



## Back Pain – Are Health Care Undergraduates At Risk?

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### Abstract

**Background:** To study the prevalence of low back pain in medical and nursing undergraduate students in our institutes and its association with physical activity, smoking, depression, use of computer and other variables.

**Methods:** It was a comparative cross sectional study carried out at two institutes of Dow University of Health Sciences, Karachi, Pakistan during October to December 2011. Two hundred and fifteen undergraduate students representing different semesters were asked to fill out the structured questionnaire. Back pain was assessed in terms of lifetime, one year and point prevalence. Bivariate analysis was done to study the relationship between back pain and different variables; including gender, study program, smoking, computer use, depression and level of physical activity. Both the groups were compared for duration/intensity of pain, seeking medical advice and duration of computer use.

**Results:** There were 183 undergraduate students who completed the questionnaire for back pain. Mean age was 22.84 (SD  $\pm$  5.85) years. Gender distribution was nearly equal (females = 51.4%). Life time prevalence was 57.9% (72% in medical students; 41% in nursing students). Medical students were 0.47 times more at risk of having back pain (95% CI 0.15-1.48;  $P=0.198$ ). Smoking (OD=0.39; 95% CI 0.04-3.6;  $P=0.001$ ) and use of laptop (OD=4.9; 95% CI 1.2-19.2;  $P=0.031$ ) were found to be associated with increased prevalence of back pain. Nursing students sought medical opinion more as compared to medical students but it was not significant. However duration of computer use was more in medical students which was significant ( $P=0.03$ ).

**Conclusion:** High lifetime prevalence of back pain was observed in undergraduate students. Medical students appeared to be more at risk. Preventive measures are required to improve the quality of life in future health care professionals.

**Keywords:** Back pain, Medical students, Nursing students

### Introduction

Low back pain is a common problem among all age groups (1). Majority of the population has experienced back pain at least some time in their lives. Health care workers are at increased risk of low back pain [LBP] (2). Back pain in nursing population is well studied and its 12 month prevalence ranges from 66% to 76% (3-4) while point prevalence ranges from 40% to 59% (5-6). Num-

bers of risk factors have been proposed including physical work, psychological, sedentary lifestyle and socioeconomic; as a contributor in low back pain (7-9). Back pain is more prevalent in nursing students during their theoretical classes before commencement of their full time clinical duties (10-11). This led to the need that back pain preventive strategies should be employed in under-

graduate nursing students. Low back pain in medical students is not well reported in literature. The curriculum in medical colleges is associated with long study hours leading to sedentary life style of medical students and thus making them prone to repeated episodes of back pain (12). With the increase use of computers and laptops the physical activity is decreased among under-graduate students. Bad postural habits during study may also contribute to the prevalence of back pain (13).

The purpose of this study was to find out the prevalence of back pain in undergraduate students at Dow University of health sciences and to identify different risk factors associated with back pain. The results of this study will help in evaluating the modifiable risk factors to develop a preventive plan for a better quality life of future health care professionals.

## Materials and Methods

This comparative cross sectional study was carried out at Dow University of Health Sciences, Karachi, Pakistan during October to December 2011. The students from two institutes, namely Dow International Medical College and Institute of Nursing were included. Students from different semesters in both institutes were invited to complete the structured questionnaire during their classes. The researchers visited all the classes in both semesters during the study period, briefed the students about the study and after their acceptance and signing consent filled the desired questionnaire. The researchers assisted the students and cleared any confusion in the minds of the students while answering the questions. Students from all the years of both the institutes who filled the questionnaire completely were included in the study, while students with incomplete information, multiple answers and refusal to sign consent were excluded from the study.

The structured questionnaire contained information on age, gender, program, semester, characteristics of back pain if present, use of computer or laptop, use of chair with lumbar support, smoking, depression and physical activity (14). Depression was assessed by using Beck Depres-

sion Inventory consisting of 21 questions. Each question scores 0-3 resulting in a total score of 63. If total score was  $>14$  then it considered depression (15). Physical activity was assessed by using International Physical Activity Questionnaire (IPAQ) and was graded as low, moderate and high (16). Backache was defined by a pain in lumbar area (starting from below the ribs up to hips). Duration was graded as acute [ $<3$  weeks], sub acute [3 weeks to 3 months] and chronic [ $>3$  months] (17). Students were asked about the radiation of pain, seeking medical advice (either by medical personal or physiotherapist), use of analgesia (either regular or occasional during pain episodes) and intensity of pain using numerical rating scale (0=No pain; 10=Max pain). Students were inquired about pain at any point in their life (lifetime prevalence), pain during last year (1 year prevalence) and back pain present at the moment (point prevalence).

The study was submitted at the Institutional Review Board of Dow University of Health Sciences, Karachi, Pakistan and started after having approval from the committee.

Statistical analyses were done by using SPSS version 17. All categorical data was presented as proportion while numerical data as mean. Bivariate analysis was done using the chi-square test to assess the relationship between different variables and back pain among students at point prevalence. Bivariate analysis was also done to compare different numerical variables among students from two programs using unpaired student t-test. Univariate logistic regression analysis was done for potential predicting variables. Statistically significant variables at 20% level of significance were further analyzed with multiple logistic regression along with clinically significant (but statistically insignificant variables). Association of predicting variables and backache is reported as Odd's Ratio with 95% CI.

## Results

There were 215 undergraduate students evaluated for back pain. One hundred and eighty three students completed the questionnaire after consent including 100 medical students and 83 nursing

students, while 32 questionnaires were excluded due to incomplete information. Mean age was 22.84 (SD 5.85 years). Gender distribution was nearly equal (females = 51.4%). Students representing different semesters were included in this study (median = 3). Medical students in this study were representing more from senior batches (median = 7) as compared to nursing students (median=2). In general, 57.9% of undergraduate students reported back pain at some point in their life; however it was observed that 72% of medical students reported back pain as compared to 41% of nursing students. On the other hand 13.1% of students reported back pain at the time of assessment and 21% reported back pain in the last one year.

Use of laptop was found to be more common in medical students as compared to use of desktop among nursing students. Mean hours of computer use per day was  $2.69 \pm 1.86$ . Majority of students were using chair with lumbar support (67.8%). Depression was present among 14.4% of the students. Physical activity was low in 26.2%, moderate in 41.5% and high in 32.2%. Comparison of different characteristics among medical and nurs-

ing undergraduate students is shown in Table 1.

Bivariate analysis was done (Table 2) to identify different factors associated with low back pain at the time of assessment (point prevalence). Smoking was found to be associated with increased prevalence of back pain. Use of laptop appeared to be associated with increase in back pain but it was not statistically significant ( $P=0.079$ ).

Table 3 demonstrates the comparison of different characteristics among medical and nursing students. There was no major difference in pain duration and intensity among the two groups. There was similar trend toward medical treatment among two groups. Nursing students sought medical opinion more as compared to medical students but it was not significant. However use of computer was observed more in medical students which was significant ( $P=0.03$ ).

In the logistic regression model with different variables, only smoking was found to be independently associated with pain (Table 4).

In multiple logistic regression models, statistically significant variable (Smoking) was further analyzed with clinically significant variables (but statistically insignificant).

**Table 1:** Comparison of different characteristics among medical and nursing undergraduate students (n = 183)

Variable	Total n (%)	Medicine n (%)	Nursing n (%)	P value
Female*	94 (51.4)	51 (54.3)	43 (45.7)	0.913
Age (mean $\pm$ SD)**	22.84 $\pm$ 5.85	21.0 $\pm$ 1.7	25.0 $\pm$ 7.9	<0.001
Phase of Program*** Median (range)	3 (1-7)	5 (1-7)	2 (1-7)	<0.001
Type of computer*				
Desktop	67 (36.6)	16 (16.0)	51(61.4)	
Laptop	62 (33.9)	52 (52.0)	10 (12.0)	<0.001
Both	54 (29.5)	32 (32.0)	22(26.5)	
Number of hours/day of computer use*	2.69 $\pm$ 1.86	3.05 $\pm$ 1.82	2.25 $\pm$ 1.84	0.004
Chair with lumber support*	124 (67.8)	73 (73.0)	51 (61.4)	0.096
Depression*	26 (14.4)	15 (15.2)	11 (13.4)	0.740
Physical activity level*				
Low	48 (26.2)	22 (22)	26 (31.3)	
Moderate	76 (41.5)	35 (35)	41 (49.4)	0.003
High	59 (32.2)	43 (43)	16 (19.3)	

\*Chi-square test\*\* Independent sample t test\*\*\* Mann Whitney u test

**Table 2:** Factors associated with low back pain (point prevalence; n=24) in all subjects (n=183)

Variables	Low back pain n (%)	Chi2 value	P value
<b>Program</b>			
Medicine (n=100)	13 (13)	0.003	0.96
Nursing (n=83)	11 (13.3)		
<b>Gender</b>			
Male (n=89)	10 (11.2)	0.537	0.464
Female (n=94)	14 (14.9)		
<b>Tobacco</b>			
No (n=154)	14 (9.1)	13.80	0.001
Ex-smoker or smoker (n=28)	10 (34.5)		
<b>Computer use</b>			
Desktop (n=68)	6 (9)	5.07	0.079
Laptop (n=61)	13 (21)		
Both (n=54)	5 (9.3)		
<b>Computer use</b>			
Less than 2 hour/day (n=102)	11 (10.8)	1.09	0.379
More than 2 hour/day (n=81)	13 (16.0)		
<b>Depression</b>			
No (n=107)	11 (10.2)	1.816	0.178
Yes (n=76)	13 (17.1)		
<b>Physical activity level</b>			
Low (n=48)	7 (14.6)	0.775	0.679
Moderate (n=76)	8 (10.5)		
High (n=59)	9 (15.3)		

**Table 3:** Characteristics of low back pain by program (n = 144)

Variables	Total n (%)	Medicine n (%)	Nursing n (%)	P value
<b>Pain duration in last year*</b>				
Acute	116 (80.6)	76 (81.7)	40 (78.4)	0.355
Sub acute	17 (11.8)	12 (12.9)	5 (9.8)	
Chronic	11 (7.6)	5 (5.4)	6 (11.8)	
<b>Pain intensity**</b>	3.28 ± 2.12	3.29 ± 1.94	3.27 ± 2.43	0.966
<b>Seek medical care*</b>				
Yes	38 (26.4)	20 (21.5)	18 (35.3)	0.073
<b>Medication use*</b>				
No	93 (64.6)	60 (64.5)	33 (64.7)	0.162
Regular	12 (8.3)	5 (5.4)	7 (13.7)	
Occasional	39 (27.1)	28 (30.1)	11 (21.6)	
<b>Use of chair with lumbar support*</b>				
Yes	103 (71.5)	69 (74.2)	34 (66.7)	0.338
<b>Computer use*</b>				
Less than 2 hour /day	70 (48.6)	39 (41.9)	31 (60.8)	0.030
More than 2 hour / day	74 (51.4)	54 (58.1)	20 (39.2)	

\*Chi-square test\*\* Unpaired student t test was applied

Within these four variables only smoking and computer use were independently & significantly associated with low back pain. Males were 0.51 times more likely to have LBP (95% CI 0.18-1.4;  $P=0.194$ ).

Besides subjects smoking had 0.39 times chance of having LBP(95% CI 0.04-3.6;  $P=0.001^*$ ) Finally in the contrast laptop use is the only single variable having a high odd ratio i.e. 4.9 times risk of having low back pain (95% CI 1.2-19.2;  $P=0.031$ )[Table 5].

**Table 4:** Univariate logistic regression to determine statistically significant predictors of pain

Variables	Odd's Ratio	95%CI	P-value
<b>Program</b>			
Nursing	1		0.96
MBBS	0.97	0.41-2.3	
<b>Age</b>			
Upto 20	1		0.535
21-25	1.6	0.57-4.8	
26 and more	2.1	0.51-8.68	
<b>BMI (kg/m<sup>2</sup>)</b>			0.483
Upto 24.9	1		
25 and above	0.483	0.24-1.95	
<b>Gender</b>			
Female	1		
Male	0.72	0.3-1.72	0.465
<b>Smoking</b>			
None	1		
Ex-smoker/ Current Smoker	0.27	0.37-2	0.001
<b>H/o Trauma</b>			
No	1		0.512
Yes	0.58	0.116-2.9	
<b>Computer use</b>			
Desktop	1		
Laptop	2.7	0.99-7.9	0.077
Both	1.05	0.3-3.6	
<b>Semester</b>			
Upto 4	1		
5 and above	1.07	0.44-2.6	0.87
<b>IPAQ score</b>			
Severe	1		
Moderate	0.65	0.23-1.8	0.681
Mild	0.94	0.32-2.7	

**Table 5:** Multivariable Logistic regression of statistically and clinically significant predicting variables

Variable	Odd's Ratio	95% CI	P-value
<b>Program</b>			
Nursing	1		0.198
MBBS	0.47	0.15-1.48	
<b>Gender</b>			
Female	1		
Male	0.513	0.18-1.4	0.194
<b>Smoking</b>			
None	1		
Ex-smoker/ Current smoker	0.39	0.04-3.6	0.001
<b>Computer use</b>			
Desktop	1		0.031
Laptop	4.9	1.2-19.2	
Both	1.2	0.31-4.0	

## Discussion

This cross sectional study showed that significant number of undergraduate students (57.9% - Lifetime prevalence) experience back pain at some point in their life. Twelve month prevalence has been reported to be very high in other studies (3-4) but in our study surprisingly it was low (i.e. 21%). Medical students appeared to be affected more as compared to nursing students (72% vs 41% - lifetime prevalence). Mean age for medical students was 21 (SD  $\pm 1.7$ ) while for nursing students it was 25 (SD  $\pm 7.9$ ). Both the groups did not match in respect of their ages. Although age is thought to be associated with increasing prevalence of back pain (18) but in our study medical students were younger than the nursing students. Medical students included in this study were representing the senior semester batches (median=5) as compared to the nursing students (median=2). Another study also reported increased prevalence with senior semester students (14). Smoking and use of laptop were found to be associated with higher prevalence of back pain. Medical students were found to spend more time on computer. There are number of reports available evaluating back pain among nurses and nursing students but



very few studies evaluated back pain among medical students. Mitchell et al. (2) reported lifetime prevalence of 79% among nursing students which was increased to 95.5% after 12 months of full time employment. They concluded that there was a substantial rise in prevalence after occupational exposure but due to high prevalence even in nursing students; psychological factors may also play a role in addition to physical factors. In our study, lifetime prevalence (57.9%) was also quite high among undergraduate students although association of depression with backache was not significant. Mitchell et al. (19) reported his results showing number of physical and psychological factors (smoking, increased physical activity, higher stress, reduced back muscle endurance, greater posterior pelvic rotation in slump sitting, and more accurate spinal repositioning in sitting) were associated with new onset low back pain. In our study we also studied different risk factors which can be associated with higher prevalence; however only smoking and use of laptop showed some significance.

Feyer et al. (10) also reported preexisting psychological stress as the only factor associated with new episodes of low back pain. In our study depression showed increased prevalence of back pain but it was not statistically significant.

Moroder et al. (12) evaluated 103 medical students and 107 physical therapy students for low back pain. There was high prevalence of back pain in undergraduate students (53.4% in medical students and 60.7% in physical therapy students). Physical therapy students were more physically active as compared to medical students yet there was no statistically significant difference in back pain among two groups. They concluded that sedentary lifestyle may no longer be a risk factor for back pain. In our study medical students showed a lifetime prevalence of 72% while nursing students had 41%. Medical students were more physically active (high IPAQ score) as compared to nurses but the level of physical activity was not associated with increased prevalence of back pain (point prevalence). There was no significant difference in duration or intensity of pain among two groups. Medical students with back pain were found to use computer more as compared to

nurses and the use of laptop was found to be an independently significant risk factor for low back pain.

All these studies have reported increased prevalence of back pain among undergraduate students. Such a high prevalence of back pain is alarming and requires implementation of back pain preventive strategies among undergraduate students and even prior to this point. Alternatively, prevention of significant disability or chronicity associated with low back pain could be a consideration for those who already report low back pain. Further, evidence for interventions such as physical therapy to prevent low back pain is limited at best.

Physical therapy programs have been described to reduce the prevalence of back pain. Rok et al. (20) studied the efficacy of therapeutic exercises to reduce the back pain among 102 nurses and reported significant improvement in back pain in the study group. Koldas Dogan et al. (21) studied the role of therapeutic exercises in three randomized groups and found these exercises effective in decreasing the intensity of back pain and increasing the aerobic capacity. Students should be counseled regarding adverse effects associated with smoking and develop programs to help them quit smoking. Small number of students with back pain at the moment (point prevalence) was a limitation to our study.

## **Conclusion**

Undergraduate health professionals have a high life time prevalence of back pain. Medical students appeared to be more at risk. Smoking and use of laptop were found to be associated with increased prevalence. Preventive strategies should be implemented to decrease the prevalence among undergraduate students.

## **Ethical considerations**

Ethical issues (Including plagiarism, Informed Consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc) have been completely observed by the authors.

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## References

1. Brennan G, Shafat A, Mac Donncha C et al. (2007). Lower back pain in physically demanding college academic programs: a question-naire based study. *BMC Musculoskelet Disord*, 8:67.
2. Mitchell T, O'Sullivan PB, Burnett AF et al. (2008). Low back pain characteristics from undergraduate student to working nurse in Australia: a cross-sectional survey. *Int J Nurs Stud*, 45(11):1636-44.
3. Smedley J, Trevelyan F, Inskip H et al. (2003). Impact of ergonomic intervention on back pain among nurses. *Scand J Work Environ Health*, 29(2):117-23.
4. Maul I, Läubli T, Klipstein A, Krueger H (2003). Course of low back pain among nurses: a longitudinal study across eight years. *Occup Environ Med*, 60(7):497-503.
5. Smith DR, Leggat PA (2004). Musculoskeletal disorders among rural Australian nursing students. *Aust J Rural Health*, 12(6):241-5.
6. Violante FS, Fiori M, Fiorentini C, et al. (2004). Associations of psychosocial and individual factors with three different categories of back disorder among nursing staff. *J Occup Health*, 46(2):100-8.
7. Frymoyer JW, Pope MH, Clements JH et al. (1983). Risk factors in low-back pain. An epidemiological survey. *J Bone Joint Surg Am*, 65(2):213-8.
8. Sjolie AN (2004). Persistence and change in non-specific low back pain among adolescents: a 3-year prospective study. *Spine (Phila Pa 1976)*, 29(21):2452-7.
9. Hartvigsen J, Lings S, Leboeuf-Yde C et al. (2004). Psychosocial factors at work in relation to low back pain and consequences of low back pain; a systematic, critical review of prospective cohort studies. *Occup Environ Med*, 61(1):e2.
10. Feyer AM, Herbison P, Williamson AM et al. (2000). The role of physical and psychological factors in occupational low back pain: a prospective cohort study. *Occup Environ Med*, 57(2):116-20.
11. Videman T, Ojajarvi A, Riihimäki H et al. (2005). Low back pain among nurses: a follow-up beginning at entry to the nursing school. *Spine (Phila Pa 1976)*, 30(20):2334-41.
12. Moroder P, Runer A, Resch H et al. (2011). Low back pain among medical students. *Acta Orthop Belg*, 77(1):88-92.
13. Nowotny-Czupryna O, Czupryna K, Bał K, et al. (2013). Postural habits of young adults and possibilities of modification. *Ortop Traumatol Rehabil*, 15(1):9-21.
14. Falavigna A, Teles AR, Mazzocchin T, et al. (2011). Increased prevalence of low back pain among physiotherapy students compared to medical students. *Eur Spine J*, 20(3):500-5.
15. Gorenstein C, Andrade L, Vieira Filho AH, et al. (1999). Psychometric properties of the Portuguese version of the Beck Depression Inventory on Brazilian college students. *J Clin Psychol*, 55(5):553-62.
16. Craig CL, Marshall AL, Sjöström M et al. (2003). International physical activity questionnaire: 12 country reliability and validity. *Med Sci Sports Exerc*, 35(8):1381-95.
17. Dionne CE, Dunn KM, Croft PR, et al. (2008). A consensus approach toward the standardization of back pain definitions for use in prevalence studies. *Spine (Phila Pa 1976)*, 33(1):95-103.
18. Dionne CE, Dunn KM, Croft PR (2006). Does back pain prevalence really decrease with increasing age? A systematic review. *Age Ageing*, 35(3):229-34.
19. Mitchell T, O'Sullivan PB, Burnett A et al. (2010). Identification of modifiable personal factors that predict new-onset low back pain: a prospective study of female nursing students. *Clin J Pain*, 26(4):275-83.
20. Rok S, Wytrazek M, Bilski B (2005). Efficacy of therapeutic exercises in low back pain surveyed in a group of nurses. *Med Pr*, 56(3):235-9.
21. Koldaş Doğan S, Sonel Tur B, Kurtaiş Y et al. (2008). Comparison of three different approaches in the treatment of chronic low back pain. *Clin Rheumatol*, 27(7):873-81.