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A STUDY OF PREVALENCE OF LOW BACK PAIN RELATED DISABILITY AMONG COAL BASED (THERMAL) POWER PLANT ENGINEERS AND WORKERS IN JAMNAGR- AN OBSERVATIONAL STUDY

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ABSTRACT:

BACKGROUND – Very few studies have evaluated the association between occupational factors and Low back pain among coal based thermal power plant engineers and workers. The epidemiological data on LBP in India-Gujarat-Jamnagar are limited.

OBJECTIVE – The aim of this study was to measure the prevalence of LBP in coal based thermal power plant engineers and workers of Jamnagar-Gujarat-India and to investigate the role of occupational factors.

METHODOLOGY – Participants in this online cross-sectional study were engineers and workers in coal based thermal power plant at Jamnagar-Gujarat-India. The questionnaire and Oswestry disability index were sent through a social media platform. SPSS was used to analyse the data with a significant level of $p<0.05$

RESULT -The data of 107 power plant workers and engineers were evaluated, most participants were male (n=107, 100%), 25 to 65 years old, 57.9% no need of pain killers, 70.1% persona care is not affected, 48.6% able to lift heavy weights, 61.7% can walk any distance without extra pain, 58.9% can sit in any chair for long time, 57.9% can stand for longtime without extra pain, 75.7% can sleep well without any pain, 80.4% social life is not affected, 67.3% can travel without extra pain, 73.8% able to do home / job activities without pain, more than 60% (n=107) of engineers and workers had no disability per the Oswestry disability index.

CONCLUSION – LBP was highly prevalent among coal based thermal power plant engineers and workers. LBP was associated with weight lifting, walking, prolonged sitting and standing, travelling. HR department should raise awareness of LBP among the workers and engineers and methods to improve their life styles and behaviours.

KEY WORDS – Jamnagar, risk factors, prevalence, coal based thermal power plant engineers and workers, low back pain.

INTRODUCTION:

One of the most prevalent and significant occupational health issues affecting the working population are musculoskeletal diseases (MSDs), which have a significant negative impact on quality of life. Numerous research has been done to look into the connection between MSP and profession [1]. *The World Health Organization* states that low back pain is the most common musculoskeletal ailment worldwide and the primary cause of disability [3]. The literature has reported the prevalence of LBP for various adult populations. The incidence of lower back pain (LBP) is higher in doctors, surgeons, engineers, and other labourers adult population prevalence studies of LBP published between 1991 and 1998, a systematic review was conducted [2].

A persistent, dull backache that extends from behind the lower edges of the twelfth ribs to the gluteal folds is known as LBP [1]. LBP frequently results in pain in one or both legs, and it can also occasionally cause neurological problems in the legs. Numerous factors, including as bad posture and strain on the nearby muscles, might contribute to LBP [1,2]. Among those of working age, LBP is a prevalent health concern whose prevalence increases with age. According to a study, the point prevalence of activity limiting low back pain (LBP) was 7.3% globally, placing LBP among the main causes of disability globally [3].

A 2019 survey found that the prevalence of LBP varies between 1.4% and 20% in the USA, Canada, and Europe and between 64% and 89% in middle eastern countries. According to a comprehensive assessment, the prevalence of low back pain (LBP) varied between 55% and 75% in India's working-age population across different professions, and it was 61.6% among the country's industrial worker [3,4]. Physical stress (e.g., prolonged sitting, standing, lifting, driving, forceful or repetitive movements involving the back), psychological stress (e.g., highly perceived workload, time pressure, poor sleep, and poor social life), and physical characteristics (e.g., obesity and hight) are the main predictors of LBP in thermal power plant engineers and workers [1,2].

The purpose of the *OSWESTRY LOW BACK PAIN* impairment *QUESTIONNAIRE* is to evaluate patients' self-rated impairment when they have low back pain. This index helps identify the limitations linked to low back pain. There are ten questions on daily activities in it [1]. One must select an alternative based on how severe their challenges are with the tasks at hand. A score of greater than 35 indicates a considerable handicap in day-to-day functioning.

NEED OF THE STUDY:

Although the literature has documented the incidence of LBP in many populations, no previous studies have been conducted in Jamnagar's coal-based (thermal) power plant. As a result, it is unknown how common LBP is among the engineers and workers at this facility. The purpose of this study is to ascertain the incidence of LBP and its contributing factors among the engineers and employees of Jamnagar's thermal power plant. The study's ultimate goal is to raise future medical professionals' knowledge of modifiable risk factors.

OBJECTIVES OF THE STUDY:

- To investigate the disability associated with low back pain among engineers and workers at thermal power plants.
- To investigate the restrictions that engineers and workers with low back pain have when doing daily activities.

INCLUSION CRIETERIA:

All the engineers and workers of thermal power plant with mechanical low back pain.

- Age should be between 25-65 years.
- Minimum work experience should be of 2 years.

EXCLUSION CRIETERIA:

- The person who has Low back pain with other pathologies (e.g.- myelopathy, tumour etc.) were excluded.
- The person who has other systemic disease were excluded.
- The person who doesn’t want to fill form.
- The person who has recent fracture was excluded.

SCOPE OF THE STUDY:

The study focuses only on the coal based (thermal) power plant engineers and workers in Jamnagar.

SUBJECTS AND METHODS:

Data collection and study design:

This was a cross-sectional observational study. For the study sample, engineers and workers from the thermal power plant of Jamnagar were included. They were contacted via a social media platform (WhatsApp) and asked to participate by completing the online Oswestry Disability Index and a questionnaire relating to their demographic characteristics. A reminder was sent fortnightly to all workers and engineers.

In the current study, we adopted the previously validated Oswestry Disability Index. Participants were additionally asked about their demographic, health behaviours, lifestyle, pain intensity score, and the characteristics and effects of their LBP. Several modifications were made to demographic questionnaire for the purpose of this study, including the addition of a question asking if participants had ever sought medical advice for LBP.

Data Collection was done by conducting online survey by using a google forms survey. All the participants were informed of the study's goals before their consent was obtained. All the participants were checked for the inclusion and exclusion criteria. Data were collected over one month from November 15, to December 15. Data were kept confidential and were only made public for research purposes. Total 107 responses have recorded and Oswestry disability Index scores counted.

RESERCH METHODOLOGY:

OSWESTRY LOW BACK PAIN DISABILITY INDEX QUESTIONNAIRE is used to rate disability with low back pain in regular activities. It includes 10 questions that describe Pain intensity, Personal care, Lifting, Walking, Sitting, Standing, Sleeping, Social life, Travelling, Employment / Homemaking.

1. PAIN INTENSITY

- I can tolerate the pain I have without having to use pain killers
- The pain is bad but I manage without taking pain killers
- Pain killers give complete relief from pain
- Pain killers give moderate relief from pain
- Pain killers give very little relief from pain
- Pain killers have no effect on the pain and I do not use them

2. PERSONAL CARE (e.g. – Washing, Dressing)

- I can look after myself normally without causing extra pain.
- I can look after myself normally but it causes extra pain
- It is painful to look after myself and I am slow and careful
- I need some help but manage most of my personal care
- I need help every day in most aspect of self care
- I don't get dressed, I was with difficulty and stay in bed

3. LIFTING

- I can lift heavy weights without extra pain
- I can lift heavy weights but it gives extra pain
- Pain prevents me from lifting heavy weights off the floor, but I can manage if they are conveniently positioned, i.e. on a table
- Pain prevents me from lifting heavy weights, but I can manage light to medium weights if they are conveniently positioned
- I can lift very light weights
- I cannot lift or carry anything at all

4. WALKING

- Pain does not prevent me walking any distance
- Pain prevents me walking more than one mile
- Pain prevents me walking more than ½ mile
- Pain prevents me walking more than ¼ mile
- I can only walk using a stick or crutches
- I am in bed most of the time and have to crawl to the toilet

5. SITTING

- I can sit in any chair as long as I like
- I can only sit in my favourite chair as long as I like
- Pain prevents me from sitting more than one hour
- Pain prevents me from sitting more than ½ hour
- Pain prevents me from sitting more than 10 minutes
- Pain prevents me from sitting at all

6. STANDING

- I can stand as long as I want without extra pain
- I can stand as long as I want but it gives me extra pain
- Pain prevents me from standing for more than one hour
- Pain prevents me from standing for more than 30 minutes
- Pain prevents me from standing for more than 30 minutes
- Pain prevents me from standing for more than 10 minutes
- Pain prevents me from standing at all

7. SLEEPING

- Pain does not prevent me from sleeping well
- I can sleep well only using medication
- Even when I take medication, I have less than 6 hours sleep
- Even when I take medication, I have less than 4 hours sleep
- Even when I take medication, I have less than2 hours sleep
- Pain prevents me from sleeping at all

8. SOCIAL LIFE

- My social life is normal and gives me no extra pain
- My social life is normal but increases the degree of pain
- Pain has no significant effect on my social life apart from limiting my more energetic interests, i.e. dancing etc.
- Pain has restricted my social life and I do not go out as often
- Pain has restricted my social life to my home
- I have no social life because of pain

9. TRAVELLING

- I can travel anywhere without extra pain
- I can travel anywhere but it gives me extra pain
- Pain is bad, but I manage journeys over 2 hours
- Pain restricts me to journeys of less than 1 hour
- Pain restricts me to short necessary journeys under 30 minutes
- Pain prevents me from travelling except to the doctor or hospital

10. EMPLOYMENT / HOMEMAKING

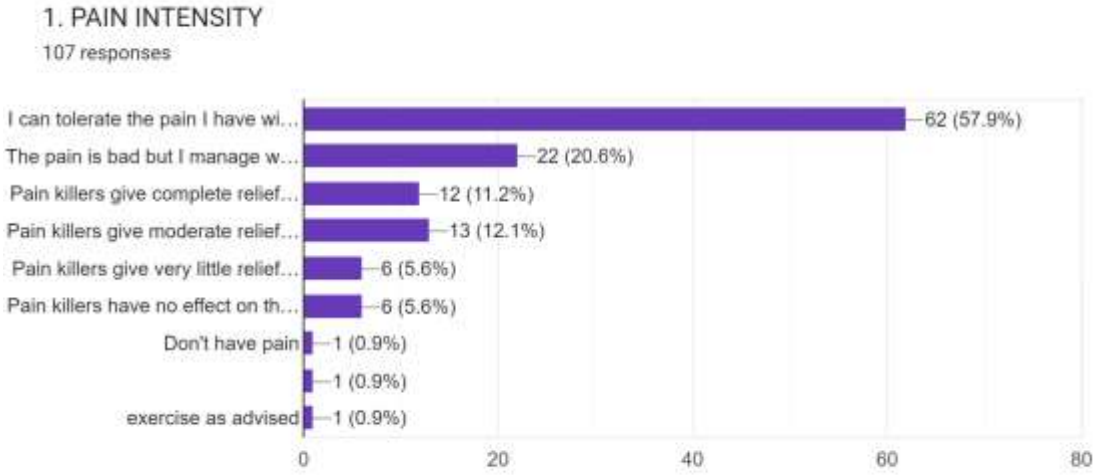
- My normal homemaking / job activities do not cause pain
- My normal homemaking / job increase my pain, but I can still perform all that is required of me
- I can perform most of my homemaking / job duties, but pain prevents me from performing more physically stressful activities (e.g.- lifting, vacuuming)
- Pain prevents me from doing anything but light duties
- Pain prevents me from doing even light duties
- Pain prevents me from performing any job or homemaking chores.

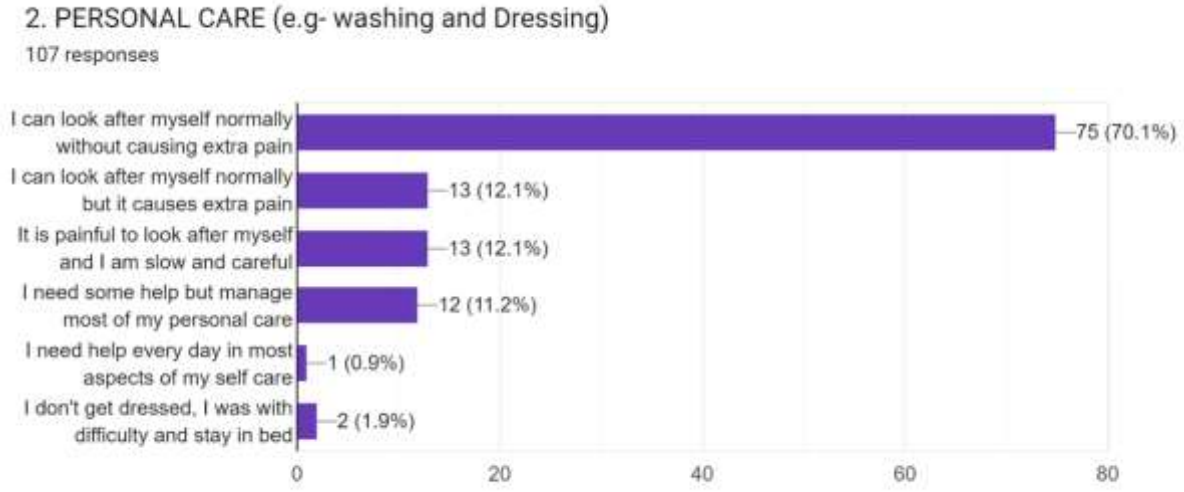
For each question, there is a possible 5 points; 0 for the first answer; 1 for the second answer; etc. Add up the total for the 10 questions and rate them in the scale at below.

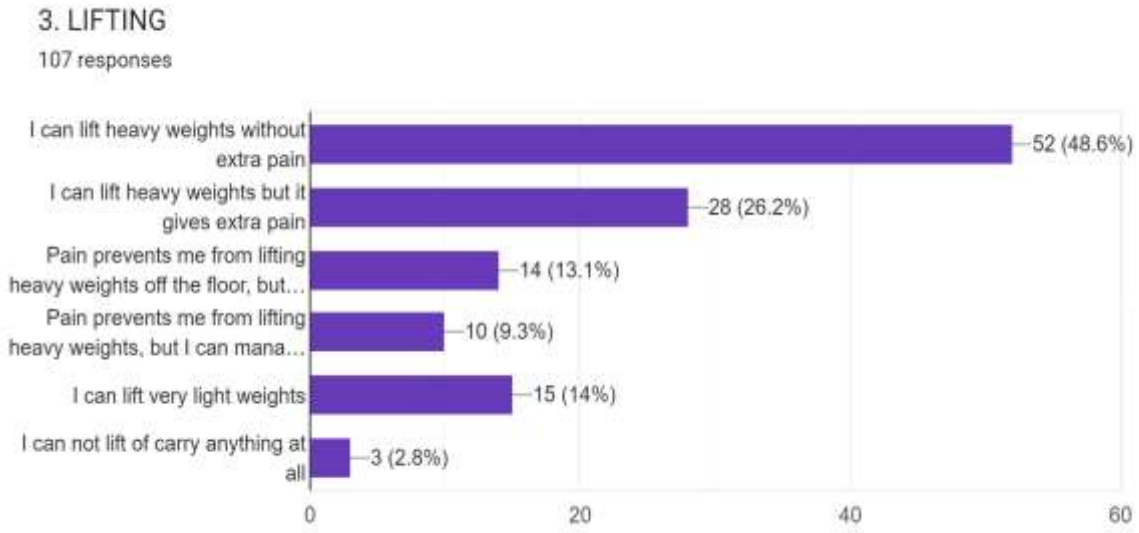
SCORE	DISABILITY LEVEL
0 – 4	No disability
5 – 14	Mild disability
15 – 24	Moderate disability
25 – 34	Sever disability
35 – 50	Completely disabled

- NO DISABILITY – The patient can cope with most living activities. Usually, no treatment is indicated apart from advice on lifting, sitting and exercise.
- MILD DISABILITY – The patient experiences more pain and difficulty with sitting, lifting and standing. Travel and social life are more difficult and they may be disabled from work. Personal care, sexual activity and sleeping are not grossly affected and the patient can usually be managed by conservative means.
- MODERATE DISABILITY – Pain remains the main problem in this group but activities of daily living are affected. These patients require a detailed investigation.
- SEVERE DISABILITY – Back pain impinges on all aspects of the patient's life. Positive intervention is required.
- COMPLETELY DISABLED – These patients are either bed-bound or are exaggerating their symptoms.

STATISTICAL ANALYSIS:

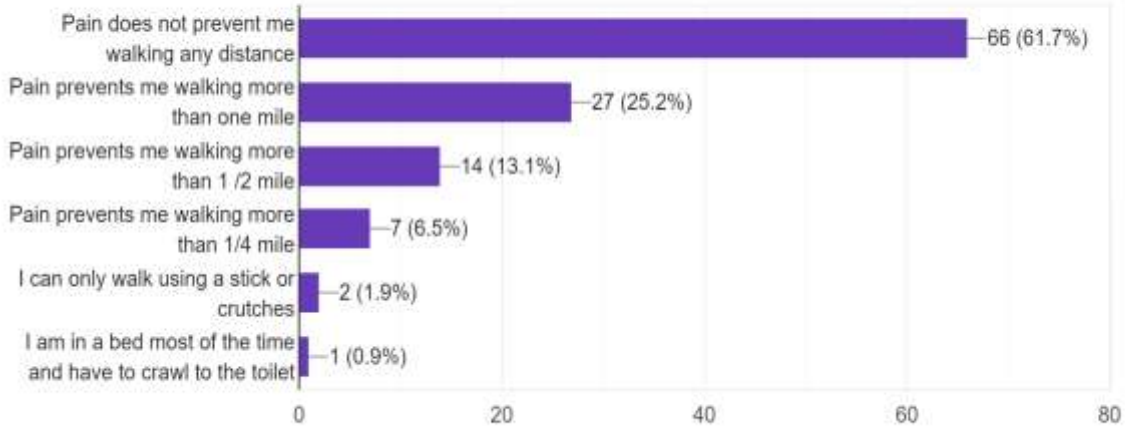



2. PERSONAL CARE (e.g- washing and Dressing)
107 responses
I can look after myself normally without causing extra pain
75 (70.1%)
I can look after myself normally but it causes extra pain
13 (12.1%)
It is painful to look after myself and I am slow and careful
13 (12.1%)
I need some help but manage most of my personal care
12 (11.2%)
I need help every day in most aspects of my self care
1 (0.9%)
I don't get dressed, I was with difficulty and stay in bed
2 (1.9%)
0
20
40
60
80


3. LIFTING
107 responses
I can lift heavy weights without extra pain
52 (48.6%)
I can lift heavy weights but it gives extra pain
28 (26.2%)
Pain prevents me from lifting heavy weights off the floor, but...
14 (13.1%)
Pain prevents me from lifting heavy weights, but I can mana...
10 (9.3%)
I can lift very light weights
15 (14%)
I can not lift of carry anything at all
3 (2.8%)
0
20
40
60

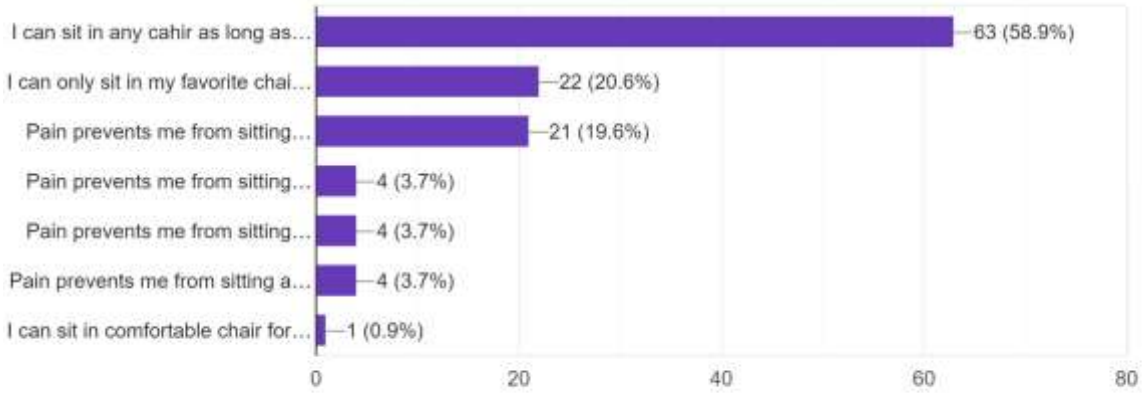
4. WALKING

107 responses



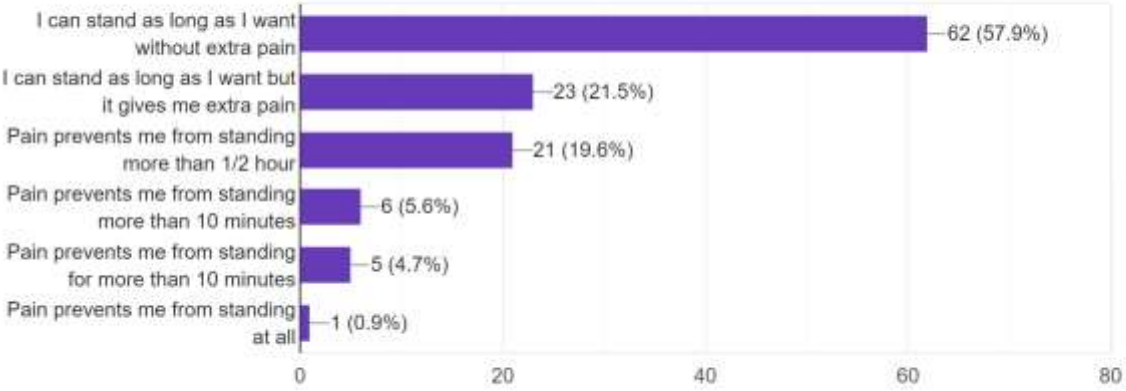
5. SITTING

107 responses



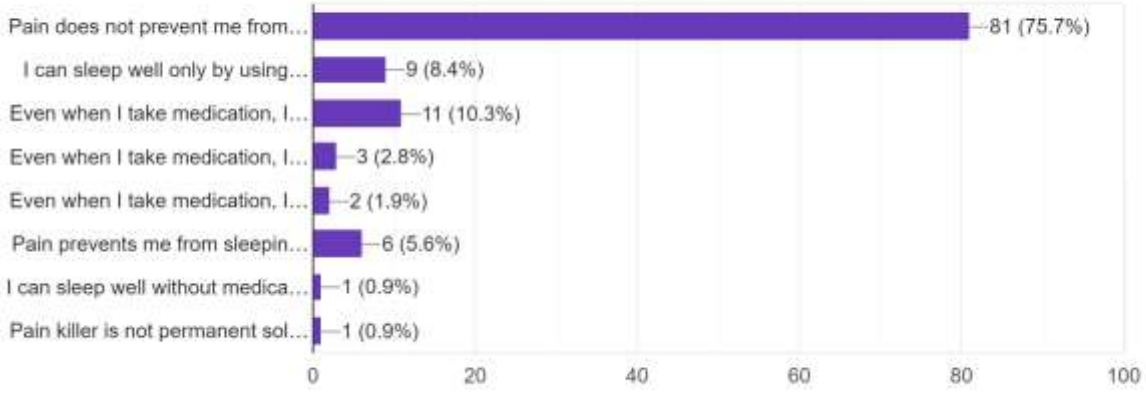
6. STANDING

107 responses



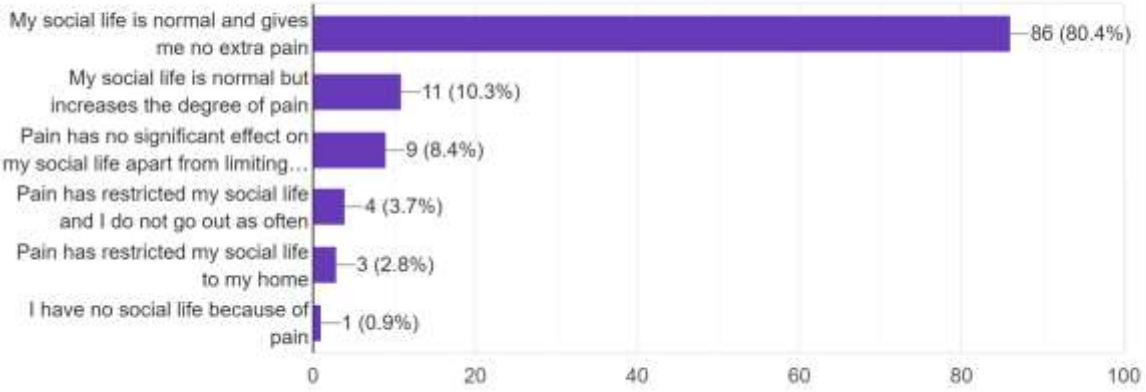
7. SLEEPING

107 responses



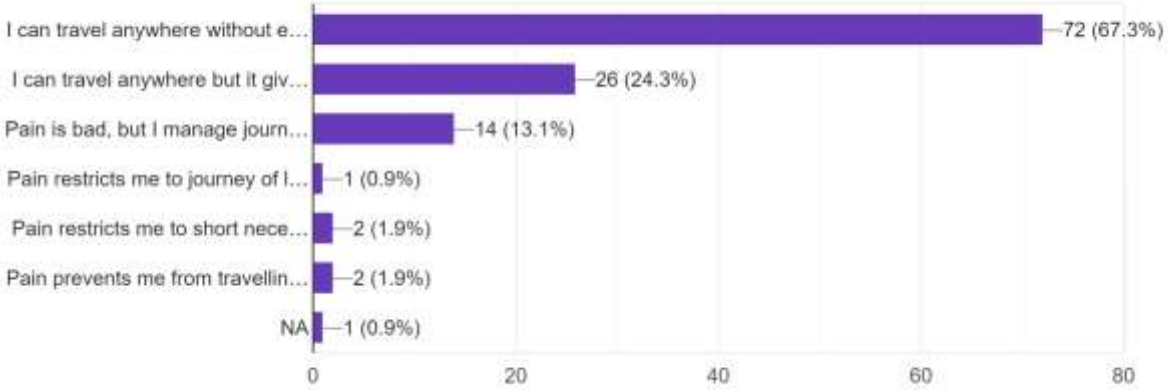
8. SOCIAL LIFE

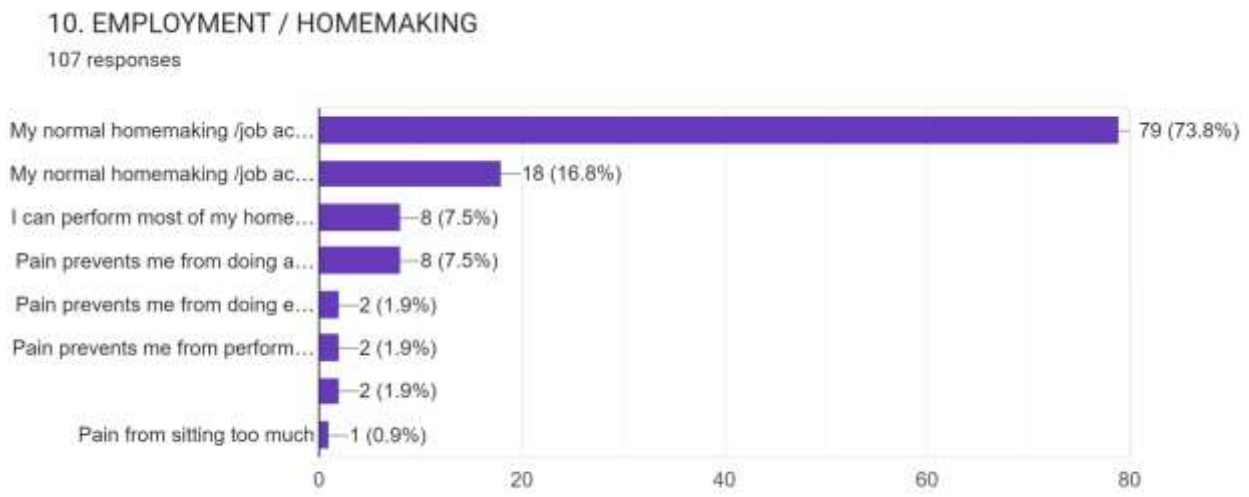
107 responses



9. TRAVELLING

107 responses





RESULT:

- A total of 107 replies were collected from the plant; of these, 57.9% said they didn't require medications, 20.6% said they had severe pain and didn't need them, and 11.2%, 12.1%, and 5.6% of people report total, moderate, or very little pain relief from opioids, while 0.9% report no pain relief at all, so they don't use them.
- For 70.1% of people, personal care is unaffected; for 12.1% of people, personal care is painful and slow; for 11.2% of people, personal care requires some assistance; for 1.9% of people, daily assistance is necessary for most personal care; and for 0.9% of people, getting dressed is impossible.
- Of those who lift heavy weights, 48.6% report no additional pain, 26.2% report pain; 13.1% report being able to lift high weights if they are positioned advantageously; 9.3% report being able to lift light to medium weights; 14% report being able to lift very light weights; and 2.8% report being unable to carry any weights.
- 11.9 percent can walk with a stick or crutches, 0.9% must crawl to the bathroom due to pain, 25.2% cannot walk more than one mile due to pain, 13.1% cannot walk more than half a mile due to pain, and 6.5% cannot walk more than one-fourth of a mile due to pain.
- While 20.6% can only spend a long time in their favourite chair, 58.9% can sit for extended periods of time in any chair. 9.9% of people are unable to sit at all, 19.6% of people can't sit for more than an hour, 3.7% can't sit for more than two hours, 3.7% can't sit for more than ten minutes, and 3.7% cannot sit at all.
- 21.5% of people who stand for extended periods of time experience discomfort. 19.6% of people are unable to stand for longer than an hour, 5.6% for longer than thirty minutes, 4.7% for longer than ten minutes, and 0.9% for no reason at all.
- Of those who can sleep, 75.7% do so painlessly, 8.4% can do so only with medicine, 10.3% can do so for less than six hours, 2.8% for less than four hours, 1.9% for less than two hours, and 5.6% are unable to sleep because of pain.

- For 80.4% of people, social life is normal and pain-free. 10.3% Social life is normal but makes pain worse, 8.4% discomfort prevents socially active engagement, 3.7% have a limited social life and are unable to go out as frequently. 2.8% limited their life to their home, and 0.9% avoided social interactions because of pain.
- Whereas 24.3% of people say that traveling causes more discomfort, 13% say that they can handle trips longer than two hours, 0.9% say that traveling is limited to less than an hour, 1.9% say they can complete brief, required trips in less than thirty minutes, and 0.9% say they are unable to travel.
- 7.5% are unable to perform more physically demanding tasks, 7.5% are limited to light duties, 1.9% are unable to perform even light duties, and 0.9% are unable to perform any job-related or household chores.
- 73.8% of people report that their activities at home or at work cause no discomfort, 16.8% are able to perform required activities while in pain.

DISCUSSION:

In order to characterize the occurrence of LBP, we investigate its prevalence among power plant engineers and employees. The study's hypothesis was that since thermal power plant engineers and workers spend a lot of time sitting and frequently twisting and bending their torsos, as well as being subjected to awkward postures, whole body vibration, and load lifting, LBP would be very common among them. The literature lists several significant risk factors for the development of lower back pain, including manual manipulation of materials, strenuous physical labour, frequent bending and twisting, lifting, and violent motions. In the study population, there was a noteworthy correlation observed between the intensity of low back pain and physical activity.

CONCLUSION:

LBP is highly prevalent in thermal power plant. Flexion of the trunk and lifting at work are moderate risk factors of LBP. An ergonomics interventions program in work place should focus on eliminating awkward postures, manual handling of heavy loads and designing sitting -standing workstation on the work line.

LIMITATIONS OF THE STUDY:

The research focuses only on Low back pain among the thermal power plant engineers and workers in Jamnagar.

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