

ASSOCIATION BETWEEN LOW BACK PAIN AND PROLONGED STANDING IN UNIVERSITY TEACHERS

Muhammad Kashif¹, Haider Darain², Fatima Sharif³, Maria Jamil⁴, Sidra Majeed⁴, Irfan Ullah⁵

Abstract:

Background: Occupations that require standing for longer duration are often associated with increased risk of low back pain. Teaching is one of the professions that may be regarded with high prevalence of low back pain.

Objective: The aim of this study was to investigate the association between low back pain and standing and to find out the contributing factors of backache in university teachers.

Methodology: A cross sectional survey was conducted on university teachers of Faisalabad. Demographic information, work ergonomics and problem relevant data were collected from the respondents by using self-made questionnaire.

Results: Out of 105 respondents, 50(47.62%) subjects had backache. Weak positive association (p value 0.017) was found between low backache and continuous standing. Prevalence was higher in female respondents (57.2%) as compared to male respondents (36.7%). Moreover, pain was more frequent in respondents with higher BMI values and who assumed uneven weight bearing posture while standing.

Conclusion: The study concludes that Backache is associated with prolong standing periods in addition to other ergonomic and occupational risk factors that lead to the onset of backache.

Keywords: Low back pain, prolonged standing, risk factors, university teachers.

INTRODUCTION

Low back pain is a health problem associated with musculoskeletal and psychosocial problems affecting individual of all ages at least once in their lifetime, and is one of the most common disability of all the human disabilities. It can be acute, sub-acute or chronic in nature. Its incidence increases with the progression of age and is more prevalent in females (1). 80% of the general population suffered by LBP

Etiology of low back pain is multifactorial. Obesity, smoking, poor general health, sedentary lifestyle, strenuous physical work or exercise, along with psychological factors such as anxiety, depression, job dissatisfaction and unfriendly working environment can be the cause of lumbago.

Biomechanically Excessive trunk flexion and rotation have detrimental effects on spinal structures. Standing, lifting, continuous work of same kind, monotonous job, vibration and high speed trunk movements also lead to Low back pain. Occupations that require standing for longer duration are often associated with increased risk of low back pain. Teaching is one of the professions that show high prevalence of low back pain.(2)

The literature shows the mechanisms underlying the back pain and how it is associated with prolonged standing. In a study, oblique muscles of abdomen's activity was recorded in order to classify them as a predictor of back pain activation. EMG activity of oblique abdominals of 6 subjects was recorded during the static standing posture.

¹Principal & Assistant Professor, Riphah College of Rehabilitation Sciences, Riphah International University (Faisalabad Campus), Pakistan

²Assistant Professor Physical Therapy, Principal/Director Institute of Physical Medicine and Rehabilitation, Khyber Medical University, Peshawar-Pakistan

³Faculty, School of Rehabilitation Sciences, The University of Faisalabad

⁴Lecturers, School of Rehabilitation Sciences, The University of Faisalabad

⁵Physiotherapist Hayatabad Medical Complex, Peshawar

Address for correspondence:

Muhammad Kashif

Principal & Assistant Professor, Riphah College of Rehabilitation Sciences, Riphah International University (Faisalabad Campus), Pakistan

Email: kashif.shaffi@gmail.com

This research concluded that prolonged standing activates the oblique abdominal specifically the internal oblique muscles which help in maintaining the static standing posture. The subjects having weak oblique abdominals are more prone to have low back pain. The reason behind is that oblique abdominals stabilize the sacroiliac joint in order to sustain standing.(3)

Another study was done to see the pattern of posture control while maintaining the long hours of standing suggested that prolonged standing aggravates the pain in those individuals who already have low back pain as the pattern of low back muscles activation is altered in them because of pain-spasm-pain cycle activation.(4)

Therefore, this type of research work emphasizes on the poor posture as a leading cause in low back pain. Working population assume different postures during standing that may be biomechanically poor in nature. It is revealed that poor standing posture is the main factor for the initiation of low back pain. In this study the different standing postures will be discussed. So the other important factor is the working

hour of population in bad or poor standing posture.

METHODOLOGY

A population based cross sectional study was conducted between January 2014 and February 2014 to fulfill the purpose of the research. Our research used the sample from both the public and private Universities of Faisalabad. In order to recruit a maximum number of subjects to the study purposive sampling technique was selected to gather data from teachers of “The University of Faisalabad” (TUF), “Government college university Faisalabad” (GCUF), “Government College for women university Madina town Faisalabad” (GCWUF), “National textile university Faisalabad” (NTU) and “University of agriculture Faisalabad” (UAF). A signed consent form was obtained from each participant of the study. All members of the population were approached in order to gather data to test the hypothesis. From the entire population 105 subjects (56 females, 49 males) were selected on the basis of the availability of the signed consent form and fulfillment of the inclusion criteria. The subjects who didn’t fulfill inclusion criteria were exempted from the study in order to avoid any confounding of the study.

Criteria for inclusion were that, subjects aged between 25-50 years of age, both males and females and from both public and private sectors. Those

who had any trauma, history of any surgery for back/spine in last 6 months, Active Systemic disease, known psychological condition, congenital deformity, low back surgery during the previous one year, history of cerebrovascular accident (CVA) or Transient ischemic attack (TIA) during the previous one year, Evidence of any bleeding or infection to the back particularly in the lower back region, history of C-section in last 3 months and pregnant females were excluded from the study.

None of the standardized questionnaire was fulfilling the requirements of our research topic and parameters. Therefore a self-made questionnaire based on Oswestry low back pain disability questionnaire and acute low back pain screening questionnaire covering all the important parameters of the study was employed to collect data from the participants. It consisted of 3 sections of questions namely, personal information, work ergonomics and problem related data. Total 23 questions were included in this questionnaire so that the outcome of interest may be explored and evaluated completely. Each participant was given the questionnaire and guidance was provided to fill that accurately.

For the statistical processing or analysis of this data, Statistical package for social sciences (SPSS) 16 version was used. Microsoft office word 2010 was also used for interpretation and

explanation of the results obtained from the SPSS. Mean ± S.D was calculated for the quantitative variables while the frequency tables, pie charts and bar charts were used in order to calculate the trend of quantitative variables. To see the association between the main (qualitative) variables of the hypothesis chi-square test (with 95% confidence interval) was applied and p-value was interpreted accordingly. P-value less than 0.05 was considered significant. Box plot was used to ensure the absence of any outlier misinterpreted into the main results.

RESULTS

In this study there were 105 subjects, and their mean age was 31.40 ± 6.223 years. The minimum age of the participants was 25 years and maximum age was 50 years.

The mean standing hours per day of our study sample were 4.4381 ± 1.31503. The maximum standing hours per day were 6 hours and the minimum standing hours per week were 2 hours.

The mean standing hours per week were 20.63 ± 7.003. The maximum standing hours per week were 36 while the minimum standing hours per week were 6 hours.

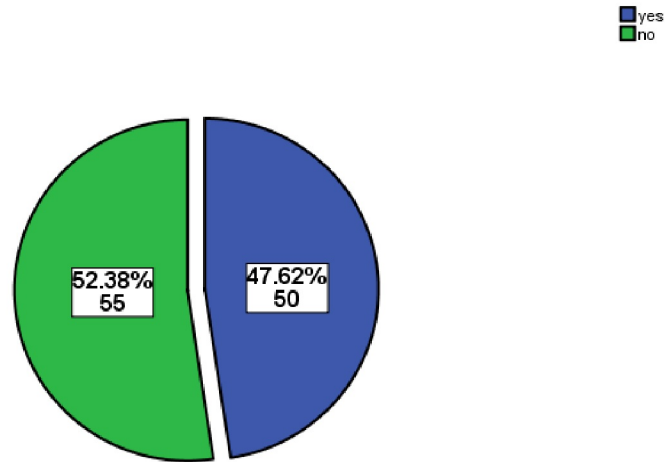
Table-I

Statistics

	age (years) of the teacher	standing hours per day	standing hours weekly
N Valid	105	105	105
Missing	0	0	0
Mean	31.40	4.4381	20.63
Std. Deviation	6.223	1.31503	7.003
Minimum	25	2.00	6
Maximum	50	6.00	36

Frequency of backache:

Fig-1
presence of backpain in teachers



Results showed that out of 105 subjects recruited, 50(47.62%) subjects had backache while 55(52.38%) subjects were not having backache.

Table-2

Cross tabulation of backache and gender:

gender of the teacher * presence of back pain in teachers Cross tabulation Count

		presence of back pain in teachers				Total
		Yes		No		
gender of the teacher	Male	18	36.7%	31	63.3%	49
	Female	32	57.2%	24	42.8%	56
Total		50	47.6%	55	52.4%	105

In this study there were 49 males, among them 18 (36.7%) male subject reported back pain with standing while 31 (63.3%) subjects reported no pain with standing. We also had 56 female subjects, among those 56 females 32 (57.2%) subjects reported back pain with standing and 24 (42.8%) subjects reported no pain with standing. As the P value for Pearson Chi-square is .037 which is less than selected α (0.05). This shows that there is some association between gender and pain.

Table3

Cross tabulation between backache and continuous standing

P-value= 0.019 Contingency Coefficient= 0.017

Presence of back pain in teachers * continuous standing Cross tabulation count

		continuous standing		Total
		Yes	No	
presence of back pain in teachers	Yes	27	23	50
	No	17	38	55
Total		44	61	105

Association Between Low Back Pain and Prolonged Standing in University Teachers

Out of 105 subjects 27 subjects reported back pain with continuous standing and 23 subjects reported back pain without having continuous standing. 17 subjects had continuous standing but they did not experience back pain and 38 subjects neither had continuous standing nor back pain.

Value of Pearson's chi-square was 0.019 which showed that there is some association between the variables while the value of coefficient of contingency calculated was 0.017, which showed that there is a weak positive association between standing and back pain.

Table-4

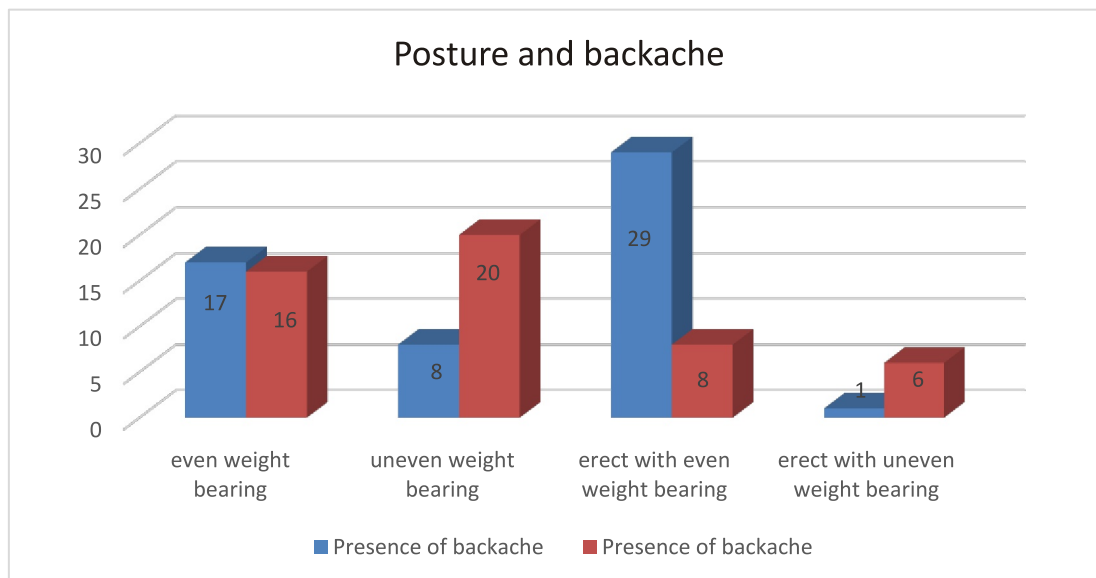
Cross tabulation between low back pain and BMI:

Count		presence of back pain in teachers				Total
		Yes		No		
BMI	Underweight	2	50%	2	50%	4
	Normal weight	23	38%	36	62%	59
	Overweight	22	59%	15	41%	37
	Obesity	3	60%	2	40%	5
Total		50	47%	55	53%	105

The results of this study showed that the frequency of backache was higher in obese (60%) and overweight (59%) individuals in comparison to normal (38%) and underweight (50%) subjects. Although underweight individual showed greater prevalence (50%) than normal BMI individuals (38%).

Description of posture:

Fig-2



Prevalence of back pain was higher (21.6%) in subjects who assumed uneven weight bearing in comparison to (85.7%) those who assumed even weight bearing.

DISCUSSION

Out of 105 subjects 27 subjects reported back pain with continuous standing and 23 subjects reported back pain without having continuous

standing. 17 subjects had continuous standing but they did not experience back pain and 38 subjects neither had continuous standing nor back pain. Therefore this study shows association between prolonged standing and the

onset of backache with P-value of 0.017 as a result of application of Pearson chi-square test on the variables.

In a study by Mohseni-Bandpei, et al. (2011), it was concluded that low

back pain was most associated with prolonged standing (85.2%) in comparison to all other aggravating factors of low backache such as repetitive movements (50.2) and incorrect postures (48.4%).(5)

In contrary to these results a review by Hoogendoorn *et al.*, 1999 concluded that there is no association between standing, sports and other recreational activities performed at regular or irregular basis and the onset or prevalence of backache.(6)

In this study, 105 subjects were included. Out of 105 subjects 49 (46.67%) subjects were males, among them 18 (36.7%) male subject reported back pain with standing while 31 (63.3%) subjects reported no pain with standing. We also had 56 female subjects, among those 56 (53.335) females 32 (57.2%) subjects reported back pain with standing and 24 (42.8%) subjects reported no pain with standing.

As the P value for Pearson Chi-square is 0.037 which is less than selected α (0.05). This shows that there is some association between gender and back pain.

Schneider , Randoll and Buchner (2006) also found that low back pain was more prevalent in female gender having a percentage of 40% in comparison to male gender who had a percentage of 32%.(3)

A study by de Schepper, *et al.* (2010) showed contrary results that LBP in male gender is more prevalent. The reason behind this is the disc space narrowing rather than the osteophyte formation leading to onset of LBP in male gender.(7)

The results of this study showed that back pain is more common in individuals who assumed uneven weight bearing(71.42%) and erect with uneven weight bearing (85.7%) during their standing activities i.e., lecture timings in comparison to those teachers who assumed even weight bearing as well as erect with even weight bearing.

The same results were shown by Yildirim, Gunay and Karadibak (2014). They concluded their study with the

results that inappropriate standing postures lead to the initiation of the low backache.(8)

These results show that as the BMI deviates from the normal range the chance of having back pain increases proportionately. The following studies support the same findings.

Hershkovich, *et al.* (2013) and Shiri, *et al* (2009) showed in their study and Meta-analysis respectively that there is strong association (p value < 0.001) between BMI and backache in both genders. As the BMI values increase from overweight group to obese group the risk of having backache increases significantly.(9, 10)

On the other hand Jensen (2012) showed that greater BMI values are not a risk factor for the onset of backache. As there was no difference in back pain onset between 2 groups of subjects with different BMI. (11)

CONCLUSION

The results of this study showed that there was a weak positive association between standing work and the incidence of backache. And the pain was reduced after the breaks or interruptions to their continuous standing. Furthermore pain was more prevalent in female gender.

LIMITATIONS OF STUDY

This study is only applicable to the university teachers and more specifically to the university teachers of Faisalabad city only. As there are many demographics, cultural and environmental differences between Faisalabad and other areas of Pakistan. Moreover this study cannot be applied to college or schoolteachers who might have different postural and ergonomically variations and frequency of the problem.

RECOMMENDATIONS

This study can be used to on government level to evaluate the health status of the university teachers of Faisalabad and to guide the teachers to avoid the factors taking them on the verge of pain. It will further help the new

researchers to conduct new and advance studies.

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