionnaire was distributed among the population who were selected according to the inclusion criteria. A consent form was filled by the participant.

Results:

The results shown that 65.9% respondents had neck pain, 49.3% respondents had wrist and hand pain, 37.7% respondents had pain in the upper back and 27% respondents had pain in shoulder and 20.3% respondents had pain in elbow in the last 12 months ..

Conclusion:

In this cross sectional survey of 138 participant's architects had found to have the neck (65.9%) and wrist/hand (49.3%) pain frequencies which are affecting their functional efficiencies. The results suggest more scope is to be cover in the future

Keywords:

Frequency, Musculoskeletal disorders, architects

Introduction:

Architects are exposed to wide range of musculoskeletal disorders due to occupation related stresses. Musculoskeletal disorders are complaints, symptoms or pain that reflect a number of conditions as neck pain, back pain, shoulder pain, elbow pain, pain of limbs, carpal tunnel syndrome, myofacial dysfunction syndrome, golfer's elbow, tennis elbow, atypical pain etc.[1] These disorders can be mild and less frequent or may be severe and devastating. Fortunately, modifications in ergonomics can drastically reduce the likelihood of severity of MSD.[2] It is valuable to determine the effects of physical demands of job nature as the risk of ill health increases with high physical demands.[3] The leading mechanism of work related MSK disorders are multifactorial like poor ergonomics[4]. The risk factors for MSK pains can be mental stress, physical Stress, poor ergonomics at work requiring multiple same kinds of activities and the poorly balanced body distribution[5]. Biomechanical load or stress is the exaggeration of force that is required to do the tasks. It is mostly happen in the repetitive activities. Office workers are exposed to repetitive movement, bad postures which are the leading causes for developing musculoskeletal symptoms.[6] The stress of time management in work may cause psychosocial problems which are leading cause of developing MSD.[7]

Whenever posture is in neutral position the muscles involved are relaxed, as the posture goes out of the neutral position then the muscles are being placed under stress and causes MSK pain usually seen in health care providers while providing care.[8] Among the researchers who worked for the work related MSK disorders observed the association of nature of work, consumption of wine, age linearly increases the risk of these disorders and architects having sedentary life style, almost all odd ratio for shoulder pain were significantly high.[9] A report was presented to present musculoskeletal problems among health care workers in 2004. It concluded that the respondents reported low back as the most common site (56%) second being the neck (45%) which was followed by shoulder (40%) and upper back (37%). lower back was it also highlighted the influence of high mental pressure with limited work support in developing the[10]. Long MH et al conducted a systemic review to determine the prevalence and incidence of back neck and shoulder related muscular disorders among nurses and physicians. He included about 29 articles between 1190 and. Median annual prevalence rates were found to be 45% (neck), 40% (shoulder), and 35% (upper back)[11]. Hesham N Alrowayeh (2010) along with his fellows conducted related to work related disorders among physiotherapists of Kuwait. He collected data from 350 physiotherapists. The response rate to the questionnaire was 63 percent. He found out one-year prevalence of WMSDs to be 47.6%, with lower back complaints as the most common (32%) that was followed by neck (21%), upper back (19%), shoulder (13%), hand/wrist (11%), knee (11%), ankle/foot (6%), elbow (4%), and hip/thigh (3%) complaints.[12] Moulood and his co-workers[12] studied the prevalence musculoskeletal disorders of office workers of Jundishapur University. The participants' age and their work appearance had mean and standard deviation 35.4 ± 6.7 and 9.7 ± 6.65 years respectively. Most of the problems (51%) were in back region, which led many of them to withdraw from daily activities. Statistical analysis also depicted 36.7% neck disorders in office workers, which reflected significant association with age and work experience ($P<0.001$).This showed that emphasis on ergonomics and correction of posture during working time plays a very important roll which should be followed my management and technical practices in organizations[13]. This study was conducted among the architects working in Lahore to determine the work related disorders of upper limb. An assessment form was filled by questioning and by manual assessment of them to find out the frequency of MSK problems. The rationale of this study is to raise awareness and reduce the risk of MSK disorders of upper limb in the architect community by ergonomically modifying their work stations.

Methodology:

It was a cross sectional study. Sample size was 138 which was calculated with 95% confidence interval, anticipated population proportion $P=0.90$ and absolute precision $d=0.05$.

Convenient sampling technique was used. Study setting was Architects community in Lahore like NCA etc. Inclusion criteria was architects working more than a year in the field. Both genders are equally inclusive**.** Age 24 plus. Exclusion Criteria was participants having systemic disorders**,** having neurological condition and recent trauma. A modified Nordiac questionnaire and upper extremity functional index was used. Questionnaire was distributed among the population who were selected according to the inclusion criteria. A consent form was filled by the participant. All data was entered and analyzed using SPSS Version 20. The qualitative data was presented in form of mean ± SD. The qualitative data was presented in form of percentages and frequency tables.

Results:

Total of 138 subjects were included in this study out of which 87 were males and 51 were females. Most commonly involved age group is 11 to 15 years. Almost 62.3% have normal work routine,

and 85.5 % have desk work. During the last 12 months most of the respondents experienced pain or any discomfort in neck (65.9%) and then in wrists (49.3%). least number of participants had experienced pain in elbows and shoulders. 50.7%(neck pain) respondents had difficulty in carrying out activities in last 12 months than other areas in creating difficulty to carrying out activities during last 12 months. Elbows (16.7%) were least responsible in carrying out activities during last 12 months. 39.9% respondents have seen physician for neck pain during last 12 months and 32.6% have seen physician for wrists pain. The least number of respondents was for elbows, upper back and hands which have seen physician for last 12 months. 42.8% respondents said that they had trouble in neck during last 7 days and 39.9% respondents said that they had trouble in wrists during last 7 days. 63.8% individuals have difficulty in work, house work and school activities while 21.7 have no difficulty. In sports activities 56.5% have little bit difficulty as compared to other 19.6 having no difficulty. In lifting a bag 42.8% individuals have little difficulty. 30.4 % individuals have difficulty in lifting bag above head and in grooming hairs 42.8% have difficulty on the other hand 49.3 have no difficulty. 38.4 % have difficulty in pushing up hands and 31.2 % have no difficulty.48.6 have difficulty in preparation of food while 39.9 have no difficulty. During driving, sweeping and dressing 50 %, 41.3% , 34.1 % have bit difficulty as compared to34.8%,44.9%,61.6% have no difficulty . In activities like doing up buttons, using tools, opening doors, cleaning and lasing shoes 32.6%,40.6%,31.9%,33.3%,43.5% have little bit difficulty and 58.7%, 50% , 55.8 % ,51.4% have no difficulty. 51.4 % have difficulty in sleeping and 32.6 % have no difficulty .41.3% have difficulty in washing clothes and 24.6% have no difficulty. 42.8% have little difficulty and 45.7 % have no difficulty in jar opening. 21 % have moderate difficulty and 42% have not any difficulty in ball throwing. In carrying a suit case 40.6% have little difficulty and 16.6% have no difficulty.

Sr#	Region	Frequency (%)	
		Yes	No
1	Neck	91(65.9)	47(34.1)
2	Shoulders	38(27)	100(73)
3	Upper back	52(37.7)	86(62.3)
4	Elbows	28(20.3)	110(79.7)
5	Wrist/hands	68(49.3)	70(50.7)

Table 1: Demographics of Musculoskeletal disorders in last 12 months

Sr#	Region	Frequency (%)	
		Yes	No
1	Neck	70(5.7)	68(49.3)
2	Shoulders	29(21)	109
3	Upper back	46(33.3)	92(66.7)
4	Elbows	24(16.7)	114(82.6)
5	Wrist/hands	52(37.7)	86(62.3)

Table 2: Demographics of Prevention of normal activities during last 12 months.

Sr#	Region	Frequency (%)	
		Yes	No
1	Neck	59(42.8)	79(57.2)
2	Shoulders	27(19.6)	111(80.4)
3	Upper back	46(33.3)	92(66.7)
4	Elbows	32(22.5)	106(76.8)
5	Wrist/hands	55(39.9)	83(16.1)

Table 3: Demographics of Having Any Trouble during last 7 days.

Discussion:

Musculoskeletal disorders are multifactorial in their origins, and when affecting workers, they can be work related in number of ways: poor work conditions, work exposure can increase the stress and may lead to impair work capacity. Personal characters and social or cultural environment can be the leading risk factors for these work related MSK disorders. (WHO, 1985)

Aim of this study was to find out the frequency of MSD among architects as their work stations or working environment were not ergonomically fit for long hours of working. There were 138 participants included in that study that filled the consent form and given questionnaire. The results shown that 65.9% respondents had neck

pain, 49.3% respondents had wrist and hand pain, 37.7% respondents had pain in the upper back and 27% respondents had pain in shoulder and 20.3% respondents had pain in elbow in the last 12 months. Out of 138 respondents had difficulty in carrying out normal activities in the last 12 months due to neck pain was50.7%, wrist and hand pain 37.7%, Upper back pain 33.3%, shoulder pain 21% and elbow pain 16.7%. The results shows that out of 138 respondents 39.1% due to neck pains, 32.6% wrist/hand pain, 31.9% upper back pain, 18.1% shoulder pain, 14.4% elbow pain, had seen the physician in the past year. In the last past week 42.8% had neck pain, 39.9% had wrist/hand pain, 33.3% had upper back pain, 22.5% elbow pain and 19.6% had shoulder pain.[14] The functional index result shows that 63.8% have a little bit difficulty in work and house work activities, 56.5% have difficulty in sports activity, 42.8% have a little bit difficulty in lifting bag up to waist level and 36.2% have moderate difficulty in lifting bag above head level, 42.8% have a little bit difficulty in grooming hair, 23.9% have moderate and 38.4% have a bit difficulty on pushing up your hands, 48.6% have a little bit difficulty in cooking, 50% have a bit difficulty and 13.8% have moderate difficulty in driving, 41.3% have a bit difficulty in sweeping. [15] 34.1% have a bit difficulty in dressing, 32.6% have a bit difficulty in doing buttons, 40.6% have a bit difficulty in using tools, 31.9% have a bit difficulty in opening doors, 33.3% have a bit difficulty in cleaning, 43.5% have a bit of difficulty in lacing shoes, 51.4% have a bit difficulty in sleeping, 41.3% have a bit and 26.1% have a moderate difficulty in washing clothes.[16] 10.9% have a bit difficulty in opening jar.[17] 42% have a bit difficulty in throwing ball, 40.6% have a bit and 32.6% have moderate difficulty in carrying suit case in the affected hand.[18] Our conclusion confirms formerly, in 2005, a total of 23% of workers reported work-related muscular pains in shoulders, neck and/or upper/lower limbs.[19] Long MH et al conducted a systemic review to determine the prevalence and incidence of back neck and shoulder related muscular disorders among nurses and physicians.[20] He included about 29 articles between 1190 and. Median annual prevalence rates were found to be 45% (neck), 40% (shoulder), and 35% (upper back).[11] The study concludes only frequencies of MSD among architects, upper limb problem and identify key problems exists in architect's community. However this study does not cover the scope of improving these MSD problems, therefore further studies and research is required in this field, study of ergonomic assessment and modification and its impact on MSD suggested for future researchers to explore and minimize the risk of MSD in architect's community.

Conclusion:

In this cross sectional survey of 138 participant's architects had found to have the neck (65.9%) and wrist/hand (49.3%) pain frequencies which are affecting their functional efficiencies. The results suggest more scope is to be cover in the future.

References:

01- Karahan A, Kav S, Abbasoglu A, Dogan N. Low back pain: prevalence and associated risk factors among hospital staff. Journal of advanced nursing 2009; 65(3): 16-24.

02- Dembe AE, Erickson JB, Delbos RG, Banks SM. The impact of overtime and long work hours on occupational injuries and illnesses: new evidence from the United States. Occupational and environmental medicine 2005; 62(9): 88-97.

03- Armstrong TJ, Buckle P, Fine LJ, et al. A conceptual model for work-related neck and upper-limb musculoskeletal disorders. Pakistan Journal of Rehabilittaion. 2019.4(5).73-84.

04- Stewart WF, Ricci JA, Chee E, Morganstein D, Lipton R. Lost productive time and cost due to common pain conditions in the US workforce. Jama 2003; 290(18):43-54.

05- Smith DR, Wei N, Zhang Y-J, Wang R-S. Musculoskeletal complaints and psychosocial risk factors among physicians in mainland China. International journal of industrial ergonomics 2006; 36(6): 599-603.

06- Ranney D, Wells R, Moore AJE. Upper limb musculoskeletal disorders in highly repetitive industries: precise anatomical physical findings. Pakistan Journal of Rehabilittaion.2015; 38(7):08-23.

07- Zare A, Choobineh A, Hassanipour S, Malakoutikhah MJIAoO, Health E. Investigation of psychosocial factors on upper limb musculoskeletal disorders and the prevalence of its musculoskeletal disorders among nurses: a systematic review and meta-analysis. Pakistan Journal of Rehabilittaion. 2021.4(3) 1-24.

08- Statzner B, Dolédec S, Hugueny B. Biological trait composition of European stream invertebrate communities: assessing the effects of various trait filter types. Ecography 2004; 27(4):70-88.

09- Ueno S, Hisanaga N, Jonai H, SHIBATA E, KAMIJIMA M. Association between musculoskeletal pain in Japanese construction workers and job, age, alcohol consumption, and smoking. Industrial health.2019; 37(4): 49-56.

10- Smith DR, Wei N, Zhao L, Wang R-S. Musculoskeletal complaints and psychosocial risk factors among Chinese hospital nurses. Occupational medicine 2004; 54(8):79-82.

11- Long MH, Bogossian FE, Johnston V. The prevalence of work-related neck, shoulder, and upper back musculoskeletal disorders among midwives, nurses, and physicians: a systematic review. Workplace health & safety 2013; 61(5):23-29.

12- Alrowayeh HN, Alshatti TA, Aljadi SH, Fares M, Alshamire MM, Alwazan SS. Prevalence, characteristics, and impacts of work-related musculoskeletal disorders: a survey among physical therapists in the State of Kuwait. BMC musculoskeletal disorders 2010; 11(1): 116-200.

13- Valipour Noroozi M, Hajibabaei M, Saki A, Memari Z. Prevalence of Musculoskeletal disorders among office workers. Jundishapur Journal of Health Sciences 2015; 7(1).1-10.

14- Latko WA, Armstrong TJ, Franzblau A, Ulin SS, Werner RA, Albers JWJAjoim. Cross-sectional study of the relationship between repetitive work and the prevalence of upper limb musculoskeletal disorders. Pakistan Journal of Rehabilittaion. 2019; 36(2):48-59.

15- Bovenzi M, Zadini A, Franzinelli A, Borgogni FJE. Occupational musculoskeletal disorders in the neck and upper limbs of forestry workers exposed to hand-arm vibration. Pakistan Journal of Rehabilittaion.2011; 34(5):47-62.

16- Stocks SJ, McNamee R, van der Molen HF, et al. Trends in incidence of occupational asthma, contact dermatitis, noise-induced hearing loss, carpal tunnel syndrome and upper limb musculoskeletal disorders in European countries. Pakistan Journal of Rehabilittaion. 2015; 72(4): 294-303.

17- Da Costa JT, Baptista JS, Vaz MJW. Incidence and prevalence of upper-limb work related musculoskeletal disorders: A systematic review. Pakistan Journal of Rehabilittaion. 2015; 51(4):35-44.

18- Occhionero V, Korpinen L, Gobba FJE. Upper limb musculoskeletal disorders in healthcare personnel. Pakistan Journal of

Rehabilittaion 2014; 57(8):66-91.

19- Walker-Bone K, Palmer KT, Reading I, Coggon D, Cooper CJAC, Research. Prevalence and impact of musculoskeletal disorders of the upper limb in the general population. Pakistan Journal of Rehabilittaion. 2004; 51(4):42-51.

20- Van Eerd D, Beaton D, Cole D, Lucas J, Hogg-Johnson S, Bombardier CJJoce. Classification systems for upper-limb musculoskeletal disorders in workers:: A review of the literature. Pakistan Journal of Rehabilittaion. 2003; 56(10):25-36