

Original Article

Assessment of Risk Factors for Chronic Low Back Pain in Adult Male

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Abstract:

Chronic low back pain (CLBP) is an important health problem in Bangladeshi adult males. This case control study was carried out in the department of Physical Medicine and Rehabilitation, BSMMU, Dhaka from January 2015 to December 2015 to determine the association between CLBP and family history, smoking, level of education, level of income, level of exercise, bad posture and BMI in adult male. Total 171 patients with CLBP were taken as cases, and 171 male without CLBP were taken as controls. Data were collected using a structured interviewer-administered questionnaire, enquiring about demographic data and details of risk factors. Heights and weights were measured to calculate body mass index (BMI). Age range was 18 to 60 years. Mean age (\pm SD) for cases was 35.8 \pm 11 years and that of controls was 37.2 \pm 13 years. It was found that Bad posture (p value <.001), lack of exercise (p value <.001) and moderate level of education (p value .044) were significant risk factors for CLBP. Family history, smoking, level of income and BMI did not have a significant association with CLBP.

Key words: Low back pain (LBP), Chronic low back pain (CLBP), Risk factors.

Introduction:

LBP is very common, experienced at some time in life by up to 80% of population¹. It is defined as pain and discomfort, localized below the costal margin and above the inferior gluteal folds, with or without referred leg pain. When it persists for at least 12 weeks, it is defined as CLBP². In 7% to 10% of cases, LBP becomes chronic³. This is a major cause of disability and an important driver of health care costs worldwide⁴. It is possible to establish a well-defined pathology in only about 15% of patients². Though a fairly common health problem, risk factors have not been completely elucidated⁵.

Being overweight has a significant association with lumbar and sacral radicular pain⁶. However, according to some studies, increased BMI did not have a significant association with development of LBP⁷.

A non-significant lowered risk of LBP was found in men who exercise regularly 3-4 times per week or more than those who did not exercise regularly⁷. Recent research indicates that heredity may be largely responsible for degeneration as well as herniation of intervertebral discs⁸. The rate of progression of disc degeneration might be controlled by genetic factors⁹.

The largest occupational risk factor is to bend or twist several times an hour¹⁰. Frequent lifting of objects weighing 11.3 kg or more with the arms extended and knees straight is a major risk factor for disc herniation¹¹.

Individuals with college degrees or higher education have a lower chance of experiencing LBP than those with only a high school education or even college drop outs⁷. A long history of smoking has a significant association with LBP and lumbar and sacral radicular pain⁶. While other studies show no significant association⁷. Having a high socioeconomic background had a protective effect against persistent LBP⁷.

Prevalence of CLBP more than doubled in the 14-year interval from 3.9% in 1992 to 10.2% in 2006¹². Chronic

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back pain affects about 20% of the population in Bangladesh in each year between the age group 30-60 years¹³. Until now very few studies of the association between factors related to CLBP have been carried out in a representative sample of Bangladeshi population. Therefore, it is clear that there is a need to determine the factors related to CLBP. Present study was designed to assess relationships between level of education, level of income, smoking, family history, BMI, working posture and exercise with CLBP among Bangladeshi adult male.

Materials and Methods:

This case control study was carried out in adult male patient attended at outpatient department of Physical Medicine & Rehabilitation, BSMMU, Dhaka from June 2015 to December 2015.

Subjects who had continuous LBP with or without radiation to lower limbs for 3 months or more and were aged within 18 to 60 yrs, were selected as cases. Patients who had LBP due to other causes such as spinal tumors, infections and trauma were excluded. Patients who did not suffer LBP at the time of questioning were included as controls. Literacy rate was selected as variable to determine the sample size and there was an expected odd ratio (OR) of 2, power of 80% and significance level of 0.05. Ethical approval was obtained from the IRB of BSMMU, Dhaka.

A structured questionnaire administered by the interviewer was used for collecting the information, which included questions relating to personal data and details of risk factors. Family history was categorized as positive when any first-degree relative had a history of chronic LBP¹⁴. Level of smoking was graded according to the extent of smoking in pack years (PY). They were classified into 5 groups: Individuals who never smoked Group 1, a smoker who stopped smoking in the past Group 2, smoker with 10 PY or less Group 3, smoker with 10-20 PY Group 4, smoker with 20 PY or more Group 5⁷. Monthly income was graded into three groups, grade 1 or low less than Tk. 5000; grade 2 or medium Tk. 5000 to Tk. 15000; grade 3 or high more than Tk. 15000. Level of education was graded into Grade 1 (low): not attended school or attended up to class five; grade 2 (moderate): class six to higher secondary education; grade 3 (high): higher education.

Activities such as walking, running and swimming was considered under the exercise category. Level of exercise was graded as grade 3 or regular (frequency of at least 3 days per week for a minimum period of 30 min each day), grade 1 or rare (frequency less than once a week) and grade 2 or occasional (all other levels of exercise)¹⁴. Harmful physical activities (bad posture) with regard to CLBP, such as mechanical work in a

stooping position, pulling water from a well without a pulley, lifting heavy objects, sitting for long hours in one place in an uncomfortable position (i.e. back unsupported), was considered under bad posture. This variable was graded as grade 3 or regular (frequency of at least 5 days per week for a minimum period of 60 min each day), grade 1 or rare (frequency less than once a week) and grade 2 or occasional¹⁴.

Heights and weights were measured and BMI was calculated. The participants was grouped according to the classification for South Asians into grade 1 or underweight (BMI less than 18.4), grade 2 or normal (BMI 18.5 to 22.9), grade 3 or over weight (BMI 23-27.4) and grade 4 or obese (27.5 or higher)¹⁵.

Statistical analysis was carried out using SPSS version 16. Continuous data were described using means and standard deviations. Categorical data were described using percentages. Bivariate analysis was done using the chi square (χ^2) test. Multivariate analysis was done using the binary logistic regression model. ORs were calculated to determine the strength of association.

Results:

The final sample consisted of 171 cases and 171 controls. Age of study populations ranges from 18 to 60 years with a mean age of 35.8±11 years. Mean age of controls was 37.2±13 years.

Bivariate analysis shows; family history, smoking, level of education, level of income, level of exercise, bad posture, BMI had significant associations with CLBP (Table I).

However, according to the results of logistic regression, only three out of the seven risk factors had a significant independent association with CLBP. Bad posture, lack of regular exercise and moderate level of education had a significant association with CLBP. Family history, Smoking, level of income, BMI did not have a significant association with CLBP.

Bad posture had a significant positive association with LBP ($p < 0.001$). People in the grade 3 (regular) bad posture group had the highest risk of developing CLBP (Table II).

Regular exercise had a significant negative association with CLBP ($p < 0.001$). People in the grade 3 exercise groups had the lowest chance of developing CLBP (Table II).

Level of education had a significant association with CLBP (<0.05). People in low (grade 1) and high (grade 3) educational groups had a lesser chance of developing CLBP compared to people in the (moderate) grade 2 education group (Table II).

Table I: Association between low back pain and risk factors (Case 71, control 171)

Variable	No. Cases (%)	No. Control (%)	OR (95% CI)*
Family history			
Present	61 (35.7)	53 (31)	1.23 (0.787-1.937)
Absent	110 (64.3)	118 (69)	1
Smoking			
Never smoked	83 (48.5)	92 (53.8)	1
Stopped in past	32 (18.7)	30 (17.5)	1.182 (0.662-2.111)
Up to 10 PYs	35(20.5)	29(17.0)	1.338 (0.753-2.377)
10 to 20 PYs	13(7.6)	13(7.6)	1.108 (0.486-2.523)
>20 PYs	8(4.7)	7(4.1)	1.267 (0.440-3.645)
Level of education			
Low	64 (37.4)	50 (29.2)	2.339 (1.304-4.198)
Moderate	78 (45.6)	68 (39.8)	2.096 (1.201-3.661)
High	29 (17.0)	53 (31.0)	1
Level of income			
Low	17 (9.9)	10 (5.8)	2.345 (1.001-5.492)
Medium	96 (56.1)	81 (47.4)	1.635 (1.043-2.562)
High	58 (33.9)	80 (46.8)	1
Level of exercise			
Rare	114 (66.7)	68 (39.8)	4.066 (2.599-6.359)
Occasional	7 (4.1)	7 (4.1)	1.92 (0.638-5.779)
Regular	50 (29.2)	96(56.1)	1
Bad posture			
Rare	24 (14.0)	86 (50.3)	1
Occasional	18 (10.5)	18 (10.5)	3.583 (1.619-7.933)
Regular	129 (75.4)	67 (39.2)	6.899 (4.019-11.842)
BMI			
18.4 or less	13 (7.6)	16 (9.4)	1
18.5 to 2.9	72 (42.1)	50 (29.2)	1.772 (0.784-4.008)
23 to 27.4	65 (38.0)	73 (42.7)	1.096 (0.490-2.450)
27.5 or higher	21 (12.3)	32 (18.7)	0.808 (0.323-2.018)

*OR=Odds ratio, CI=Confidence interval

Discussion:

In Bangladesh, there are not many published studies available with regard to risk factors for CLBP among Bangladeshi adult male.

In the present study, the association between CLBP and bad posture was very strong ($p < 0.001$) (Table II). Study on adult Sri Lankan women has found a significant association between bad posture and CLBP¹⁶. The largest occupational risk factor for LBP is to twist or bend several times a hour¹⁰. Bad posture increases intramuscular pressure in the Para-spinal muscles and this rise in pressure can lead to muscle fatigue¹⁷.

In this study regular exercise had a significant protective effect on LBP ($p < 0.001$) (Table II). Previous studies from other countries have also indicated that physical exercise is useful in preventing CLBP¹⁶. Regular exercises help to prevent osteoporosis¹⁸.

Table II: Results of logistic regression

Variable	Family history	p value	OR (95% CI)
Family history	Positive	0.115	1.490(0.908-2.447)
Smoking	Never smoked	0.787	1.165(0.386-3.520)
	Stopped in past	0.616	1.354(0.415-4.422)
	Up to 10 PYs	0.371	1.726(0.522-5.702)
	10 to 20 PYs	0.820	1.170(0.301-4.545)
	>20 PYs	-	-
Level of education	Low	0.090	1.799(0.912-3.546)
	Moderate	0.044(<0.05)	1.858(1.018-3.392)
	High	-	-
Level of income	Low	0.118	2.106(0.828-5.352)
	Medium	0.131	1.482(0.889-2.469)
	High	-	-
Level of exercise	Rare	0.000(<0.05)	3.106(1.950-4.948)
	Occasional	0.190	2.138 (0.686-6.667)
	Regular	-	-
Bad posture	Rare	-	-
	Occasional	0.063	0.502(0.243-1.039)
	Regular	0.000(<0.05)	0.148(0.085-0.258)
BMI	18.4 or less	0.617	1.295(0.470-3.566)
	18.5 to 22.9	0.150	1.699(0.825-3.497)
	23 to 27.4	0.450	1.314(0.647-2.667)
	27.5 or higher	-	-

In addition to preventing osteoporosis, regular exercises help in strengthening of spinal and abdominal muscles¹⁹. These reasons explain the usefulness of physical exercise in preventing CLBP.

According to this study, level of positive family history had no significant association with CLBP. According to certain previous studies from other countries, positive family history has been found to be significantly associated with CLBP¹⁴. Recent research from other countries indicates that heredity may be largely responsible for disc degeneration and disc degeneration is an important cause of LBP⁸. Strong muscles around the spine and abdomen are important in preventing the development of LBP¹⁹. The skeletal muscle fiber types have different capabilities and are genetically dependent²⁰. One reason for this insignificant association with CLBP and family history in my study could be recall bias. Due to lack of medical records running through generations we were unable to verify the information regarding family history of LBP using documentary sources. Another reason may be these studies have been performed on different races and different countries.

In the present study, level of education had a significant association with CLBP ($p = 0.044$) (Table II). A person with a moderate education level (class six to H.S.C) had a two-fold greater chance of developing CLBP compared to a person with an education higher than school level (higher education group). However, a person who has not gone to school or followed education up to the primary level had a negative association with CLBP (Table II). Previous studies have also demonstrated that people with higher education levels have lower chances of experiencing LBP than those with lower levels of education⁷. Physical exercise is important in the management of LBP²¹. Level of education had a positive association with exercise habits²². People with higher levels of education were involved in consuming diets rich in calcium and proteins and not indulging in smoking compared to people with low levels of education²³. Therefore, Bangladeshi male who fell into the high education group, similar to those in other countries, may be more involved in healthy life styles than people with lower levels of education. The people who fell into the lowest education group may be involved in beneficial activities, such as walking more frequently, as compared to people in the moderate and high education groups, due to lack of transport because of poorer income. Walking is a beneficial exercise that helps to prevent LBP²⁴. Therefore, this may be a reason why people in the grade 1 education group had a negative association with CLBP.

This study could not find an association between level of smoking and CLBP. Certain studies done in other countries have also not been able to find an association between smoking and LBP⁷. However, other studies have found an association between smoking and LBP⁶. These studies have been performed on different races and different countries and these may be contributing to the different study findings.

According to the results of this study, level of income had no significant association with CLBP. In a previous study among Sri Lankan male, the level of income did not have a significant association with CLBP¹⁴. According to certain previous studies from other countries, socioeconomic status has been found to be significantly associated with LBP²². Level of income is only one component of socioeconomic status. Therefore, although socioeconomic status has a significant association with LBP, level of income may not have a significant association with CLBP.

Present study could not find a significant association between CLBP and BMI. However previous studies from other countries have found a significant association between LBP and being overweight⁶. Some studies have failed to find an association between LBP

and being overweight⁷. In the present study on men, the majority of the study subjects who were in the overweight and underweight categories were marginally overweight or underweight. Being marginally overweight or underweight has not been found as risk factors for CLBP even in previous studies¹⁴. These could be reasons why LBP did not have a significant association with BMI.

Conclusion:

This study showed that bad posture, exercise and moderate level of education had significant associations with chronic low back pain. Positive family history, smoking regularly, monthly income and BMI were not significantly associated with chronic low back pain. A majority of patients in this study, in both cases and controls, did not follow a correct posture while engaging in daily activities and did not participate in regular physical activities such as walking, running and swimming. In practice, the results of this study can help to promote in healthy lifestyle, ergonomic measurement and control, good posture and execution educational programs and consider resting periods during the work shift. It was hospital based unmatched case control study and this did not cover all the areas. So, further study is strongly recommended to include the persons from the community or all over the Bangladesh to ensure the generalization of this study.

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