

# Observational study to correlate BMI with low back pain in young adults

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## Abstract

**Introduction:** Low back pain is a common condition comprising a major health problem worldwide & will eventually affect almost everyone in life, men and women equally. In the present generation Overweight and obesity a major health hazard and predisposing to major non communicable disease. Young adults between 20-30yrs presenting with low back ache were taken and measured BMI with standard method. **Results:** In our the study correlation of low back pain in relation to the duration and BMI was analyzed, in which we observed as the BMI increases the duration of LBA also increases. **Conclusion:** our study the strong association of body mass index in relationship with development of low back ache in young adults of both genders is greatly implicated.

**Key words:** Low back pain, Body mass index, Obesity

## Introduction

Pain over the lower portion of the back below the rib cage is called as low back pain or lumbar back pain. It is a very common medical condition and invariably affects all age groups. Low back pain is caused by injury to a muscle or ligament. Common cause including improper lifting, poor posture, lack of regular exercise, a fracture, a ruptured disc or arthritis. Low back pain is a common condition comprising a major health problem worldwide. It will eventually affect almost everyone in life, men and women equally [1].

The lifetime prevalence of low back pain is estimated at 60% to 85%, while the annual prevalence in the general population is ranging from 15% to 45% [2–4]. The annual incidence of back pain in the general population is estimated between 10% and 15% [5]. In the vast majority of patients, low back pain is a self limiting condition, from which 90% are expected to recover in about 6 weeks [6]. However, high recurrence rates of 40% to 70%, including annual recurrence rates of 60%, have been reported [7, 8]. Results from various studies on prevalence, incidence, and recurrence of low back pain are difficult to compare, often because of differences in the period of recall [9]. A complicating

factor in low back pain research is the fact that onset and duration of low back pain episodes are difficult to measure. For example, if the time of onset of low back pain is not clearly defined, it is very difficult to distinguish between incidence and recurrence [10]. Obesity is an undesirable outcome of changing in lifestyle and behavior. It is also a major risk factor for development of diabetes, hyperlipidemia and osteoarthritis [11–17].

Obesity may lead to early disability and loss of job in the majority of subjects because of osteoarthritis as well as diabetes and coronary artery associated complications. The medical expense of obesity associated conditions is estimated to be about one hundred million dollars annually in the USA [18,19]. Although, the contribution of hereditary factor may account for about 30–70% of obesity [17], but intake of high caloric diets and reduced expenditure of energy in the form of low physical activities, changing lifestyle and behaviors, particularly, in the modern societies, are also responsible for development of overweight and obesity. The prevalence of obesity varies significantly across the world [20]. The rate of obesity and overweight among adults population ranges from 15 to 60%. It is usually more common in women than men. According to WHO report, obesity has become

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epidemic in the world [21]. The main purpose of this observational study among young adults is to estimate the prevalence of chronic low back pain in relation to BMI levels, with adjustment for potential confounders as age, sex, work status, exercise, and tobacco smoking. The target population consisted of all inhabitants aged 20 -30 years.

## Methodology

**Type of study and setting:** This is an observational study among young adults is to estimate the prevalence of chronic low back pain in relation to BMI levels, in DBR & SK Super Speciality Hospital, Tirupati which is a 100 bedded multidisciplinary tertiary care centre. **Sampling method:** 360 subjects including both gender of healthcare provided among the above setting.

**Samplecollection:** With the consent of the patients all demographic details & BMI was collected. **Inclusion criteria:** All patients with age group between 20-30yrs of both genders presented to OPD with low back ache were included in the study. **Exclusioncriteria:** Patients with secondary cause, trauma, other risk factors (DM, HTN and DYSLIPEMIA) and pregnancy were excluded from the study. **Statistical method:** The collected data was compiled and statistically analyzed by using SPSS software. The study proposal was approved by the ethical committee of the institution and written

## Results

In our study of 180 males and 180 females between 20-30years presented to us with low back ache were enrolled for the study. In our study age group between 27-30 years was more 49%, among which IT employed were more than 60%. Among the study population more than 90% do not have travel more than 30kms in two wheelers. The mean BMI among the study population was 28.06 + 2.12 for males and 24.8 + 3.7 for females, and the mean height was 174.1 [SD, 6.8] cm for males and 162.1 [SD, 6.25] cm for females. Among the study group correlation of low back pain in relation to the duration and BMI was analyzed, in which we observed as the BMI increases the duration of LBA also increases.

informed consent was obtained from all subjects prior to their participation in the study.

**Anthropometric measurements and data collection-** After an interview and clinical examination, the anthropometric measurement of height, weight, waist circumference (WC) was measured by standard method. WC was determined by measuring of waist diameter of the level of midpoint between iliac crest and lower border of tenth rib. The average of three measurements was considered as WC. BMI was measured by standard method. Body mass index (BMI) was calculated by weight in kilogram divided to square of height in meter (kg m).

The demographic and lifestyle data, in particular, age, gender, marital status, marriage age, family history of obesity, educational level, occupation, occupational physical activities, the level of leisure time physical activities, the duration of exercise per week by hours, the number of children and the parity were collected with designed questionnaire. The diagnosis of obesity was confirmed by the WHO standard recommended method [22, 23] in which a BMI 25– 29.9 kg m<sup>-2</sup> was regarded as overweight; BMI ≥ 30 kg m<sup>-2</sup> as obesity. Central obesity was diagnosed on the base of WC with cut-off points of WC > 88 cm for women and WC > 102 cm for men.

**Table-1: Gender- wise distribution.**

Gender	No. of patients	% of patients
Male	180	50%
Female	180	50%
<b>Total</b>	<b>360</b>	<b>100%</b>

**Table-2: Age - wise distribution.**

Age	Male	Female	No of patients
20-22	29	19	48
23-24	36	41	77
25-26	28	30	68
27-28	40	40	80
29-30	47	50	97
<b>Total</b>	<b>180</b>	<b>180</b>	<b>360</b>

**Table-3: Occupation wise distributions.**

Occupation	No of patients	% of patients
IT	220	61.11
Non IT	140	38.88
Total	360	100%

**Table-4: Two wheeler ridding.**

S.No	< 30km/day	>30km/day
1	330	30

**Table-5: Body Mass Index.**

Range	Male	Female	No of patients
Below 18.5	04	07	11
18.5-24.9	42	51	93
25-29.9	84	73	157
30-above	50	49	99
Central obesity Inappropriate	09 {WC [WC > 102 cm]}	13 {WC [WC > 88 cm]}	22
Total	180	180	360

**Table-6: LBA duration wise distributions with relation to BMI.**

Duration of LBA	<1month	>1month-6months	> 6month	Total
No of persons Both gender	110	168	82	360
Mean BMI	22.82+4.44	28.74+1.67	32.63+2.85	-

## Discussion

The lumbar spine, or low back, is a remarkably well-engineered structure of interconnecting bones, joints, nerves, ligaments, and muscles all working together to provide support, strength, and flexibility. However, this complex structure also leaves the low back susceptible to injury and pain. Depending on the underlying cause of the pain, symptoms can be experienced in a variety of ways.

- Pain that is dull or achy, contained to the low back.
- Stinging, burning pain that moves from the low back to the backs of the thighs, sometimes into the lower legs or feet; can include numbness or tingling (sciatica).
- Muscle spasms and tightness in the low back, pelvis, and hips.
- Pain that worsens after prolonged sitting or standing
- Difficulty standing up straight, walking, or going from standing to sitting

Understanding the complicated nature of low back pain is a daunting challenge. Although low back pain is considered a common and disabling medical condition, its true prevalence throughout life and, in particular, during the first decades of life, is unknown.

There are many causes of pain in the back. Symptoms in the low back can be a result of problems in the bony lumbar spine, discs between the vertebrae, ligaments around the spine and discs, spinal cord and nerves, muscles of the low back, internal organs of the pelvis and abdomen, and the skin covering the lumbar area. Pains in the upper back can also be a result of disorders of the aorta, chest tumors, and inflammation of spine. Common causes of lower back pain include strain injury from athletics or overuse, disc herniation, kidney infection, pinched nerve in the spine, and pregnancy. Less common causes of back pain include infection of the spine, ankylosing spondylitis with lumbosacral and sacroiliac joint disease, compression fracture of a spinal vertebra, disc ligament tear (annular tear), and spinal tumor or cancer in the bone of the spine.

Two common types of Low Back Pain:

**Mechanical pain-** By far the most common cause of lower back pain, mechanical pain (axial pain) is pain primarily from the muscles, ligaments, joints (facet joints, sacroiliac joints), or bones in and around the spine.

This type of pain tends to be localized to the lower back, buttocks, and sometimes the top of the legs. It is usually influenced by loading the spine and may feel different based on motion (forward/backward/ twisting), activity, standing, sitting, or resting.

**Radicular pain-** This type of pain can occur if a spinal nerve root becomes impinged or inflamed. Radicular pain may follow a nerve root pattern or dermatome down into the buttock and/or leg. Its specific sensation is sharp, electric, burning-type pain and can be associated with numbness or weakness (sciatica). It is typically felt on only one side of the body.

Acetaminophen relieves pain in mild arthritis but has no effect on the underlying inflammation, redness, and swelling of the joint. If the pain is not due to inflammation, acetaminophen is as effective as aspirin.

Acetaminophen is as effective as the non-steroidal anti-inflammatory drug ibuprofen (Motrin) in relieving the pain of osteoarthritis of the knee. Unless directed by a physician, acetaminophen should not be used for longer than 10 days.

Possible associations of weight and height with low back pain have intrigued researchers for many years. Although low back pain path physiology has been associated with body measures by some experts, there is no consensus on this subject in the literature.

Today, with obesity becoming a rapidly growing problem worldwide, its possible association with the development of low back pain has gained even greater importance.

It has been postulated that, among other serious medical conditions, obesity could explain the concomitantly growing prevalence of low back pain among young adults. Our analysis provides a detailed summary of the prevalence of low back pain in 20-30 years population and pertinent information about its associations with BMI and height. The most intriguing findings of our study are the dose-dependent curves between low back pain and BMI.

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Here are the lists of studies done at various centers to prove our facts around the world

- HeikkiFrilander et al [22] in his study concluded being overweight or obese in early adulthood as well as during the life course increases the risk of radiating but not non-specific low back pain among men.
- Rahman shiri et al [23] concluded that overweight and obesity increase the risk of low back pain.
- U.K.Ezemagu et al [24] demonstrated the degree of relationship between BMI and LBA.
- Louisa et al [25] also supported our similar results in his study.
- Chowdhury D et al [26] proved the association of LBA and BMI was highly significant.

## Conclusion

In our study the strong association of body mass index in relationship with development of low back ache in young adults of both genders is greatly implicated. Our study also implicates that as BMI increases the duration of LBA also increases. This gives a great importance in the society to overcome overweight and obesity for a healthier society.

## Limitations

- Smaller sample size
- Should be a multicentre study for a better implication.

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