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ASSOCIATION OF LOW BACK PAIN AND FOOT POSTURE IN RESTAURANT WAITERS

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Abstract:

Background: Various musculoskeletal disorders are commonly seen in restaurant waiters. Low back pain is found to be one of the most common musculoskeletal disorders related to work in waiters. Previous studies have proposed that subjects with low back pain may have altered foot posture, as changes in foot posture may lead to interference in lumbopelvic rhythm. To understand this link, between low back pain and foot posture this study was undertaken.

Aim and Objectives: To check the association between low back pain with foot posture index in restaurant waiters.

Method: 94 restaurant waiters having low back pain between age 25-45 years were included in the study as per inclusion and exclusion criteria. Low back pain was assessed by using Numerical Pain Rating Scale, while foot posture was assessed by Foot Posture Index (FPI-6). Subjects were included from restaurants in Mumbai, India. The Pearson's correlation coefficient was used to find the correlation between low back pain and foot posture in restaurant waiters.

Results: A weak positive correlation was found between Low back pain with right foot and left foot posture in restaurant waiters ($p<0.001$).

Conclusion: This study concluded that there is a high prevalence of low back pain in restaurant waiters and a weak positive correlation between low back pain and foot posture in restaurant waiters.

Keywords: Low Back Pain, Foot Posture Index, Restaurant waiters, Numerical Pain Rating Scale.

1. INTRODUCTION

Low back pain is one of the most common disorders seen in the world and found to be in top ten of the disorders affecting people in day-to-day life. Low back pain can be defined as pain, muscle tension, or stiffness in the lower costal region and above the inferior gluteal folds which can either radiate or not radiate to the lower extremity. Low back pain can be caused without any mechanism called as nonspecific mechanism or due to any pathological condition which is termed as specific mechanism [1].

Low back pain is usually seen as a self-limiting condition which occurs in the region from 12th rib to iliac crest often combined with pain in the buttock region, consists of different categories of pain such as nociceptive, nociplastic, neuropathic or even non-specific occurring in soft tissue, vertebrae, zygapophyseal and sacroiliac joints, intervertebral discs, and neurovascular structures caused due to disc degeneration, nerve root compression, facet arthropathy, myofascial pain, sacroiliac joint pain and spondyloarthropathy.[2]

Restaurants are one of the most popular industries that provides employment to a diverse group that leads economical potency. However, due to development of this sector the workers have to work for an extended period of time, with a smaller number of intervals to rest and sometimes even work overtime. This leads to various musculoskeletal symptoms affecting various body parts of the workers, low back being one of the most common regions.[3]

Work-related musculoskeletal disorders are conditions in which the work environment and performance of work contribute significantly to increase in development of musculoskeletal disorders. The condition is made worse or persists longer due to work conditions and it is one of the most important occupational health problems in restaurant workers. Musculoskeletal disorders may result into reduced productivity and quality of work among the waiters. [4]

The leading physical threat in relation to Musculoskeletal disorders are forced, repetitive, awkward postures or long-term static postures. When standing is attained for a prolonged period it causes fatigue especially in back muscles. In waiters, fatigability is common due to maintaining awkward postures. [4] Low back pain is found to be one of the most common musculoskeletal disorders related to work in waiters, there is also high probability of low back pain to become continuous or constant resulting in chronic low back pain. [4]

The risk factors can contribute to work related musculoskeletal disorders can be repetitive work, carrying or moving heavy loads or prolonged standing or walking in waiters.[5] According to recent studies, there may be an interference of normal muscle as well as biomechanics of the joint in the lower back which maybe caused due to postural abnormalities in the feet.[6]
There is a link from lower back region to pelvic region further going to lower limbs and finally to the foot region, for instance in case of pronation of subtalar joint there is- adduction and plantar flexion of the talus, and an eversion of the calcaneus in a closed kinematic chain and this may cause anteversion and further advance to increase in lumbar lordosis giving rise to low back pain.[7]

The dynamic function of the foot plays a major role in alteration of lumbopelvic rhythm due to pronated feet leading to low back pain. In early gait stance, there is eversion of calcaneus, adduction of talus and plantarflexion which occurs in pronation. This further causes talus inferomedial translation further causing femur to internally rotate. When this occurs in a pronated foot it leads to compensatory proximal joint movement thus producing alteration in lumbopelvic rhythm. [8]

There may also be asymmetrical pronation which causes pelvis to over rotate which produces muscle imbalance as one side of the body tries to compensate for the contralateral side which induces alterations in biomechanics of low back and generate low back pain.[9]

Nevertheless, low back pain is consistently reported as a common effect resulting from deviations in normal foot postures.

2. MATERIALS AND METHODS

2.1 Study Setting- It is a cross sectional study carried out in restaurants of Mumbai, India.

2.2 Participants- A total of 102 restaurant waiters having low back pain were randomly selected for the study from various hotels in Mumbai. They were screened according to the inclusion and exclusion criteria. After screening a total of 94 restaurant waiters were fulfilling the criteria and they were included in the study. Nature and purpose of the study was explained to the subject in detail in language they understood. All the subjects acknowledged their understanding of the study and their willingness to participate by providing a signed consent form.

This study included both females and male gender with age between 25-45 years, with low back pain of minimum duration of more than 3 months and a normal BMI between 18.5-24.9 kg/m^2.

The study excluded subjects with history of malignancy, significant trauma or injury and any lumbar pathological conditions. After the consent taken from all the restaurant waiters, the intensity of pain was measured with the help of Numerical Pain Rating Scale and foot posture was assessed using Foot Posture Index. Based on the scoring of Foot Posture Index, the type of was categorized as supinated, normal and pronated foot.

3A. PROCEDURE

A questionnaire was used to record demographic data of the participants which contained information regarding their age, gender, duration of low back pain as well as their working hours and body mass index (BMI) was calculated as weight in kg divided by height in meter square and classified according to World Health Organization (WHO) categories. After attaining data mentioned above, Numerical Pain Rating Scale was used as an outcome measure to identify the intensity of low back pain which helped determine the severity of pain and to help with assessment of foot posture, Foot Posture Index (FPI-6) was used.

3A.1. Numerical Pain Rating Scale (NPRS) [10] -This is a unidimensional outcome measure used to calculate participants pain intensity in low back region. The respondent selects a whole number from 0-11, where 0 corresponds to no pain whereas 10 indicates worst imaginable pain.

3A.2. Foot Posture Index (FPI-6) [11]- FPI was used to assess the participants foot posture by quantifying the degree to which a foot is supinated, pronated or normal. The components used to measure FPI were- talar head palpation, curves above and below malleoli, calcaneal inversion/eversion, talo-navicular congruence, medial arch height, forefoot abduction/adduction.

The score ranged from -2 to +2, where negative scoring implies supinated foot and positive scoring implies pronated foot. The combined scoring of components in FPI-6 ranges from -12 to +12, which classifies foot type from highly pronated to highly supinated posture. With a score of +10 to +12 implies a highly pronated foot, +6 to +9 as pronated foot, 0 to +5 is a normal posture. A supinated foot posture ranges from -4 to -1 and more than -5 suggests a highly supinated posture.

Assessment of Foot Posture Index is as follows:

The subjects were asked to take several steps in place and stand with their arms by their side and looking straight ahead. During the assessment, it was ensured that the patient did not swivel to try to see what is happening, as this will significantly affect the foot posture. Features with neutral foot are graded as zero, while pronated postures are given a positive value and supinated posture features as negative.

The data obtained from the assessment was further analyzed by using Pearson correlation coefficient to find the association of low back pain and foot posture in restaurant waiters.

3B. STATISTICAL ANALYSIS

A total of 94 subjects (restaurant waiters with low back pain between age group 25-45) were included in this study. Data was collected on a data sheet and recorded using Microsoft Excel. Pearson's correlation coefficient was used to find the correlation between low back pain and foot posture in restaurant waiters.

4A. RESULTS

Table 1: Mean and Standard Deviation

Descriptive Statistics	Mean	Standard Deviation
Age	35.81	5.64
Duration of work	10.04	1.34
NPRS	5.17	1.28
FPI Right	4.34	3.11
FPI Left	4.52	3.13

Table 1 displays mean and standard deviation of the study, the descriptive statistics showed mean age of waiters was 35.81 ± 5.64 years, mean duration of work was 10.04 ± 1.34 hours per day, mean NPRS was 5.17 ± 1.8, mean FPI right was 4.34 ± 3.11, mean FPI left was 4.52 ± 3.13. The mean of foot posture index of both feet implies normal foot posture while mean of NPRS showed moderate intensity of pain.

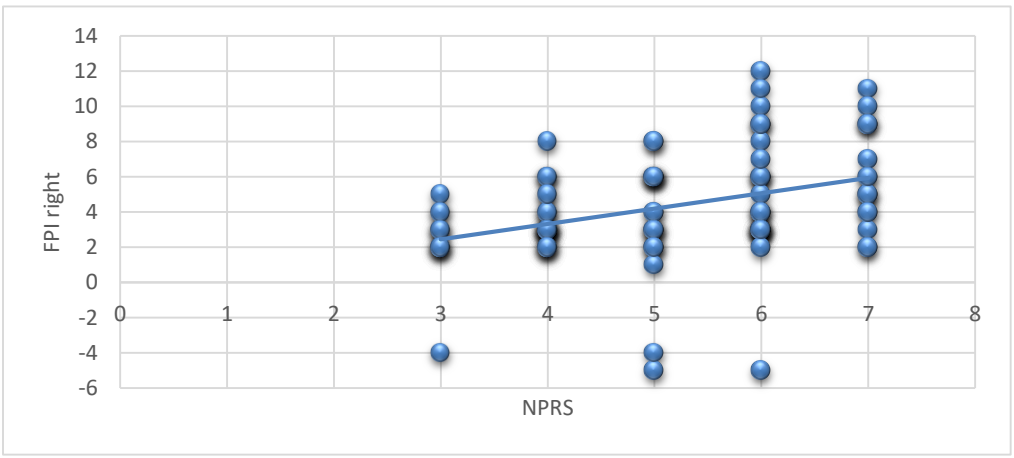

Figure 1: Correlation between NPRS and FPI right foot

Figure 1 illustrates to check correlation between NPRS and FPI right which was done with the help of Pearsons correlation. The score of foot posture ranges from +12 to -5, most common score being +6 depicting pronated foot while pain was rated between 3 to 7 which implies moderate type of pain. By using correlation coefficient (r), there was weak positive correlation (r= 0.36, p<0.001) between them as r value less than 0.40 was considered to have a weak correlation.

Figure 2 suggest just about the same results as figure 1 for correlation between NPRS and FPI for left foot, as shown below.

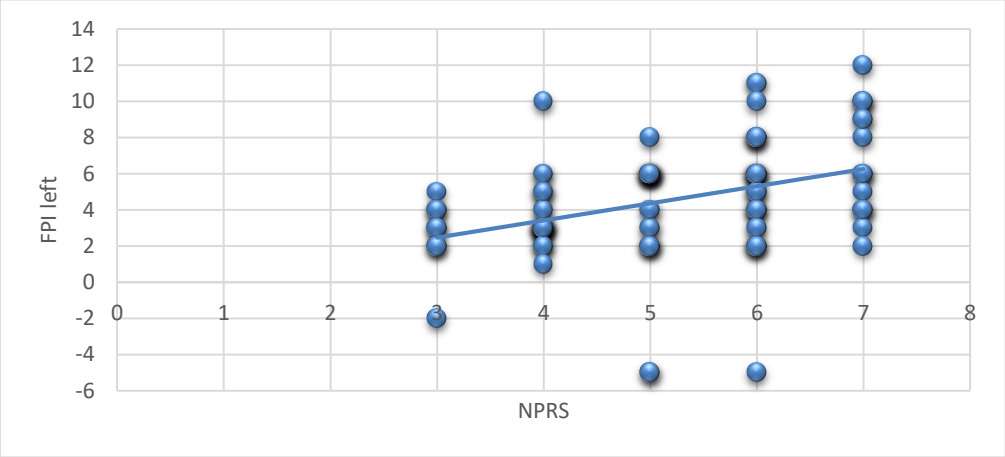

Figure 2: Correlation between NPRS and FPI left foot

Figure 2 illustrates Pearson's Correlation was done to check correlation between NPRS and FPI left. It was found that, there was weak positive correlation (r= 0.387, p<0.001) between them.

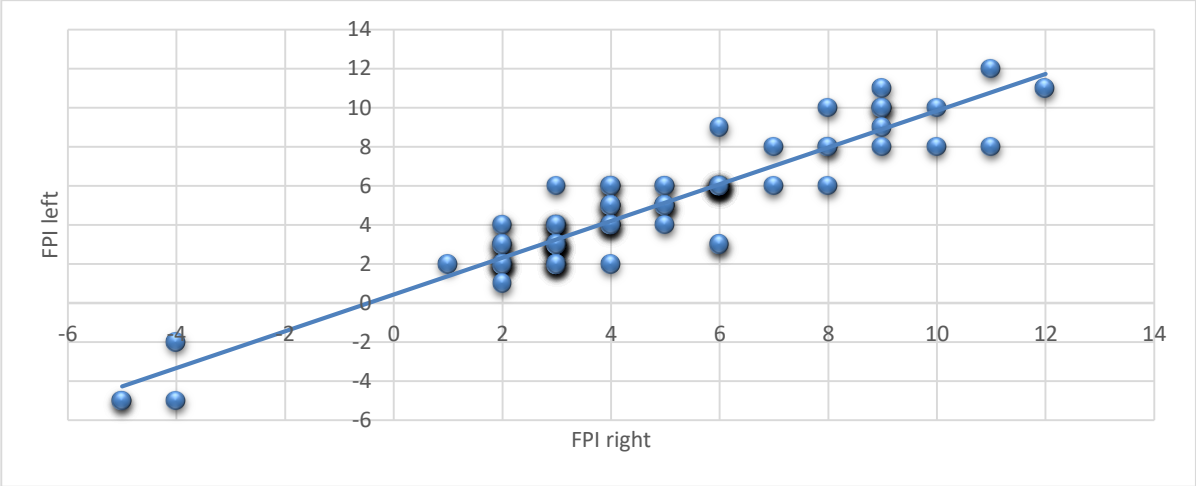

Figure 3: Correlation between FPI right and FPI left

Figure 3 displays Pearson's Correlation was done to check correlation between FPI right and FPI left. The figure shows the most foot posture was found to be pronated foot as the scoring for FPI ranged from +2 to +8 for right as well as left foot posture. In conclusion, there was very strong positive correlation (r= 0.934, p<0.001) between them.

4B. DISCUSSION

Restaurant waiters are professionals who work in restaurants, bars, hotels and other food serving and drinking establishments. It is a line of work where the wait staff requires to work for a prolonged time with limited number of breaks, to stand for extended period of times as well as performing repetitive tasks with an awkward posture.

Consequently, restaurant waiters often experience various musculoskeletal discomfort one of the commonest being low back pain. Due to this type of occupation where it requires muscular effort for extended period of time, prolonged standing being the main concern, can be an additive reason for low back pain. Thus, this study was conducted to check the association between low back pain and foot posture index in restaurant waiters.

In this study, 94 restaurant waiters between age group of 25 to 45 years with a complaint of low back pain for more than 3 months were included in the study. It was observed that participants of age more than 25 years were susceptible to chronic low back pain.

Low back pain score of the individuals which satisfied the inclusion criteria were taken by Numerical Pain Rating Scale (NPRS) [10] and Foot posture assessment was done with the help of Foot Posture Index (FPI-6) to classify into pronated, supinated or normal posture [11] . The mean score for Numerical Pain Rating Scale was 5.17 which indicated a moderate type of pain.

Statistical analysis was done which showed mean Foot Posture Index score of right foot being 4.34 while left being 4.54 which indicated normal foot posture. Mean of total duration of hours of work per day was found to be 10.04.

Statistical analysis between Foot posture of index right and left foot was carried out and it was found to have a very strong positive correlation (<0.001) between them.

Correlation between Numerical Pain Rating Scale and Foot Posture Index right was done with the help of Pearson's correlation and it was found that there was weak positive correlation (<0.001) between them.

Correlation between Foot Posture Index left and Numerical Pain Rating Scale was found to have weak positive correlation (<0.001) between them.

Studies showed that the prevalence of Low back pain among participants with flat feet was 65.9%, compared with 32.8% prevalence of Low back pain among those with regular feet, this study also showed that the presence of flat feet in both genders was significantly associated with both acute and chronic low back pain and the odds of Low back pain was higher among females with flat feet compared with males with flat feet.

5. CONCLUSION

This study concluded that majority of the restaurant waiters have low back pain due to prolonged standing, extended periods of walking and repetitive awkward posture. The study inferred that there was strong positive correlation between Foot Posture Index of left foot and right foot. The study also depicted that there was weak positive correlation between Numerical Pain Rating Scale and Foot Posture Index of right foot and left foot.

6. STUDY LIMITATIONS

This study came across some limitations such as the sample size taken for the study was small also particular age group was selected for the study. Female population working as waitresses were not found, hence in this study only male waiters were included.

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Conflict of Interest: None

Ethical Approval: Approved

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