

Original Research Article

# Prevalence of Low Back Pain in Sitting Vs Standing Postures in Working Professionals in the Age Group of 30-60

Divya Pillai<sup>1</sup>, Dr. Purti Haral<sup>2</sup>

<sup>1</sup>Final Year BPT, School of Physiotherapy, D.Y. Patil University, Navi Mumbai, India.

<sup>2</sup>Associate Professor, School of Physiotherapy, D.Y. Patil University, Navi Mumbai, India.

Corresponding Author: Dr. Purti Haral

## ABSTRACT

Low back pain is one of the most commonly experienced musculoskeletal disorders in recent times. Sitting and standing occupations require individuals to remain in static postures for longer durations which may lead to discomfort in their lower back. It may interfere with an individual's quality of life and performance at work. The primary focus of this study is to find out if there is an association between sitting and standing working postures and low back pain.

**Method:** A cross sectional survey was carried out among working professionals having occupations which required predominant sitting or standing in the age group of 30-60 years using a pre-validated self-administered questionnaire. 100 individuals were invited in the study out of which 50 individuals had working postures that involved sitting whereas 50 individuals had standing working postures.

**Result:** 76% of individuals with sitting occupation and 70% of individuals with standing occupations experience low back pain. 63.15% of individuals with sitting occupations and 60% of individuals with standing occupations feel that improper ergonomics might be one of the causes of their low back pain.

**Conclusion:** Data analysis concluded that low back pain was more prevalent in individuals with sitting working postures than standing. The percentile difference between both the groups was 6%; it can be noted that prolonged sitting and standing both have adverse effects which may result in complaints of low back pain.

**Keywords:** Low back pain, Prevalence, Musculoskeletal disorders, sitting posture, standing posture.

## INTRODUCTION

Musculoskeletal conditions arise throughout an individual's life at various points of time. Out of the many problems suffered, low back pain is one of the most frequently reported conditions. Low back pain is defined as "pain and discomfort, localised below the costal margin and above the inferior gluteal folds, with or without leg pain" and can be categorized into 3 types- Acute, Sub-acute and Chronic. Acute low back pain is defined as an episode of pain persisting for less than 6 weeks; sub-acute as pain persisting between 6 and 12 weeks; chronic as pain persisting for 12 weeks or more. [1]

Sitting and Standing are two of the most common postures attained during various occupations. Occupations which involve sitting include desktop jobs, computer professionals, bankers, receptionists, chartered accountants. Whereas occupations that require standing are that of beauticians, security guards, teachers, pharmacists. These jobs involve working in the same posture for long periods of time, which is why it is very important to maintain proper ergonomics during work.

The purpose of this study is to find out the prevalence and to determine which working postures among sitting and

standing are associated with low back pain in working professionals aged 30-60 years. Studying the prevalence of low back pain in both these professions is essential in devising preventive and treatment measures. **Aim:** To find out the prevalence of Low Back Pain due to occupational sitting and standing postures.

**Objectives:**

1. To identify Low Back Pain in working professionals who predominantly use sitting postures.
2. To identify Low Back Pain in working professionals who predominantly use standing postures.

### REVIEW OF LITERATURE

Studying the relationship between low back pain and working postures among those who stand and those who sit most of the working day by F. Tissot, K. Messing and S. Stock. In this study, associations between work factors and self-reported LBP during the previous 12 months that interfered with usual activities were examined among 4493 standing workers and 3237 sitting workers interviewed in the 1998 Quebec Health and Social Survey; 24.5% reported significant LBP.

Causal assessment of occupational standing or walking and low back pain: results of a systematic review by Roffey DM1, Wai EK, Bishop P, Kwon BK, Dagenais S. A summary of existing studies was not able to find any high-quality studies that satisfied more than two of the Bradford-Hill causation criteria for occupational standing or walking and LBP. Based on the evidence reviewed, it is unlikely that occupational standing or walking is independently causative of LBP in the populations of workers studied.

### MATERIALS AND METHODS

The study includes 100 working professionals in the age group of 30-60 years, among which 50 individuals had occupations which involved sitting, and the other 50 had occupations which involved standing. Exclusion criteria for the study were individuals who have worked for less than 4 or more years in the same job/posture and individuals having any serious cardiovascular, neurological, musculoskeletal complications. For the survey, a questionnaire was drafted following with due deliberations of the relevant literature and thereby validated with an expert in the field. The questionnaire contained information on: Demographic details-Age and BMI, working hours, posture during their normal day at work, presence of low back pain, improper ergonomics during work, rest pauses during work, usage of a foot stool and a comfortable footwear. The questionnaire was printed and distributed among the working professionals. The data was analysed and presented in tabular and graphical form. Anthropometric measurements of height and weight were noted. BMI values were calculated according to WHO- International Classification of adult underweight, overweight, and obesity according to BMI. [2]

### OBSERVATIONS AND STATISTICAL ANALYSIS

The data was processed using Descriptive statistics - for demographic data (Age & BMI) and percentages were used to depict proportions. Tables were made using Microsoft Word 2016 and figures were plotted using Microsoft Office Excel 2016.

Table 1-Age Distribution

Age group (Years)	Percentage of individuals having sitting occupations	Percentage of individuals having standing occupations
30-40	8%	36%
41-50	54%	36%
51-60	38%	28%

According to table 1, 54% of individuals who have sitting occupations fall under the age group of 41-50 years, followed by 38%

in the age group of 51-60 years and 8% in 30-40 years.

36% individuals who have standing occupations fall under the age group of 30-

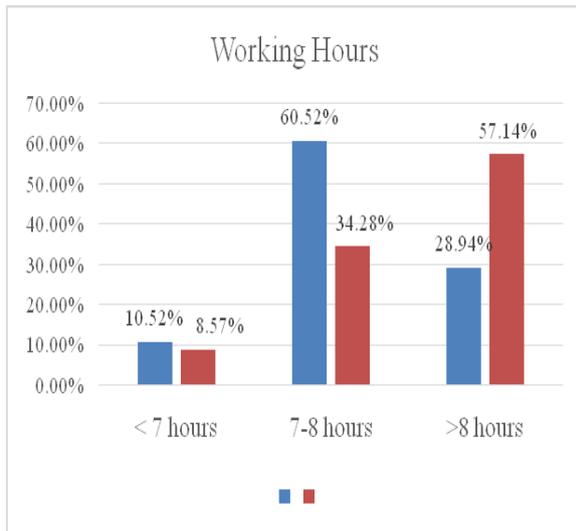
40 years as well as in 41-50 years, followed by 28% in the age group of 51-60 years.

**Table 2- BMI**

BMI(kg/m <sup>2</sup> )	Percentage of individuals having sitting occupations	Percentage of individuals having standing occupations
Underweight (<18.50)	-	4%
Normal BMI (18.50-24.99)	36%	46%
Overweight (25.00-29.99)	40%	38%
Obesity Class 1 (30.00-34.99)	24%	10%
Obesity Class 2 (35.00-39.99)	-	2%
Obesity Class 3 (>40)	-	-

According to table 2, Among individuals who sit during their normal day at work-36% fall under the category of normal BMI, 40% fall under the overweight category and 24% fall under the category of obesity class 1.

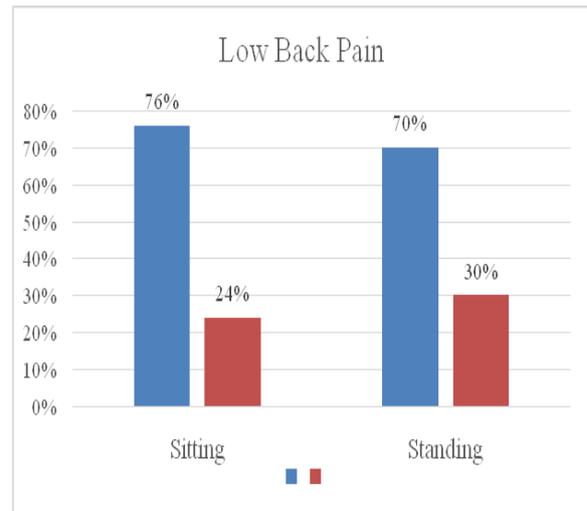
Among individuals who stand for the most part during their work day 4% are underweight, 46% have a normal BMI, 38% are in the overweight category, 10% fall under the category of obesity class 1 and 2% under obesity class 2.



**Figure 1-Working hours**

According to Figure 1, 60.52% of individuals with sitting occupations work for 7-8 hours, followed by 28.94% who work for more than 8 hours and 10.52% work for less than 7 hours.

57.14% of individuals with standing occupations work for more than 8 hours, followed by 34.28% who work for 7-8 hours and 8.57% work for less than 7 hours.



**Figure 2- Presence of low back pain.**

According to Figure 2, 76% of individuals who predominantly sit during their work and 70% of individuals who predominantly stand at work experience low back pain.

**Table 3-Duration of pain.**

Duration of pain	<7Days	7 days-8 weeks	8weeks-6months	>6Months
Sitting occupations	-	7.89%	7.89%	84.20%
Standing occupations	-	8.57%	22.85%	68.57%

According to table 3, 84.20% of individuals with sitting occupations and 68.57% of them with standing occupations have complained of having Low back pain since more than 6 months, followed by 7.89% and 22.85% of individuals with sitting and standing occupations respectively have been experiencing low back pain for the past 8 weeks to 6 months.

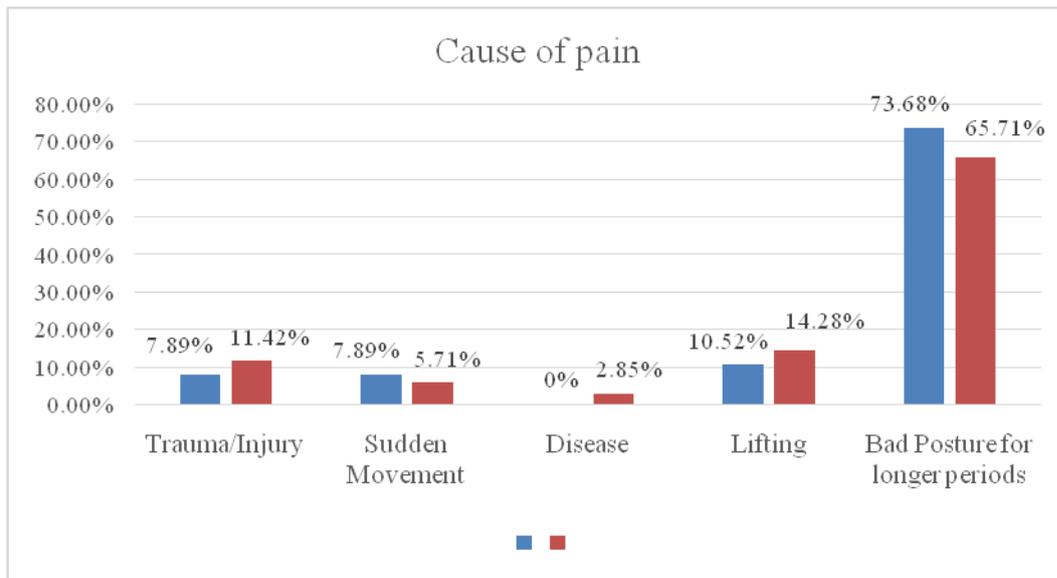


Figure 3- Cause of Low back pain

According to Figure 3, 73.68% of individuals with sitting occupation and 65.71% of individuals with standing occupation feel that they might be experiencing low back pain because of maintaining bad postures for longer periods of time. 10.52% (sitting occupation) and 14.28% (standing occupation) feel that lifting of a load might be a cause of their low back pain. 2.85% of individuals with standing occupation feel that their low back pain has resulted from a disease they have suffered from in the past. 7.87% (sitting occupation) and 5.71% (standing occupation) feel that their back pain has been caused due to a sudden movement. 7.89% (sitting occupation) and 11.42% (standing occupation) have low back pain because of a history of trauma or injury.

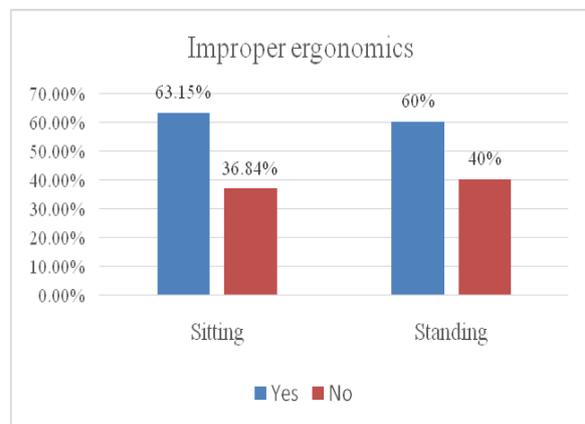


Figure 4- Improper ergonomics at workplace.

According to Figure 4, 63.15% of individuals with sitting occupation and 60% of individuals with standing occupation feel that improper ergonomics might be one of the reasons of their low back pain.

Table-4 Consultation for low back pain.

Consultation for Low back pain	Yes	No
Percentage of individuals having sitting occupations	50%	50%
Percentage of individuals having standing occupations	60%	40%

According to table 4, 50% of individuals with sitting occupation and 60% of individuals with standing occupations have sought consultation for their low back pain.

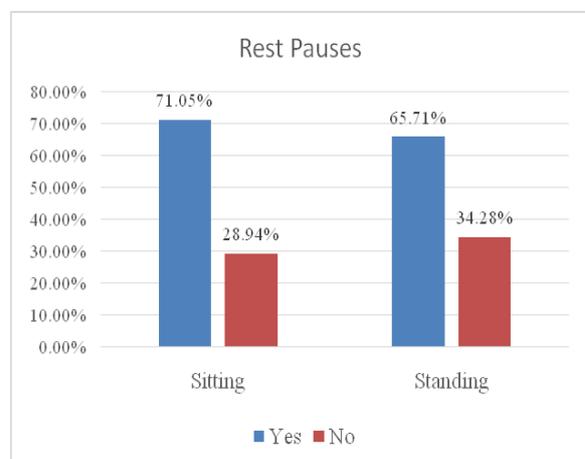


Figure 5- Rest pauses in between working hours.

According to figure 5, 71.05% of individuals with sitting occupation and 65.71% of individuals with standing occupation take rest pauses in between their working hours.

According to figure 6, 36.84% of individuals use a footrest while sitting and 63.15% do not use one.

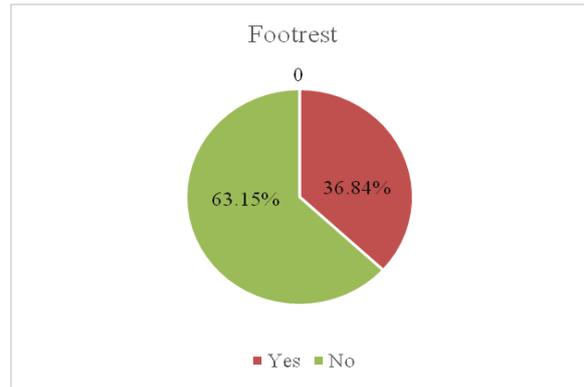


Figure 6-Usage of footrest while sitting during work.

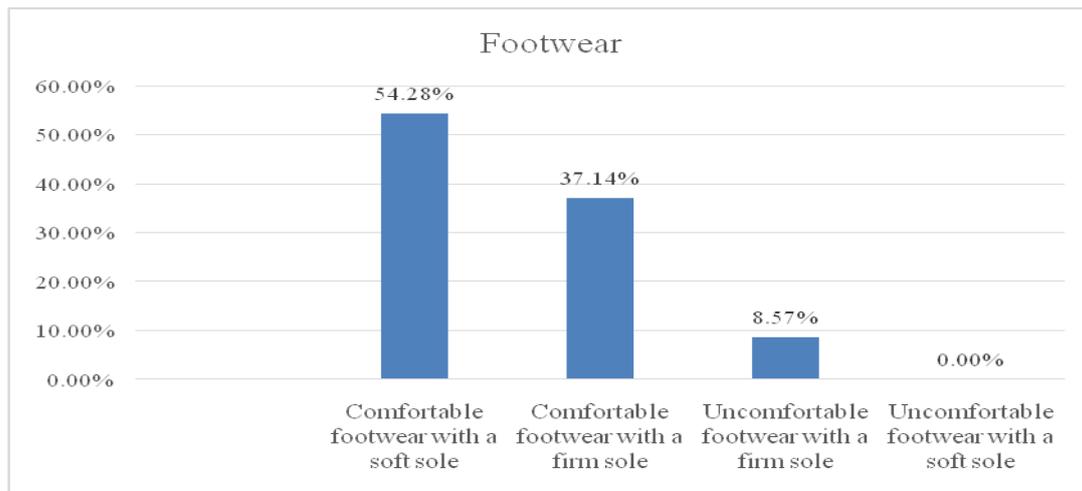


Figure 7- Usage of comfortable footwear with firm or soft soles during work in standing occupations.

According to Figure 7, among individuals with standing occupations, 54.28% of them feel that the footwear with a soft sole which they currently wear for work is comfortable whereas 37.14% of individuals wear comfortable shoes with a firm sole. 8.57% of individuals feel that the footwear they are wearing for work are uncomfortable and has a firm sole.

Table-5 Requested changes at their workplace for relief of low back pain.

Changes at workstation for relief of pain	Yes	No
Percentage of individuals having sitting occupations	21.05%	78.94%
Percentage of individuals having standing occupations	17.14%	82.85%

According to table 5, 21.05% of individuals who have sitting occupation and 17.14% of individuals having standing occupation have requested changes at their workstation to relieve their low back pain where as 78.94% and 82.85% of the individuals with sitting and standing occupations respectively have not requested any such modification.

## DISCUSSION

High prevalence of Low Back Pain has been noted in sitting and standing postures. According to data analysis, 76% of the working population who predominantly work in sitting postures and 70% of them who predominantly work in standing postures have complained of Low Back Pain. 60.52% of the individuals who sit for the most part of their job work for 7-8 hours and 57.14% of the individuals who stand during their job work for more than 8 hours. Long working hours without adequate rest pauses in between can give rise to low back pain. The pain in sitting posture may arise mainly because prolonged sitting can subject the spine to various stresses i.e., the discs have to withstand a lot of compressive forces and there is an increase in intradiscal pressure which may lead to gradual creep of tissues. [3] Whereas while standing, one has to maintain an erect posture which can result in muscle fatigue; in addition to that,

pain can also be caused because of stresses placed on the discs resulting from excessive lordosis and due to co-activation of agonist-antagonist muscles of the spine. [4]

According to the survey, 84.20% and 68.57% of individuals who have sitting and standing occupations respectively, have complained of low back pain since more than 6 months. Chronic pain can lead to muscle weakness. Due to lack of exercise, strength and flexibility of individuals can be compromised. Before the condition progresses to a chronic stage, appropriate treatment should be taken to avoid the pain from worsening. According to data analysis, 60% of the subjects who stand and 50% of them who sit during their work day have sought consultation for their low back pain. The pain should be consulted and evaluated as early as possible so that an individualized treatment program can be devised for the subjects.

According to the study, 73.68% and 65.71% of the subjects who work in sitting and standing postures respectively feel that their low back pain might be because of attainment of bad posture for longer periods of time. While sitting there is a posterior pelvic tilt which causes a reduction in the lumbar curvature. The upper and lower erector spinae have to contract strongly to maintain an erect posture and to prevent the individual from slouching. [5] While standing the extensors and flexors of the spine work to keep the trunk upright and to maintain the pelvic tilt. [6] Anterior tilt of the pelvis results in an increase in the lordotic curve of the lumbar spine to maintain an upright posture while standing. [7] Also, equal weight bearing on both the limbs is essential but while standing for longer periods of time, people might weight-bear on one side and attain faulty postures. Regular long bouts of sitting or standing can accelerate the wear and tear of the discs causing pain.

According to the survey, 63.15% of subjects who sit during their work day and 60% of those who stand feel that improper ergonomics might be one of the causes of

their low back pain. To maintain proper ergonomics, it is essential to adapt the job and work place to fit the worker. [8] Sustained static postures lead to fatigue of lower back muscles. [9] While sitting, to overcome fatigue, the individual tries to relax the muscles and in absence of a backrest they tend to slump forward which makes it important for individuals who have sitting occupations to use an ergonomically designed chair with adequate back support. To stand upright for longer periods of time, the body segments need to be aligned with respect to the centre of gravity. The abdominals and back extensors have to contract strongly to counterbalance a shift in the centre of gravity and to ensure that equilibrium is maintained. [10] A foot-stool can be used to reduce the load on the back while standing. [11]

According to the study, 71.05% of subjects who sit during their work day and 65.71% of those who stand take rest pauses between works. Rest pauses can include change in posture and stretching. Including rest pauses during work is extremely important since change in posture from long bouts of sitting and standing removes the work load from a particular group of muscles and recruits other muscles and also improves circulation to pressure points. Performing activities like forward, backward and side bending stretches the muscles, improves blood supply and enhances fluid exchange in the discs.

According to the study 36.84% of the subjects use a footrest while sitting. Ideally while sitting, feet should be flat on the floor. Footrests can be helpful when the chair height cannot be adjusted. The feet can be completely supported with the help of a footrest. 54.28% of the subjects feel that the footwear they wear which has a soft sole is comfortable. Footwear with proper arch support and pressure absorbing qualities is essential for a job which requires standing for longer periods of time.

#### **Limitations:**

The study was not focused on specific professions from sitting and standing each.

## CONCLUSION

This study was conducted to find out the prevalence of low back pain in sitting and standing postures in working professionals in the age group of 30-60 years. The overall interpretation of the study states that low back pain is more prevalent in working professionals who have sitting occupations (76%) than those who have standing occupations (70%). It can be observed that the percentile difference is of 6%, it can be seen that long bouts of both these postures cause low back pain and proper ergonomics at an individual's workplace is important for reduction and prevention of pain.

### Clinical significance:

Long working hours may lead to an individual being in fixed postures for prolonged periods of time. Hence to avoid low back pain it is essential to include rest pauses in between. Alternating between sitting and standing tasks and performing simple stretches at the desk can be extremely beneficial in alleviation of pain and fatigue as they encourage normal joint movements. <sup>[11]</sup> Leading an active lifestyle helps in maintaining optimal health and posture. Work places should try to integrate ergonomics thereby reducing the risk factors and preventing pain in the future. Also, proper ergonomic measures can help in reduction of pain and thereby improving the employee's productivity and quality of work.

## REFERENCES

1. K. Burton, F. Balagué, G. Cardon et al. European guidelines for prevention in low

- back pain. *Eur Spine J* (2006) 15 (Suppl. 2): S140.
2. WHO. Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies. *Lancet*. 2004, Mar 13;363(9412):902.
  3. David J. Magee. *Orthopaedic Physical Assessment*. Sixth edition. New Delhi. Reed Elsevier Private Limited; 2014. 557.
  4. F. Tissot, K. Messing and S. Stock. Studying the relationship between low back pain and working postures among those who stand and those who sit most of the working day. *Ergonomics*. 2009; Vol 52, (No.11): 1411.
  5. Pamela K. Levangie, Cynthia C. Norkin. *Joint Structure and Function*. Fifth edition. New Delhi: Jaypee Brothers Medical Publishers (P) Ltd; 2012. 511.
  6. M. Dena Gardiner., *The principles of exercise therapy*. Fourth Edition. New Delhi: CBS Publishers and distributors Pvt Ltd; 2005. 33.
  7. E. N. Corlett, John R. Wilson, I. Manenica, *Ergonomics of Working Postures: Models, Methods and Cases*. London and Philadelphia; Taylor and Francis; 1986. 309.
  8. Nancy C. Selby, John J. Triano. *Ergonomics of the Office and Workplace: An Overview* [Internet]. 2006 Sept. 26 Available from: <https://www.spine-health.com/wellness/ergonomics/ergonomic-s-office-and-workplace-overview>
  9. Jan Dul, Marjolein Douwes, P. Smitt. A work-rest model for static postures. *Biomech Sem*. 1990; vol 4:117
  10. Malcolm H. Pope, Kheng Lim Goh, Marianne L. Magnusson. *Spine ergonomics*. *Annu. Rev. Biomed. Eng.* 2002. 4:57.
  11. Glenda L. Key. *Industrial Therapy*. United States of America: Mosby; 1995. 133.

How to cite this article: Pillai D, Haral P. Prevalence of low back pain in sitting vs standing postures in working professionals in the age group of 30-60. *Int J Health Sci Res*. 2018; 8(10):131-137.

\*\*\*\*\*