

“To Evaluate the Different Causes and Preventive Measures of Low Back Pain: A Retrospective Study”

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Abstract: *Introduction:* Most epidemiological data concerning low back pain (LBP) are related to developed and industrialized countries but little information about LBP in the general population in developing and low-income countries. Back pain affects 60-80% of people at some time in their lives. Acute low back pain is one of the most common reasons for adults to see a family physician. Although most patients recover quickly with minimal treatment, proper evaluation is imperative to identify rare case of serious underlying pathology. *Aim of the study:* The aim of the study is to evaluate the different causes of low back pain, occupational and risk factors, association with age and sex of the patient and their life styles. *Materials and Methods:* The present study is a retrospective study of 300 patients of low back pain between the age group of 31-70 years of both sexes who were admitted and treated at Dept. of Forensic Medicine, Kushtia Medical College Hospital, Kushtia, Bangladesh from January 2020 to December 2020. The information was collected from the patients regarding their occupation, education, obesity, smoking, tuberculosis, diabetes, alcohol consumption, osteoporosis, Osteoarthritis and history of trauma. The provisional diagnosis of cases was done and confirmed radiologically. A proforma was prepared and the patient's age, sex, duration of symptoms, place of living and the cause for low back pain was noted. A neurological examination of the lower limbs was performed. *Results:* The author tabulated 300 patients of low back pain into four categories according to age and noted the number of cases in each group. The highest number of cases (124) is observed in the age group of 31-40 years (41%) and the lowest number of cases (45) is observed in the age group of 51-60 years (15%). All patients were thoroughly interrogated (occupational, trauma, infection, diabetes mellitus, smoking, alcohol and medication history), subjected to a rigorous clinical examination and a battery of investigations. In 300 cases of LBP studied, the most common cause for back pain was disc prolapse (44%). The next common causes were lumbar spondylosis, spondylolisthesis and lumbar spinal stenosis (17%, 10% & 10% respectively). The study found association between low back pain and various factors. Prevention is the best strategy for avoiding low back pain but is realistically hard to practice because the problem of low back pain has many environmental and intrinsic risk factors. *Conclusion:* Low back pain affects a large proportion of the population and is difficult to diagnose. Physicians must accept the diagnostic ambiguity that often accompanies the condition. Identification of etiological and risk factors, cause for back pain and type of occupation and instituting preventive measures, as well as rehabilitation of patients can lead to a meaningful reduction in the incidence of debilitating back pain.

Keywords: Low back pain, lumbar region, risk factors, evaluation, patients, prevention.

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INTRODUCTION

Most epidemiological data concerning low back pain (LBP) are related to developed and industrialized countries but little information about LBP in the general population in developing and low-income

countries. The lack of research leaves a profound gap in the knowledge of LBP in a large part of the world, where the bulk of the world's working population resides [1]. International surveys of LBP report a point prevalence of 15-30%, and a 1-month prevalence of 19

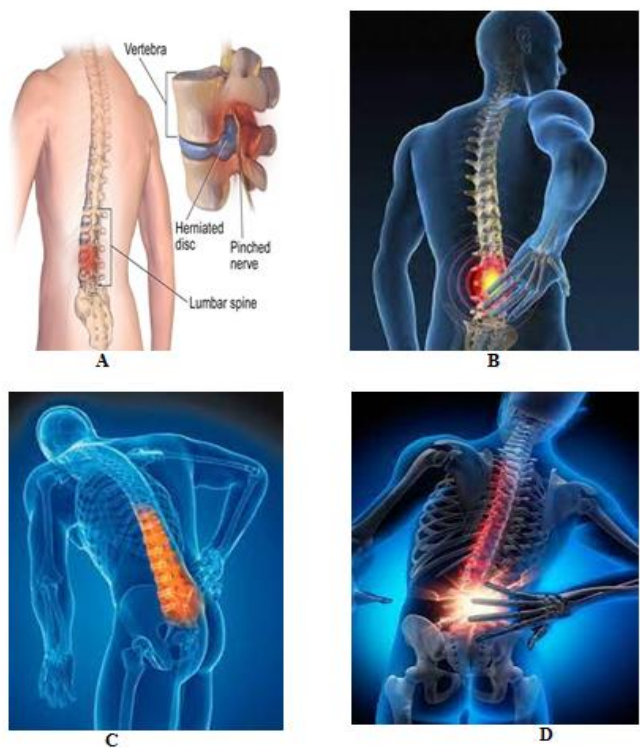
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- 43% [2]. Worldwide estimates of lifetime prevalence of LBP vary from 50 to 85% [1-3]. LBP is a ubiquitous health problem, representing one of the most frequent illnesses of mankind. It is often controversial, frustrating, and challenging for clinicians. Low back pain is the pain of variable duration in the lumbar region of the spine. It is a cause of physical morbidity and disability. In recent times it has become a major medical concern across the globe. Low back pain occurs as a result of multiple factors. Patient education and medications are beneficial. Most persons will experience acute low back pain during their lifetime. The first episode usually occurs between 20 to 40 years of age. Pain can be moderate to severe and debilitating, causing anxiety. Many cases of acute LBP are self-limiting and resolve with little intervention. However, many patients with acute LBP go on to develop chronic LBP. Chronic LBP is the most common cause of disability among people younger than 45 years and the third most common cause of disability among people aged 45-64 years [4]. LBP is the primary cause of activity limitation in both men and women. It affects day-to-day activities and also the performance at workplace. Acute LBP is often nonspecific and therefore cannot be attributed to a definite cause. Recurrent episodes usually are more painful with increased symptoms. LBP occurs as a result of multiple etiologies. It has a variable magnitude for different ethnic and age groups. The consequences of back pain are felt not only by the patient but also by family members, and society as a whole. The knowledge of LBP will create awareness in society of causes and risk factors associated with LBP which may be of help in taking preventive measures. LBP is a major public health problem, worldwide, which causes pain, functional disability and poor quality of life. It is a common diagnosis resulting in absence from work. It is frequently cited as a significant economic burden and the cause of much personal hardship. In Bangladesh, occurrence of LBP is alarming; nearly 60% of the people in Bangladesh have significant back pain at some time or the other in lives. It affects people from all strata of the society. Most of the low-income group people in our country are engaged in physically demanding jobs. In upper group also, lack of physical activity leads to obesity and back pain. LBP may be due to involvement of the vertebral bodies, intervening discs, ligaments, muscles, nerves, or other structures in the spine. The pain may be constant or intermittent, experienced in one site or radiating to other areas. In spite of lot of literature available on this topic there are still many lacunae in our understanding of this disease entity. It is evident, therefore, that this is a disease, which requires finding of cause, effective treatment and merits the closest study. Identification of the risk factors of back pain can assist the physician in taking preventive measures and rehabilitating patients. Low back pain is defined as a non-specific condition that refers to complaints of acute or chronic pain and discomfort in or near the lumbar region. It is an

extremely common phenomena, a price mankind has to pay for their upright posture. 70% of acute back pain recovers with rest. Pain recurs in 70%. There are two types of back pain: Inflammatory, which are worst in the morning (after rest) and mechanical, which come up after exertion. Most common cause of backache is bad posture, which increases the strain on the disc and ligaments causing faster disc degeneration. The intervertebral discs and facet joints are the major units that work together to maintain the spinal kinematics. Muscle weakness, ligament injury, broken bones or damage to the intervertebral disc can all lead to abnormal biomechanics, and in the development of low back pain. A number of risk factors are associated with LBP. The modifiable risk factors include life style (like physical activity, poor muscle strength, obesity, smoking) and occupational (heavy lifting, twisting, bending, stooping, prolonged sitting, awkward posture at work). The non-modifiable risk factors include increasing age, number of children, a previous episode of LBP and major spinal deformities. The aim of the study is to evaluate the different causes of low back pain, aetiological, occupational and risk factors, association with age and sex of the patient and their life styles. All the factors of low back pain were compared with previous studies and conclusions to be drawn.

MATERIALS AND METHODS

The present study is a retrospective study of 300 patients of low back pain between the age group of 31-70 years of both sexes who were admitted and treated at Dept. of Forensic Medicine, Kushtia Medical College Hospital, Kushtia, Bangladesh from January 2020 to December 2020. The information was collected from the patients regarding their occupation, education, obesity, smoking, tuberculosis, diabetes, alcohol consumption, osteoporosis, Osteoarthritis and history of trauma. The provisional diagnosis of cases was done and confirmed radiologically. A proforma was prepared and the patient's age, sex, duration of symptoms, place of living and the cause for low back pain was noted. A neurological examination of the lower limbs was performed. The results were analyzed and recorded. The battery of investigations included clinical examination like measurement of height, weight and neurological examination; Blood tests like complete blood count, erythrocyte sedimentation rate, fasting blood sugar, serum calcium and alkaline phosphatase, serum creatinine and phosphorous, protein electrophoresis, serum uric acid and rheumatoid factor; urine analysis including Bence Jones proteins; imaging included plain X-ray of the lumbosacral spine, AP and lateral views, plain X-ray of the chest, films of Computed Tomography (CT scan) and Magnetic Resonance Imaging (MRI Scan). All the findings were entered in the proforma. The descriptive measures included count and percentage. All the data were checked and edited after collection. Then the data were entered into computer and statistical analysis of the results was obtained by using windows based computer



Pic: Symptoms, Causes, Preventing Low Back Pain.

RESULTS

Age Wise Distribution in Study Population

The author tabulated 300 patients of low back pain into four categories according to age and noted the number of cases in each group. As shown in fig. 1, the highest number of cases (124) is observed in the age group of 31-40 years (41%) and the lowest number of cases (45) is observed in the age group of 51-60 years (15%).

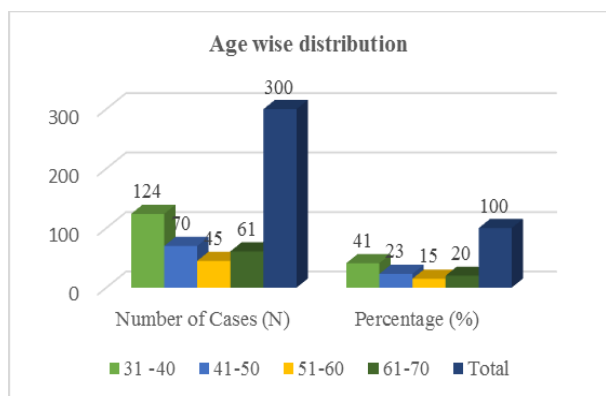


Fig-1: Age wise distribution in study population.

Sex Wise Distribution in Study Population

Among 300 cases of low back pain studied, there were 138 males (46%) and the number of females was 162 (54%) as shown in fig. 2.

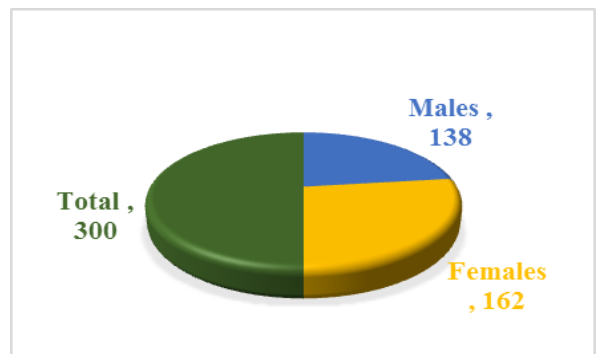


Fig-2: Sex wise distribution in study population.

Age and Sex Wise Distribution in Study Population

As evident in table 1, among 300 cases of low back pain studied, the highest percentage of male (51%) and the highest percentage of female (33%) were found in the age group of 31-40 years.

Table 1: Age and sex wise distribution in study population.

Age Group	Male		Female		Total
	No. of cases	%	No of cases	%	
31-40	70	51	54	33	124
41-50	28	20	42	26	70
51-60	15	11	30	19	45
61-70	25	18	36	22	61
Total	138		162		300

Association of Smoking with Low Back Pain

Out of 138 males of low back pain, there were 50 smokers (36%) and 88 non-smokers (64%) as shown in fig. 3.

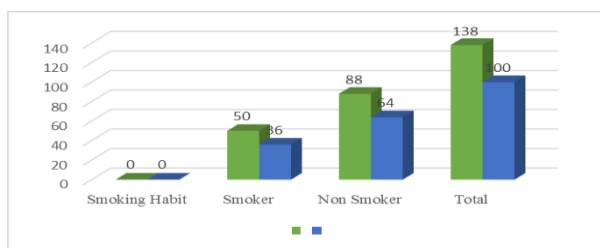


Fig.-3: Distribution of smoking habit in males.

Distribution of Study Population Based on Occupation in Males

Under sedentary category there were 70 cases (51%) suffering with back pain. In manual group 40 cases (29%) were identified. There were 28 cases (20%) of backache associated with mainly sitting occupational group. The findings are shown in fig. 4.

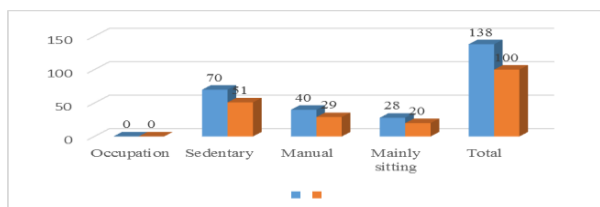


Fig.-4: Distribution of occupation in males.

Distribution of Study Population Based on Occupation in Females

Under the category of housewives there were 107 cases (66%) suffering with backache. In manual group (moderate to heavy physical work) 21 cases (13%) were identified. There were 34 cases (21%) of backache associated with sedentary work. The findings are shown in fig. 5.

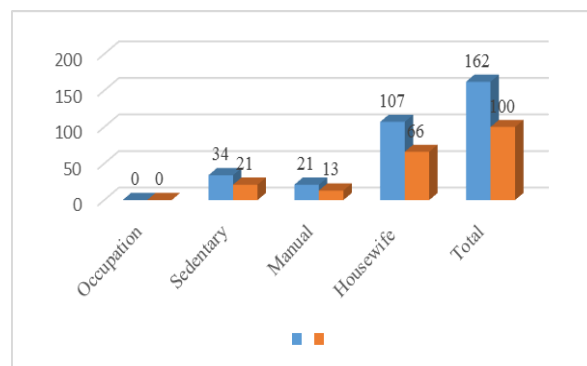


Fig.-5: Distribution of occupation in females.

Weight of the Study Population According to Sex

In 300 cases of LBP, 98 cases (33%) is weighing less than 60 kg. In 139 cases (46%) weight was between 60-69 kg. There were 21 cases (7%) under 70-79 kg. In 29 cases (10%) weight was between 80-89 kg. There were 13 patients (4%) with weight more than 90 kg. The findings are shown in table 2.

Table-2: Weight of study participants according to sex.

Weight (Kg)	No. of Males	No. of Females	Total No. of cases (N)	Percentage (%)
Less than 60	23	75	98	33
60-69	88	51	139	46
70-79	17	04	21	07
80-89	05	24	29	10
More than 90	05	08	13	04
Total	138	162	100	100

Area Wise Distribution in Study Population

Out of 300 cases studied, 72 cases (24%) of LBP came from rural areas for evaluation, treatment and follow up. In this group there was a higher

incidence in females (28%). Similarly, there were 228 cases (76%) of LBP from urban area. This group showed a higher incidence in males (81%) shown in table 3.

Table-3: Area wise distribution in study population.

Sex	Rural		Urban	
	No	%	No	%
Male	26	19	112	81
Female	46	28	116	72
Total	72	24	228	76

Distribution of Study Population Based on Educational Level

According to educational status, the study population was divided into 4 categories- Illiterate,

primary, secondary and higher level. The findings are shown in table 4. It is observed that most of the study population were either illiterate or had just primary education.

Table-4: Distribution of educational level.

Level	Males (138)		Females (162)	
	Number (N)	%	Number (N)	%
Illiterate	42	30	76	42
Primary	40	29	36	40
Secondary	32	23	24	32
Higher	24	17	26	24

Association of Risk Factors with Low Back Pain

The following risk factors of low back pain were studied: Obesity, smoking, diabetes and alcohol consumption. There were 54 cases of obesity (18%), 50

cases of smoking (36%), 47 cases of diabetes (16%) and 45 cases of alcohol consumption (15%). The findings are shown in table 5.

Table-5: Distribution of risk factors.

Risk factor	No. of cases (N)	Percentage (%)
Obesity	54	18
Smoking	50	36
Diabetes	47	16
Alcohol consumption	45	15

Association of aetiological factors with low back pain

The following aetiological factors of low back pain were studied: Tuberculosis, steoporosis, osteoarthritis and depression. There were 13 cases of

tuberculosis (4%), 33 cases of osteoporosis (11%), 26 cases of osteoarthritis (9%) and 9 cases of depression (3%). The findings are shown in table 6.

Table-6: Distribution of aetiological factors.

Aetiological Factors	No. of cases (N)	Percentage (%)
Tuberculosis	13	4
Osteoporosis	33	11
Osteoarthritis	26	9
Depression	9	3

Association of Physical Risk Factors oith Low Back Pain

In 300 cases of low back pain studied, there were 122 cases of heavy physical work (41%), 57 cases

of prolonged sitting/standing (19%), 50 cases of definite history of fall/trauma (17%) and 35 cases of bad posture (12%). In 36 cases the cause for backache is unknown (12%). The findings are shown in table 7.

Table-7: Distribution of physical risk factors.

Physical risk factors	No. of cases (N)	Percentage (%)
Heavy physical work	122	41
Bad posture	35	12
Prolonged sitting / standing	57	19
H/o fall / trauma	50	17
Unknown	36	12
Total	300	100

Distribution of Causes of Low Back Pain in Study Population

In 300 cases of LBP studied, the most common cause for back pain was disc prolapse (44%). The next

common causes were lumbar spondylosis, spondylolisthesis and lumbar spinal stenosis (17%, 10% & 10% respectively). The results are shown in table 8.

Table-8: Distribution of causes of low back pain.

Cause	Males	Females	Total no of cases (N)	Percentage (%)
Lumbar spondylosis	14	37	51	17
Disc prolapse	72	61	133	44
Spondylolisthesis	14	16	30	10
Lumbar spinal stenosis	15	15	30	10
Fractures	12	16	28	09
Tuberculosis (Koch's) spine	04	09	13	04
Others	07	08	15	06
Total	138	162	300	100

DISCUSSION

In view of the fact that adults constitute the majority of the active work force in the society, it is recommended that risk factors of back pain be more precisely identified in order to accelerate the rehabilitation of affected patients. Disc prolapse was the most common cause of LBP in accordance with other studies. Age was a risk factor for LBP in this study as reported by previous authors [5-9] and yet other studies have indicated that age is not a significant risk factor for LBP [10-15]. Few studies showed that the risk of age for LBP differed according to the kind of pain or the duration of the pain [16, 17]. Some studies have reported that the prevalence of LBP increases with age [18-20]. It is observed that more number of patients with back pain was aged between 31 to 60 years [6, 7]. Gender differences in the prevalence of LBP are frequently observed, but might differ in degree from country to country [21-24]. The association of LBP with gender has been reported in previous studies [11, 18, 19, 25, 26]. LBP has also been shown to be more common among women than men in some occupations [6, 20, 26-30], whereas it is more frequent for men than for women in other occupations [19]. In the present study, the prevalence of LBP was higher among women than men. Few studies observed no gender specific backache [5, 12, 13, 31-33]. Osteoporosis, rheumatoid arthritis, etc., are more common in females, while ankylosing spondylitis, trauma, etc., are more common in males. In a study done by Leino-Arjas *et al.*, height showed an association with back pain in women [9]. While in other study the prevalence of LBP was associated with stature among men [34]. Further studies may be necessary as this association of tall stature with the occurrence of LBP was not reported in other studies [11, 35, 36]. In previous studies, there was a positive association between LBP and level of education [5, 9, 15, 37-39]. Today, low level of education seems to be a stronger determinant of back trouble than do low household income. As a component of socioeconomic status, education is individual and does not change with time like occupations and income often do. Measurement by education also avoids the problems of

comparability due to unemployment. In the present study, also it was found that the maximum number of patients with backache was either illiterate or had just primary level education. The data correlates with the findings of other studies [5, 9, 15, 37-39]. The present study showed that obesity is associated with LBP. Positive associations between overweight and LBP have been observed in previous studies [6, 13, 25, 38, 40-42]. Back pain had more influence on the life style habits on females than in males [6]. Further studies may be necessary as this association of weight with the occurrence of LBP was not reported in other studies [11, 15, 35-37]. Our findings are in agreement with those of Pande *et al.* [43]. In few studies it was found that tuberculosis is a common cause of LBP [43-45]. While in one study it was found that tuberculosis was not significantly associated with low back pain [27]. In the present study, the prevalence of TB was less probably because of early diagnosis and effective treatment. People with sedentary jobs and heavy manual work are frequently prone for back ache [6]. Poor working postures are known to increase the rate of LBP [36, 41]. More number of cases of LBP is associated with housewives [6, 40] and sedentary life [6]. The findings in our study are correlating with that of Bener *et al.* [6]. Housewives tend to do most of the work around the house. This may demand them to sit, stand or bend for long periods of time or to lift heavy weights. The severity of back pain may be doubled under stressful conditions at home. This may explain the high prevalence among housewives and partly explained the high prevalence of LBP among females in general population. Many studies have shown that heavy physical work in general is associated with LBP [2, 7, 11-13, 20, 27, 32, 37, 38, 46-50]. However, those whose work was sedentary had slightly more back pain than did those whose work contained plenty of walking. Heavy physical work involves long-term repetitive mechanical stress on structures in and around the spine, such as vertebral end-plates, intervertebral discs, muscles, tendons and ligament. This may result in injuries or evoke symptoms from already present weaknesses [12]. In accordance with other studies,

heavy physical work, prolonged sitting or standing, history of falls and repetitive work were significant risk factors for LBP in our study. An association between smoking and LBP as observed in this study has been found in several epidemiological studies [3, 5, 8, 9, 13, 27, 31, 37, 41, 42, 46-48, 51-55]. While in few studies, there was no such association [6, 12, 32]. Other studies showed that smoking is significantly related to LBP even after correcting for many factors [8, 9]. Levangie PK found a positive association between smoking and LBP when current smokers were compared with non-smokers [31]. In a review, LebouefY de, suggested that smoking should be considered a weak risk factor but not a cause of LBP [56]. In one study it was concluded that by quitting smoking, the incidence of back pain can be reduced [13]. In few studies, it was found that the prevalence of LBP increased in those with prolonged smoking [27]. Smoking leads to reduced perfusion and malnutrition of tissues in or around the spine [47, 57]. This may weaken the power of the spine's resistance to stress. It may also interfere with the healing of injuries [12]. To date, the nutrition of vertebrae and intervertebral discs has been found to be affected by smoking [47, 57]. The association between smoking and LBP has been reported to be stronger among persons who suffer from respiratory diseases [3, 47], similar to heavy physical work, chronic cough and expiratory obstruction may also involve mechanical stress on spinal structures [12]. Smoking may reflect a complex of psychological and life style factors. Smokers tend to have a lower physical and mental health status and thus show more depressive symptoms. Smoking also may vary with social class, education and occupation. No mechanism for the association between smoking and LBP has been established, but some researchers tried to explain the association. One hypothesis is that nicotine reduces the body's blood flow and nutrition supply, negatively affects tissue metabolism [47], and can increase susceptibility to injury. Another hypothesis is that smoking decreases bone mineral density and leads to higher risk of fracture [58]. The results of our study confirm the association of the occurrence of LBP with smoking habits. Smoking is also associated with psychological risk factors, such as job dissatisfaction, lack of social support, job stress, and daily physical activity. Smoking may not be a direct cause of LBP, but only a confounding factor. Moreover, while smoking may be a cause of LBP, it may also be an effect of LBP. Smoking is thought to induce mood enhancement and may reduce the subjective stress caused by LBP [59]. Further study is needed to determine which precedes, smoking or LBP. The level of urbanization in our study has some relation with low back pain in accordance with previous study [6]. Craig Desmond Smith [27] found that subjects with urinary tract infection (UTI) had a higher prevalence of LBP and found that UTI was significantly associated with LBP. In the present study also there was association between UTI and LBP. Recent studies have reported that psychological factors such as job satisfaction [60]

and job strain [60, 61] also may be risk factors for LBP. In few studies depression was significantly associated with LBP [27, 39, 40]. In a previous study, workers exposed to high stress at home and at work also suffered a significantly higher rate of LBP [60]. In present study, the highest prevalence of depression in LBP was seen in patients between 41-50 years. The findings are not correlating with the previous studies. The association of depression with back pain is more prevalent in developed countries than in developing countries, and that depression was more prevalent in women than in men. A definitive history of trauma is found to be associated with LBP. The findings in the present study are correlating with previous studies [13]. Alcohol consumption was not a significant risk factor for LBP in this study, but another study has shown that alcohol abuse is significantly more frequent among patients with LBP [62]. Back pain is common in women who have had several pregnancies. Lack of exercise leading to poor muscle tone and nutritional osteomalacia are contributory factors in the patients. In one study it was found that LBP was associated with pregnancy, industrial exposure and time spent in a car [31]. Osteoarthritis is a degenerative, progressive disorder that commonly affects the knee and the back. The most common symptom of osteoporosis is backache secondary to vertebral compression. Associations between various factors and back pain have consistently been found in a number of studies. The results of this study are in line with the previous observations. Preventing LBP is an important theoretical principle of treatment, but in practice it is difficult to implement because LBP has a variety of risk factors. Clinical findings, in combination with radiological examination in particular, and MRI enable an early diagnosis to be established in cases like tuberculosis [45]. Obese person is of a higher risk of developing LBP and it is recommended that, health education regarding weight reduction is a useful means to prevent LBP. Regular exercises like walking is of great help in adult population. Health education on posture and correct weight lifting techniques; no lifting of heavy weights; avoid prolonged sitting, standing, squatting, etc. Health education is the most important aspect to prevent back pain. Proper posture during work; using ergonomically designed chairs; taking breaks from work at regular intervals; getting up, taking a short walk and sitting again for work is a good practice. Yoga and meditation helps to combat mental and physical stress. Keeping realistic goals and philosophical attitude defuses mental tension and prevents burn out. High protein and calcium rich diet for osteoporosis patients; adequate rest; use of pain killers, muscle relaxants, supports like belt etc. are useful.

CONCLUSION

Low back pain affects a large proportion of the population and is difficult to diagnose. Physicians must accept the diagnostic ambiguity that often accompanies

the condition. Identification of etiological and risk factors, cause for back pain and type of occupation and instituting preventive measures, as well as rehabilitation of patients can lead to a meaningful reduction in the incidence of debilitating back pain. Special attention should be given to the education of housewives in terms of low back protection, healthy nutrition, and family planning. Poverty seems to be a significant barrier to patient presentation to physicians, requiring extended social security coverage. It is important to take comprehensive preventive measures to address a range of work and life conditions that can be improved to decrease the incidence of low back pain. Within the public health context it is important to prevent injuries and painful conditions by addressing modifiable risk factors.

REFERENCES

- Volinn, E. (1997). The epidemiology of low back pain in the rest of the world: a review of surveys in low-and middle-income countries. *Spine*, 22(15), 1747-1754.
- Nachemson A, Jonsson E. (2000). The scientific evidence of causes, diagnosis and treatment. Lippincott Williams & Wilkins, 165-183.
- Leboeuf-Yde C, Yashin A, Lauritzen T. (1996). Does smoking cause low back pain? Results from a population-based study. *J Manip Physiol Therap*, 19:99-108.
- Kuritzky L. (1997). Low back pain. *Compr Ther*, 23: 332-336.
- Otani, T., Iwasaki, M., Ohta, A., Kuroiwa, M., Sasazawa, Y., Suzuki, S., & Aoki, S. (2002). Low back pain and smoking in a community sample in Japan. *Journal of Occupational Health*, 44(4), 207-213.
- Bener A, Alwash R, Gaber T, Lovasz G. (2003). Obesity and low back pain. *Coll Antropol*, 27(1): 95-104.
- Sanya AO, Omokhodion FO, Ogwumike OO. (2005). Risk factors for low back pain among hospital workers in Ibadan, Oyo State, Nigeria. *Journal of the Nigerian Society of Physiotherapy*, 15(2): 31-34.
- Eriksen WB, Brage S, Bruusgaard D. (1997). Does smoking aggravate musculoskeletal pain? *Scand J Rheumatol*, 26: 49-54.
- Leino-Arjas P; 1998). Smoking and musculoskeletal disorders in the metal industry: a prospective study. *Occup Environ Med.*, 55: 828-833.
- Skov T, Borg V, Orhede E. (1996). Psychological and physical risk factors for musculoskeletal disorders of the neck, shoulders and lower back in sales people. *Occup Environ Med*, 53: 351-356.
- Burdorf A, Sorock G. (1997). Positive and negative evidence of risk factors for back disorders. *Scand J Work Environ Health*, 23: 243-256.
- Eriksen W, Natvig B, Bruusgaard D. (1999). Smoking, heavy physical work and low back pain: A fouryear prospective study. *Occup Med (Lond)*, 49(3): 155-160.
- De Costa C, Honeyman and Jacob; 2002: 1-45.
- Kim NH, Lee HM, Yoo JD, Suh JS. (1999). Sacroiliac joint tuberculosis – classification and treatment. *Clin Orthop Relat Res*, 358: 215-222.
- Kwon MA, Shim WS, Kim MH, Gwak MS, Hahm TS, Kim GS et al. (2006). A correlation between low back pain and associated factors: a study involving 772 patients who had undergone general physical examination. *J Korean Med Sci*, 21(6):1086-1091.
- Lipscomb HJ, Dement JM, Loomis DP, Silverstein B, Kalat J. (1997). Surveillance of workrelated musculoskeletal injuries among union carpenters. *Am J Ind Med*, 32: 629-640.
- Leboeuf-Y de C, Lauritsen JM, Lauritzen T. (1997). Why has the search for causes of low back pain largely been non conclusive? *Spine*, 22: 877-881.
- Bejia I, Younes M, Jamila HB, Khalfallah T, Ben Salem K, Touzi M et al. (2005). Prevalence and factors associated to low back pain among hospital staff. *Joint Bone Spine*, 72:254-259.
- Fabunmi AA, Aba SO, Odunaiya NA. (2005).Prevalence of low back pain among peasant farmers in a rural community in South West Nigeria. *Afr J Med Sci.*, 34: 259-262.
- Ghaffari M, Alipour A, Jensen I, Farshad AA, Vingard E. (2006).Low back pain among Iranian industrial workers. *Occup Med (Lond)*, 56(7): 455-460.
- Leino PI, Berg MA, Puska P. (1994). Is back pain increasing? Results from national surveys in Finland during 1978/9-1992. *Scand J Rheumatol*, 23: 269-276.
- Kuwashima A, Aizawa Y, Nakamura K, Watanabe M. (1997). National survey on accidental low back pain in work place. *Ind Health*, 35: 187-193.
- Morken T, Riise T, Moen B, Hauge SHV, Holien S, Langedrag A et al. (2003). Low back pain and widespread pain predict sickness absence among industrial workers. *BMC Musculoskelet Disord*, 4: 21.
- Guo HR, Chang YC, Yeh WY, Chen CW, Guo YL. (2004). Prevalence of musculoskeletal disorders among workers in Taiwan: a Nation wide study. *J Occup Health*, 46: 26-36.
- Mohammed H, Tarawneh M, Mahadine Z. (2000). The association of low back pain with obesity in one of the primary health care centres. *Bahrain Med Bull.*, 22(1). Available from http://www.bahrainmedicalbulletin.com/march_2000/association.pdf
- Nagasu M, Sakai K, Ito A, Tomita S, Temmyo Y. (2007). Prevalence and risk factors for low back pain among professional cooks working in school lunch services. *BMC Public Health*, 24(7): 171.
- Desmond SC. (2004).An Epidemiological study of low back pain in a student population of South

- African Tertiary Education Institution, Available from <http://ir.dut.ac.za/handle/10321/294>
28. Stam HJ, Dommissie AM, Bussman HJ. (2004). Prevalence of low back pain after transfemoral amputation related to physical activity and other prosthesis-related parameters. *Disabil Rehabil*, 26: 794-797.
 29. Leroux I, Brisson C, Montreuil S. (2006). Job strain and neck-shoulder symptoms: a prevalence study of women and men white collar workers. *Occup Med*, 56: 102-109.
 30. Marty M, Rozenberg S, Duplan B, Thomas P, Duquesnoy B, Allaert F. (2008). Quality of sleep in patients with chronic low back pain: a case control study. *Eur Spine J*, 17(6): 839 – 844.
 31. Levangie PK. (1999). Association of low back pain with self-reported risk factors among patients seeking physical therapy services. *American Physical Therapy Association*.
 32. Omokhidion FO, Umar US and Ogunnowo BE. (2000). Prevalence of low back pain among staff in a rural hospital in Nigeria. *Occup. Med. (Lond)*, 50(2):107-110.
 33. Gurpreet Singh SK, Sandhu R. (2008). Severity of disability in elderly patients with low back pain in Amritsar, Punjab. *Anthropologist*, 10(4): 265-268.
 34. Lau EM, Egger P, Coggon D, Cooper C, Valenti L, O'Connell D. (1995). Low back pain in Hong Kong: prevalence and characteristics compared with Britain. *J Epidemiol Commun Health*, 49: 492-494.
 35. Han TS, Schouten JS, Lean ME, Seidell JC. (1997). The prevalence of low back pain and associations with body fatness, fat distribution and height. *Int J Obesity Related Metab Disord*, 21: 600-607.
 36. Yip YB, Ho SC, Chan SG. (2001). Tall stature, overweight and the prevalence of low back pain in Chinese middle-aged women. *Int J Obesity Related Metab Disord*, 25: 887-892.
 37. Heliövaara M, Makela M, Knekt P, Impivaara O, Aromaa A. (1991). Determinants of sciatica and lowback pain. *Spine*, 16: 608-614.
 38. Heistaro S, Vartianen E, Heliövaara M, Puska P. (1998). Trends of back pain in eastern Finland, 1972-1992, in relation to socioeconomic status and behavioural risk factors. *Am J Epidemiol*, 148 (7): 671-682.
 39. Bener A, El Rufaie OF, Kamran S, Georgievski AB, Farooq A, Rysavy M. (2006). Aplar Disability, depression and somatization in a low back pain population. *Int J Rheum Dis*, 9(3), 257-263.
 40. Altinel L, Kose KC, Ergun V, Isik C, Aksoy Y, Ozdemir A et al. (2008). The prevalence of low back pain and risk factors among adult population in Afyon region, Turkey. *Acta Orthop Traumatol Turc*, 42(5): 328 -333.
 41. Tiwari RR, Pathak MC, Zodpey SP. (2003). Low back pain among textile workers. *Indian Journal of Occup and Environmental Med*, 7(1): 2729.
 42. Mortimer M, Wiktorin C, Pernold G, Svensson H, Vingard E. (2001). Sports activities, body weight and smoking in relation to low-back pain: a population-based case-referent study. *Scand J Med Sci Sports*, 11(3):178 – 192.
 43. Pande KC, Pande SK, Babhulkar SS. (1996). An atypical presentation of tuberculosis of the spine. *Spinal Cord*, 34(12): 716 – 719.
 44. Galukande M, Muwazi S, Mugisa DB. (2005). Aetiology of low back pain in Mulago Hospital, Uganda. *Afr Health Sci*, 5: 164-167.
 45. Abou Raya S, Abou Raya A. (2006). Spinal tuberculosis: overlooked? *J Intern Med*, 260(2):160-163.
 46. Frymoyer JW, Pope MH, Costanza MC, Rosen JC, Goggin JE, Wilder DG. (1980). Epidemiological studies of low-back pain. *Spine*, 5: 419-423.
 47. Frymoyer JW, Pope MH, Clements JH, Wilder DG, Mac Pherson B, Ashikaga T. (1983). Risk factors in low back pain An epidemiological survey. *J Bone Joint Surgery Am*, 65(22): 213-218.
 48. Riihimäki H, Viikari-Juntura E, Moneta G, Kuha J, Videman T, Tola S. (1994). Incidence of sciatic pain among men in machine operating, dynamic physical work, and sedentary work. *Spine*, 19: 138-142.
 49. Wickstrom GJ, Pentti J. (1998). Occupational factors affecting sick leave attributed to low-back pain. *Scand J Work Environ Health*, 24, 145-152.
 50. Vingård E, Alfredsson L, Hagberg M, Kilbom A, Theorell T, Waldenström M et al. (2000). To what extent do current and past physical and psychosocial occupational factors explain care seeking for low back pain in a working population. *Spine*, 25(4): 493-500.
 51. Manninen P, Riihimäki H, Heliövaara M. (1995). Incidence and risk factors of low back pain in middle-aged farmers. *Occup Med (Lond)*, 45(3): 141-146.
 52. Boshuizen HC, Verbeek JHAM, Broersen JPI, Weel ANH. (1993). Do smokers get more back pain? *Spine*, 18:35-40.
 53. Goldberg MS, Scott SC, Mayo NE. (2000). A review of the association between cigarette smoking and the development of non-specific back pain and related outcomes. *Spine*, 25: 995-1014.
 54. Morken T, Moen B, Riise T, Bergum O, Bua L, Hauge SH et al. (2000). Prevalence of musculoskeletal symptoms among aluminium workers. *Occup Med (Lond)*, 50(6): 414-421.
 55. Power C, Frank J, Hertzman C, Schierhout G, Li L. (2001). Predictors of low back pain onset in a prospective British study. *Am J Public Health*, 91(10): 1671 – 1678.
 56. Leboeuf-Yde C. (1999). Smoking and low back pain: A systematic literature review of 41 journal articles reporting 47 epidemiologic studies. *Spine (Phila Pa 1976)*, 24(14): 1463-1470.

57. Holm S, Nachemson A. (1988). Nutrition of the intervertebral disc: Acute effects of cigarette smoking. *Uppsala J Med Sci*, 93: 91-99.
58. Hopper J, Seeman E. (1994). The bone density of female twins discordant for tobacco use. *N Engl J Med.*, 330: 387-392.
59. Ueno S, Hisanaga N, Jonai H, Shibata E, Kamijima M. (1999). Association between Musculoskeletal pain in Japanese construction workers and job, age, alcohol consumption and smoking. *Ind Health*, 37: 449-456.
60. Bongers PM, de Winter CR, Kompier MA, Hildebrandt VH. (1993). Psychosocial factors at work and musculoskeletal disease. *Scand J Work Environ Health*, 19: 297-312.
61. Muto S, Muto T, Seo A, Yoshida T, Taoda K, Watanabe M. (2006). Prevalence of and risk factors for low back pain among staff in schools for physically and mentally handicapped children. *Ind Health*, 44: 123-127.
62. Sandstrom J, Andersson GB, Wallerstedt S. (1984). The role of alcohol abuse in working disability in patients with low back pain. *Scand J Rehab Med*, 16: 147-149.