

## A Study on How Common Muscle and Joint Problems are Among Petrol Pump Workers in Sangli District Using the Modified Nordic Questionnaire.

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### ABSTRACT:

**Background:** Musculoskeletal disorders (MSDs) are common occupational illnesses causing severe pain, disability, and economic burden. They arise from awkward postures, repetitive motions, and prolonged standing. Petrol pump workers are particularly vulnerable due to repeated actions like lifting fuel nozzles, bending, twisting, and extended standing. This study aimed to determine MSD prevalence among these workers and explore links between pain sites and personal, physical, and psychological factors.

**Objectives:** To assess MSD prevalence among petrol pump workers in Sangli district using the Modified Nordic Musculoskeletal Questionnaire (MNQ).

**Methods:** A cross-sectional study screened 171 petrol pump workers aged 25-55 years at various stations in Sangli district. Subjects met inclusion/exclusion criteria; informed written consent was obtained. MSDs were evaluated via the Modified Nordic Musculoskeletal Questionnaire.

**Results:** Participants (aged 25-55) mostly worked 8 hours/day, 6 days/week, for 1-3 years. 64.33% reported problems, whereas 35.67% reported no MSD pain. Low back pain was most prevalent (45%), primarily from prolonged standing, which strained the hips and lower back. Knee pain affected 13.75%, and foot pain 18.13% during work.

**Conclusion:** Most workers reported low back pain (45%), followed by foot pain (18.13%) and knee pain (13.75%). Prolonged standing was the main contributor; 35.67% had no issues.

**KEYWORDS:** Musculoskeletal disorders (MSDs), petrol pump workers, prolonged standing, Modified Nordic Questionnaire

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### INTRODUCTION:

Musculoskeletal disorders are injuries affecting muscles, nerves, tendons, joints, and cartilage. These injuries typically progress slowly due to consistent overexertion, leading to chronic soreness, swelling, and limited movement, particularly in the shoulders, neck, and back. They arise from repetitive movements, sustained awkward postures, or constant strain on muscles and tendons.<sup>(1)</sup> They can severely limit daily functioning, making them a leading cause of disability worldwide. These conditions are frequently linked to prolonged static positions, awkward or sustained postures during

work, and repetitive physical activities. Such occupational exposures may eventually result in decreased functional ability and chronic musculoskeletal pain. MSDs are thought to be among the most prevalent causes of chronic pain and disability worldwide. These factors significantly influence workforce productivity and individual well-being. The United Nations and the World Health Organization sponsored the Bone and Joint Decade (2000–2010).<sup>(2)</sup> initiative to increase awareness and promote the prevention and management of musculoskeletal disorders in response to the growing global burden of musculoskeletal conditions. This

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project was designed

to facilitate cooperation between researchers, legislators, and medical professionals to produce effective solutions for these conditions. To lessen the effects of musculoskeletal disorders on people and society at large, several programs and interventions have been developed, with an emphasis on education, early intervention, and encouraging healthier lifestyles. In certain occupational groups, musculoskeletal complaints are identified to be very high. The study of such professionals as dentists<sup>(3)</sup>, teachers<sup>(4)</sup>, and hairdressers<sup>(5)</sup> revealed the frequency of musculoskeletal pain at the workplace. These conditions affect not only the physical health of workers but also social and economic consequences in general. The financial burden encompasses both the direct expenses associated with healthcare services and the indirect costs brought on by lower productivity, absenteeism, and work performance.<sup>(6)</sup> Musculoskeletal issues can have a particularly big impact in low- and middle-income nations. People with musculoskeletal pain may find it challenging to carry out daily activities and regular work tasks. This restriction may make it more difficult for them to keep a job and carry out their social obligations, which will ultimately have an impact on the financial security of families and communities.<sup>(7)</sup> The number of motor vehicles in urban areas has noticeably increased as a result of rapid urbanization and population growth. As a result, there is now a greater need for gas stations. Workers at gas stations are essential to the day-to-day maintenance of these cars. However, their jobs frequently require them to stand for extended periods of time and perform repetitive tasks, which may put them at risk for musculoskeletal strain.<sup>(8)</sup>

Opening fuel tank caps, lifting and positioning fuel nozzles into vehicle tanks, controlling fuel flow, returning the nozzle after refueling, and fastening the tank cap are all common tasks performed by petrol pump workers. Additionally, some employees help with windshield cleaning. Long-term standing combined with repetitive, awkward movements like bending and twisting places high mechanical stress on the body, increasing the risk of pain and discomfort. Persistent, physically demanding tasks frequently cause muscular and joint strain, posing a high risk for chronic injury and fatigue.<sup>(8)</sup> The Modified Nordic Questionnaire (MNQ) is a commonly used screening tool to determine whether petrol pump workers have musculoskeletal symptoms. A body diagram showing typical anatomical areas where musculoskeletal issues arise is part of the MNQ, a structured, self-administered questionnaire. Participants will confirm their symptomatic status (Yes/No) on the provided questionnaire. In particular body areas like the neck, shoulders, elbows, wrists and hands, upper back, lower back, hips or thighs, knees, ankles, and feet, participants are asked if they have had pain, aches, discomfort, numbness, or similar symptoms in the past 12 months. When someone reports symptoms, they are also asked if these issues have affected their daily activities or regular work during that time.<sup>(9)</sup> Studies on

musculoskeletal disorders among gas station attendants have been conducted in various regions, including Brazil, Ghana, and Lagos.<sup>(8,10)</sup> Despite a high concentration of petrol pumps in Sangli, India, the prevalence of musculoskeletal complaints among workers remains understudied. The dearth of information indicates that healthcare professionals and researchers have paid comparatively little attention to this occupational group. Therefore, the current study was conducted using the Modified Nordic Questionnaire to screen for musculoskeletal disorders among petrol pump workers in Sangli who are between the ages of 25 and 55. The distribution and patterns of musculoskeletal pain in the workforce may allow pointing out the job-related risks, and the results of the study may provide valuable data regarding the specific types of disorders prevalent among this population group. By managing these issues, the stakeholders can use specific intervention programs that will directly offset the specific problems of the petrol pump workers.

#### **MATERIALS AND METHODS MATERIALS:**

PenModified Nordic Questionnaire Subject Evaluation Form Consent Form

**AIM OF STUDY:** Screening of musculoskeletal disorders using Modified Nordic Questionnaire.

#### **STUDY DISCRIPTION:**

Study Design: A Cross-sectional Observational study.

Sample Design: Convenience sampling Duration of study: 6 months.

Location of study: Petrol Pumps in Sangli District

Outcome Measure: Modified Nordic Questionnaire. (Reliability = 0.869)<sup>11</sup>.

#### **Sample size (n): 171**

Sample size is calculated using the following Formula:

$$n = \frac{N}{1 + N(e)^2}$$

$$= \frac{300}{1 + 300(0.05)^2} = 171.42$$

#### **Sampling Method:**

1. Based on inclusion and exclusion criteria.
2. Area of Petrol pumps to be covered: Sangli District.
3. Total No. Of Petrol Pumps to be included in the study; at least 20
4. Total No. Of workers at each Petrol pump : approximately 8 workers to be tested as per their availability.

#### **a. Inclusion criteria:**

1. Petrol pump workers between the 25-55 year of age group residing in sangli district.
2. Minimum 1 year of experience working in the petrol pump.
3. Both male and female participants.
4. Petrol pump worker who are working for at least 7 hours /day .
5. BMI : less than 30 Kg/m<sup>2</sup>.
6. Petrol pump workers who are willing to participate in the study.

A Study on How Common Muscle and Joint Problems are Among Petrol Pump Workers in Sangli District Using the Modified Nordic Questionnaire.

7. Workers who understand either hindi, marathi ,english.

**b. Exclusion criteria:**

1. Anyone with history of trauma, neurological disorders, spinal fracture, spinal surgery.
2. Recent surgeries in past one year.
3. Person with disability.
4. Anyone suffering from degenerative, inflammatory musculoskeletal condition like osteoarthritis, ankylosing spondylitis, rheumatoid arthritis or any other rheumatic condition
5. BMI above 30 kg/m<sup>2</sup>.

**Sampling Method**

Convenient sampling method was used.

**Outcome Measure**

The Modified Nordic Questionnaire was used to assess musculoskeletal symptoms in different body regions.

**Ethical Approval**

Ethical approval was obtained from the Institutional Ethics Committee prior to commencement of the study. Written informed consent was obtained from all participants.

**METHODOLOGY**

A cross-sectional, observational study was carried out involving 171 petrol pump workers who gave their consent to the study in Sangli, but the study protocol was approved by the Institutional Review Board, and the ethical clearance was given to the research by the Institutional Ethics Committee. The primary screening tool that was to be employed in establishing whether or not the employees were experiencing musculoskeletal pain was the Modified Nordic Musculoskeletal Questionnaire (MNQ). Respondents were not chosen

based on some criteria to fill in a survey assessing musculoskeletal symptoms, which are relevant in this study. Those employees that satisfied these requirements were informed about the objectives and methodology of the study. They were assured that their personal information would remain confidential and they would only be used in research. Informed consent was given by all the participants through written consent in a language that was easy to understand. The employees completed the questionnaire during their working time. The data on the baseline, such as age, weight, hours on working, and medical history, were gathered with the use of subject evaluation forms. The analysis and evaluation of the collected data with the help of appropriate statistics have provided the results and conclusions of the study

**Statistical Analysis:**

Data was analyzed using Microsoft Excel 2025 edition. Graphical representation too, was done using MS Excel 2025.

**RESULTS**

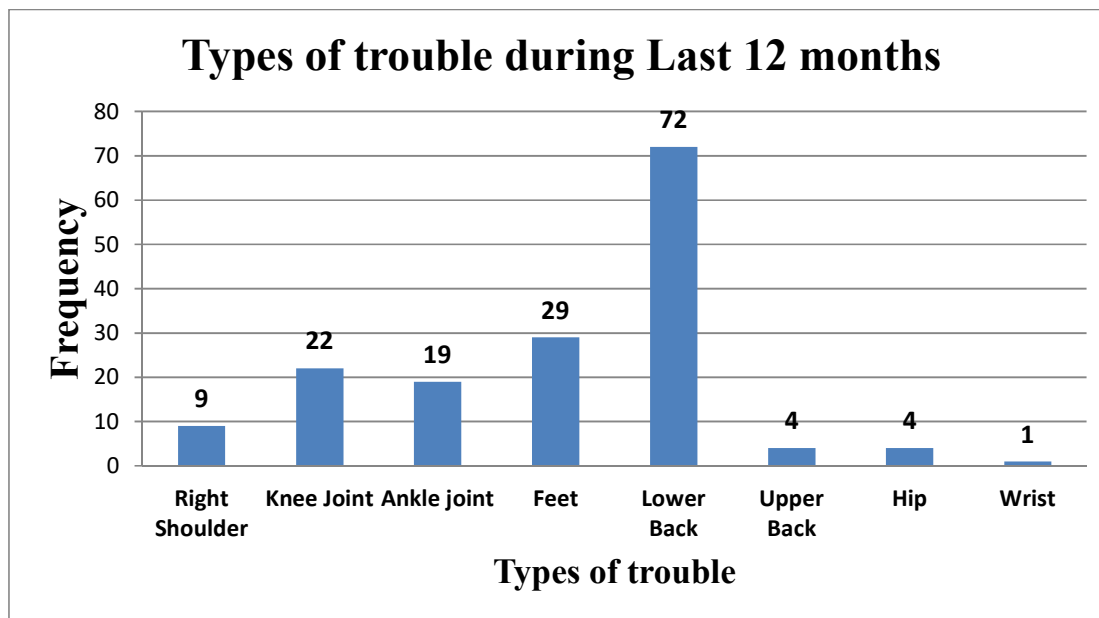
The Study on 171 workers of petrol pump.25 to 55 was the age range of the group. For screening, the Modified Nordic Musculoskeletal Questionnaire was used. The majority worked for one to three years. Six days a week, eight hours a day, they worked. No musculoskeletal pain was reported by 35.67%. 64.33% of respondents said they have many musculoskeletal discomfort issues. Most prevalent (45%) is low back pain .Long periods of standing are the primary source of pain. The hips and lower back are strained when standing. From standing, 13.75% experienced knee pain. At work, 18.13% of people complained foot pain. Standing for a long time wears out muscles. Posing awkwardly raises the risk of musculoskeletal disorders.

(Table.1)

**Distribution of Different types of trouble (Pain, ache, discomfort, numbness During Last 12 months during last 12 months:**

Different types of trouble (Pain, ache, discomfort, numbness During Last 12 months	Count	Percentage
Right Shoulder	9	5.63%
Knee Joint	22	13.75%
Ankle joint	19	11.88%
Feet	29	18.13%
Lower Back	72	45.00%
Upper Back	4	2.50%
Hip	4	2.50%

<b>Wrist</b>	1	<b>0.63%</b>
<b>Total</b>	<b>160</b>	<b>100.00%</b>



(Graph no.1)

**DISCUSSION**

We carried out a study involving 171 petrol pump workers of different fuel stations in the Sangli district who were aged between 25-55 years. The main aim of the research was to establish the rate of musculoskeletal issues among petrol pump attendants. The inclusion and exclusion criteria were defined and the participants were recruited. Prior to the procedure, everyone was informed about the procedure, and informed consent was signed. The Modified Nordic Musculoskeletal Questionnaire was used as a screening procedure in musculoskeletal disorder screening. The findings indicated that the highest percentage of employees (45%) was 1-9 years of work experience. The working day was eight hours, six days per week with a 30-minute lunch or snack break and in the same job. The work experience was reported between one and nine years. The study revealed that, 35.67% reported no musculoskeletal pain in any part of the body. These individuals mainly belonged to the 25–28 year age group, had 1–3 years of work experience, and were comparatively more physically active and fit. Additionally, they were employed at petrol stations with lower vehicle traffic, which may have reduced their workload. However, 64.33% of the participants reported experiencing musculoskeletal pain. These findings are consistent with the study conducted by Isaac Money et al. in Ghana, which showed that among 145 fuel attendants, 97% of workers experienced musculoskeletal pain, with low back pain (43%) being the most frequently reported condition.<sup>(8)</sup> Which is quite higher than our study. The authors suggested that

repetitive job tasks and prolonged standing significantly contribute to the development of musculoskeletal problems.<sup>(8)</sup> Similarly, A study done by Pradeep Dohare et al. at Bhopal petrol pump which included 111 attendants, revealed that people dealing with musculoskeletal disorders (90%) and lower back pain (47%) are the most prevalent work-related health issues.<sup>(13)</sup> Various occupational factors have been identified as contributors to work-related musculoskeletal disorders (WMSDs), including repetitive movements, excessive physical force, awkward or sustained postures, and prolonged sitting or standing.<sup>(14)</sup> Workers at fuel service stations frequently perform repetitive physical activities, which have been recognized as an important risk factor for the development of WMSDs. The findings of the present study indicate that low back pain was the most frequently reported complaint (47%) among the workers.<sup>(8)</sup> This observation is comparable to the results reported by Akodu et al., who conducted a study on 300 male and female filling station attendants aged 25–64 years in Nigeria. Their research identified an 85% prevalence of low back pain, with prolonged standing being a major contributing factor.<sup>(15)</sup> The predominant working posture of petrol pump workers is standing. In this position, the body’s center of mass is situated around the hips and waist, causing the hip joints to support a major portion of the body’s weight. Maintaining this position for extended periods may lead to muscle fatigue around the hip and lower back, eventually contributing to back pain.<sup>(16)</sup> The current research also indicated that

13.75 percent of respondents complained of knee pains, 18.13 percent complained of foot pains as shown in Graph 1. The occupational demands that are related to petrol pump work can be explained by these findings. Some of the petrol pump workers experienced low back pain due to higher body mass index and lordotic posture. additionally, a number of workers reported experiencing foot pain as a result of wearing uncomfortable footwear. When employees have prolonged standing posture, there is a continuous contraction of the muscles instead of going at rest, especially the back and the lower limbs and thus these muscles may have diminished functional effectiveness of the calf muscles. Such a condition may cause muscle tiredness and pain.<sup>(18)</sup> Long periods of standing requires the lower back to support the weight of the upper body, which is the direct cause of chronic pains and discomfort.<sup>(17)</sup> As stated by American Podiatric Association, in the United States, about 83% of workers in industries report of experiencing foot or lower leg discomfort due to extensive standing. Moreover, there is a number of biomechanical risk factors linked to the occurrence of knee-related WMSDs such as working with heavy loads, kneeling or squatting, and standing a long time. The requirement to stand for long, uninterrupted periods puts petrol pump staff at greater risk of knee discomfort.<sup>(14)</sup>

#### CONCLUSION

The findings of this study indicate that most participants experienced low back pain (45%), with knee pain occurring in 13.75% of the subjects and foot pain in 18.13%. Additionally, 35.67% of the participants stated that they had no musculoskeletal issues.

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No external funding was received for this study.

#### DECLARATION OF INTEREST

The authors declare no conflict of interest.

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#### FIGURE LEGENDS

#### Figure 1

Distribution of Different types of trouble.

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A Study on How Common Muscle and Joint Problems are Among Petrol Pump Workers in Sangli District Using the Modified Nordic Questionnaire.

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