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ORIGINAL ARTICLE

Frequency of Musculoskeletal Disorders and their Related Causative Factors Among Female Architecture Students in Lahore

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A B S T R A C T

Background: Work-related musculoskeletal disorders (WRMD's) are "disorders of soft tissue structures, caused or enhanced primarily by the overwork and by the effects of the environment in which work is carried out."(1)

Objective: The purpose of the study was to find out the frequency of musculoskeletal disorders among female architecture students of Lahore College.

Methodology: A descriptive cross-sectional survey was conducted in three months. Data was collected from female architecture students studying in Lahore College for Women University. 300 students of architect engineering from 1st till 4th year who did not have the systemic disease were included by non probability Convenience sampling technique. Standardized Nordiq Questionnaire was used to collect the data.

Results: Results show that the frequency of musculoskeletal disorders among given sample is 76.7%.

All regions were assesed and among all neck pain (24.7%) being the most affected and then the low back (18%) area. 3rd year (85.3%) and 4th year (85.3%) students were more affected then the 1st (69.3%) and 2nd years (67.6%) students.

Conclusion: MSD's had a high frequency among female architecture students due to monotonous movements of the wrist, hand and shoulder and prolong awkward posture of cervical spine and low back.

Introduction

Musculoskeletal disorders are the mass of conditions involving framework and supporting structures of human body as muscles, skeleton, tendon, ligament and cartilages.[1] According to the international classification of diseases (ICD- 10) musculoskeletal disorders fit into the group of diseases of the musculoskeletal system and connective tissue.[2] They cover a variety of disorders, from those of acute onset and short duration to chronic lifelong dysfunctions leading to disturbing condition e g. carpal tunnel syndrome, low back pain. Musculoskeletal disorders constitute 2% of the global economic disease burden.[3]

Many aspects have been recognized as having the probability in causing MSD's and exaggerating its symptoms but Philippa Grimes has a different theory for it. According to him MSD's perhaps a physical manifestation in later life as a consequence of awkward posture in childhood. His sample were school going children and undergraduate students of university, he recognized the common position adapted by students in the classroom

arrangement. The postures adapted by students were not fixed but they keep on modifying it according to their ease and comfort and the work they are doing e.g. Posture is dissimilar when working at the desk and entirely different when using the computer or listening to a lecture.[4]

Students' of architecture work for an approximate of 6 hours out of the 7 or 8 hours of college in a day. Radiographic studies shows that prolong flexed posture of neck leading to straightening of cervical spine and also posterior tilting of the pelvis and decrease in the lumbar lordotic curve puts the intervertebral disc to undue pressure and these stresses are more in sitting than in standing. Also, a research done by Jan Hartvigsen et al, to find out the association between low back pain (LBP) and sitting posture in the occupational place. He concluded that sitting alone may not be a causative factor for low back pain, but found a positive relationship with the work and duration related with this posture and LBP.[5]

MSD's are describe as injury or dysfunction that mostly involves the major supporting structures of body including the nerves, muscle, bones and cartilages.[6] These disorders are mainly caused by collaboration of recurring movements or sustained poor or awkward position. These disorders are represented as ache, distress, stinging or paresthesia of body part. Pain is the most familiar sign related to musculoskeletal disorders others include joint firmness, redness and swelling of involved region, muscle spasm and numbness of diseases recorded as occupational disorder in USA.[5,7] According to statistics of Global Burden of Disease and risk factors, put forth by World Health Organization (WHO), musculoskeletal disorders add to 37% of the disease load attributes to occupational risk factors.[8] Risk factors are:

1. Individual factors as awkward position and related co morbidities as stress, gynecological problems
2. Organizational/ psychological factors as prolong work hours, low job security, poor social interaction and poor bed rest cycle etc.
3. Physical requirement at work place as repetitive movements, un-adjustable working surface and height of working seat, no ergonomic devices.[9]

According to Leon Straker's research paper, differentiating the postures implicited during laptop use and desktop use, reveal that overall the posture in laptop use is awkward than in desktops use. The cause was the deficiency of flexibility of the screen and keyboard in it; this forces the consumer to assume poor postures in the form of enhanced flexion of head and neck resulting in increased biomechanical stress of the surrounding tissues and consequently the development of MSD's. Increase neck flexion of 60 degrees, amplified the torque at C7 by 7% putting extra load on neck muscles also 75% of the users reported visual tiredness with 20 minutes of laptop usage. [10]

Architecture students are primarily entangled to drawing and drafting. Their lessons also allow them to make models of their plans. They work on their plan for at least 20 hours in a week and additional time of their work is subjective. Drawing and drafting involves repetitive movements and static posture leading to these disorders. Since there is scarce data available regarding musculoskeletal disorders faced by architecture students the present study intended to find out the frequency of areas most prone to develop musculoskeletal disorders in them and severity of pain. Its prevalence is high although relatively few studies had focused in this profession. [11]

Wei-Ying Chou reported that backward tilt sitting position as compared to upright sitting position, during typing decreases the activities of neck-shoulder muscles and the hectic typing condition liable to enhance muscle performance. EMG studies demonstrated that there was enhanced upper trapezius and the cervical erector spine muscle performance leading to compression stresses on the spinal cord leading to pain in the neck region and also cause radiclulopathies. Postural examination revealed forward flexed neck posture assumed by the individuals further enhancing the compressive stresses.[12]

Derek smith et al reported the occurrence of MSD's among nurses in mainland china, using a modified version of the SNQ. They found out an overall prevalence of 70%, and individually from highest scores were low back (56.7%), neck (42.8), followed by the shoulders and upper back. [13]

Methodology

It was adescriptive Cross Sectional survey conducted at Lahore College For Women University. The

Study was completed in three months with the sample size of 300 students calculated by using 5% margin of

error at 95% C.I. through non Probability Convenience Sampling technique. Undergraduate female architecture students of LCWU were involved. Undergraduate female architecture students of LCWU who were not willing to participate and who were having history of fall/accident/injury to neck, shoulders, elbow, wrist/hand, back, hips/thighs, knee, ankle/feet, psychological stress, family history of musculoskeletal problems, socioeconomic problems, endocrine disorders, nutritional deficiencies or other problems, soft tissue disorders. Data was collected in questionnaire form. Standardized Nordic questionnaire is used which is then modified according to musculoskeletal disorders.

Results

The sample size in all years of study were homogenous that was 75 in each year of study making a total of 300. The frequency of MSD's in 1st, 2nd, 3rd, and 4th year was 69.3%, 67.6%, 85.3% and 85.3% respectively. 76.7% per cent of the female architecture students reported at least one musculoskeletal symptom.(Figure 1) The regional distribution for the prevalence among these students were as follows neck (24.7%),low back (18%), shoulder (8%),ankle (7.3%),hip (5%), Knee (4%), elbow (3.7%), upper back (3%), wrist/hand (3%).The frequency of MSD's is highest among 3rd year and 4th year with 64 out of 75 students affected by MSD's followed by 1st year and 2nd year with 52 and 50 students out of 75 students are affected.

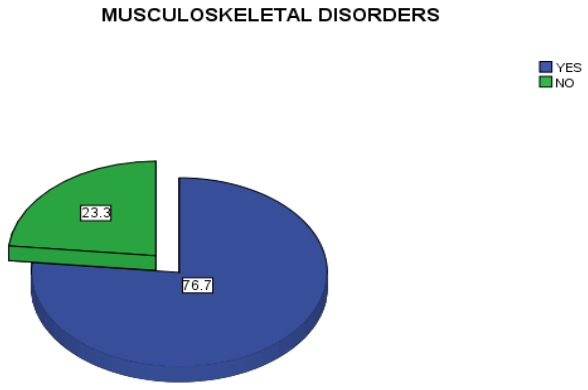

Figure 1. Frequency of MSD's in the sample

Table II: Representing the sample distribution and the frequency of MSD's among students in different years of architecture.

YEAR OF ARCHITECTURE		TOTAL	ANY MSD's	
			YES	NO
1st year	Number	75	52	23
	% of MSD's within group	100%	69.3%	30.6%
2nd year	Number	75	50	25
	% of MSD's within group	100%	67.6%	33.4%
3rd year	Number	75	64	11
	% of MSD's within group	100%	85.3%	14.6%
4th year	Number	75	64	11
	% of MSD's within group	100%	85.3%	14.6%
TOTAL	Number	300	230	70
	% of MSD's within group	100%	76.7%	23.3%

Table I: Representing the regional prevalence of WRMD's among the target population.

AREA	1st year Frequency	2nd year Frequency	3rd year Frequency	4th year Frequency	Total frequency	TOTAL %
NECK	24	8	13	29	74	24.7%
SHOULDER	7	6	7	4	24	8%
ELBOW	5	6	0	0	11	3.7%
WRIST/HAND	5	4	0	0	9	3%
UPPER BACK	0	5	4	0	9	3%
LOWER BACK	2	3	18	31	54	18%
HIP/THIGHS	9	5	1	0	15	5%
KNEE	0	12	0	0	12	4%
ANKLE/FEET	0	1	21	0	22	7%

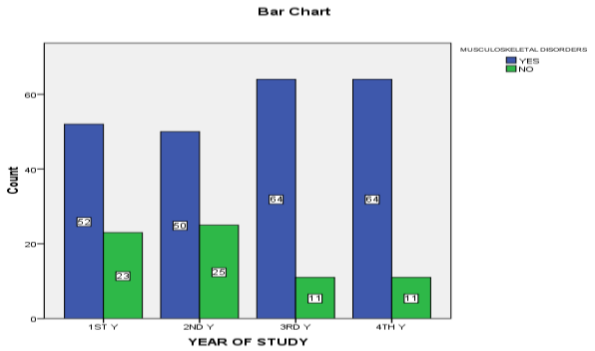

Figure 2. Representing the sample distribution and the frequency of MSD's among students in different years of architecture.

Table III: Representing the frequency of students with and without postural awareness

Characteristic	Musculoskeletal disorders		Total
Postural awareness	YES	NO	
Yes	67	21	88
No	163	49	212
Total	230	70	300

Discussion

Architecture department of Lahore College for Women University was approached to participate in this study. The result of this study showed a high prevalence of musculoskeletal disorders in this population (76.7%). Work related activity, like drafting and sketching causes the students to assume awkward postures. The highest prevalent area for pain was the neck region followed by the back and then the shoulder. These results are consistent with Kuorinka's studies, after which he designed the Standardized Nordic questionnaire and gave special consideration for these three body areas.[14]

The study was done to find out the neck, shoulder pain and low back pain prevalence and the various activities contributing to this. Cervical region was the area with the highest prevalence (63%), this may have been because of the faulty sitting posture of the students. Since they work for long hours, they are habituated to sit with a slouched back and this puts a lot of strain on the muscles.[15] Along with this they often rotate their back to accommodate to the large drawing boards while working, this adds extra stress to it. The most common area of symptoms was the neck pain with a prevalence of 24.7%. students when they work on the drafting table tend to keep the neck in protruded manner which is relative to the increased spinal flexion. Over periods of time this habitual neck posture may cause a forward head posture, which they assume even when there are not working. This posture causes the anterior neck muscles to get stretched and weak and the neck extensors to become shortened and to go into spasm. This alters the biomechanics of the neck and predisposes a person to have neck pain and if the posture is not corrected, there is chronic overload on these structures leading to the failure of these structures.

Low back pain is second common region of musculoskeletal disorder leading to posterior pelvic tilting and resulting in reduced lumbar lordosis and lumbar flattening. [16]

Work related shoulder pain, comes third in the area wise prevalence of MSD's. This occurs when the person works with the upper limb without giving it support. Working with the computer necessitates the use of keyboard and mouse and also during activities like drafting and drawing etc. the arm is not supported; the muscles around the shoulder have to work extra to stabilize the shoulder so that the wrist and fingers are able to do fine and minute work like sketching and typing.[17]

Conclusion

From the present study it can be concluded that the frequency of MSD's among Female architecture students is high and that the most commonly affected areas of pain are neck, low back and shoulder in the decreasing order of prevalence.

They were facing these musculoskeletal disorders as a result of their work, work posture and work environment.

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