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## Prevalence of musculoskeletal symptoms among car mechanics in Pimpri-Chinchwad municipal Corporation, Pune

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### Abstract

**Introduction:** The most commonly reported occupational health problems by the mechanics were musculoskeletal diseases (87.4%), and this could be due to the discomforting positions they are forced to adapt in the process of their work <sup>[1]</sup>. When asked which symptoms had been most troublesome at work most mechanics reported symptoms from the lower back, upper back, shoulders and neck <sup>[2]</sup>. Car mechanics mostly work standing on a floor made of cement or of similar hard materials. This work requires that mechanics have to work for prolonged periods with their spine flexed forward and/or with their arms flexed at or above shoulder level. These working postures are strenuous for the back and shoulders <sup>[2]</sup>.

**AIM:** To assess the prevalence of musculoskeletal symptoms among car mechanics.

**Objective:** To assess the musculoskeletal symptoms in various body parts among car mechanics. To compare relation between age and pain. To conduct the statistical result of the prevalence.

**Methodology:** An observational cross-sectional study was performed on 100 car mechanics, with minimum of 5 years of work experience and of age group ranging between 20-40 years, with minimum of 8hrs of working period. They were assessed on the basis of Standardized Nordic questionnaire.

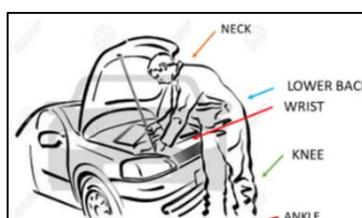
**Data Analysis and Result:** Statistical analysis was done using Chi square test. Out of the 100 subjects 84% had reported with 'Pain' whereas the rest 16% reported with 'No pain'. In the present study, majority of them experienced pain in the lower back (53%) followed by- wrist (32%), ankle (23%), knees (20%), elbow (13%) and neck and shoulder (12%) each. Many of them complained of experiencing pain as a barrier in carrying out their normal activities (household work and job activities)-84% reported pain as a barrier in lower back, wrist 77%, ankle 63% and 94% in knee. Owing to the complaints reported, it was studied that very few visited a physician, for: lower back-39%, wrist-38%, knees-37%, ankle-16%. In the last 7days when enquired about their pain, major complains reported were of-Lower back > wrist > ankle > knees.

**Conclusion:** The prevalence of MSS obtained in car mechanics was of 84% and the ratio of LBP in these subjects was high (53%) compared to the other joint involvement. With the p value being 0.23, the relation between the age group and pain stands insignificant as the number of subjects in each group were unequal.

**Keywords:** car mechanics, prevalence, musculoskeletal symptoms, standardized nordic scale.

### Introduction

The most commonly reported occupational health problems by the mechanics were musculoskeletal diseases (87.4%), and this could be due to the discomforting positions they are forced to adapt in the process of their work <sup>[1]</sup>.



**Fig 1:** Flexed posture attained during work

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The most common Musculoskeletal Symptoms (MSS) were symptoms from the low back, neck, head and shoulders. When asked which symptoms had been most troublesome at work most mechanics reported symptoms from the lower back, upper back, shoulders and neck [2].

Car mechanics mostly work standing on a floor made of cement or of similar hard materials. People who continuously stand while working are more likely to suffer from pain and aching in the legs and low back than others. 6"8 in a study of car mechanics' working postures Kant *et al.*, 9 found that many car repairs are done under the bonnet and underneath the car. This work requires that mechanics have to work for prolonged periods with their spine flexed forward and/or with their arms flexed at or above shoulder level. These working postures are strenuous for the back and shoulders [2].

Road side automobile mechanics belong to an informal sector of a developing country like India. There are various hazards in the occupational environment to which mechanics may be exposed like work-related injuries, chronic illness, stress, and disability [3].

Exposure to physical, mechanical and chemical hazards, and the performance of unsafe practices by workers are the leading causes of work-related injuries. Encouraging practices of occupational safety through health education is the practicable and feasible means of reducing or preventing the exposure of welders to various hazards [3].

Shin at al showed that one of the risk factors of worker's lower back pain was working more than 45 h per week and Le found in his cohort study that workers who consistently worked more than 48 h per week had a higher risk of lower back pain and the prevalence of lower back pain was decreased in case that working hours were reduced [8].

The Nordic Musculoskeletal Questionnaire (NMQ) was developed from a project funded by the Nordic Council of Ministers. The aim was to develop and test a standardized questionnaire methodology allowing comparison of low back, neck, shoulder and general complaints for use in epidemiological studies [6].

**1. Need of Study:** In this fast upcoming world people are dependent on vehicles for all their due course of work. Thus the maintenance of these vehicles are a task.

Among the car and bike mechanics, the % of MMS among car repair mechanics are more compared to the bike repair mechanics due to their strenuous, forward flexed postures under the bonnet and supine work under the car [2].

Researches have found that around 87% of Car repair mechanics are mostly exposed to a variety of ergonomic hazards and risk factors of musculoskeletal system [1].

Ergonomic awareness and advices between the car mechanic employer and employee with training and information sharing shall reduce the prevalence of MSSs through which their quality of work can be enhanced.

Hence the need of this study is to determine the prevalence of musculoskeletal symptoms among car mechanics in PCMC Pune.

**2. AIM:** To assess the prevalence of musculoskeletal symptoms among car mechanics.

**3. Objectives:** To assess the musculoskeletal symptoms in various body parts among car mechanics. To compare

relation between age and pain. To conduct the statistical result of the prevalence.

**4. Methodology:** Observational study performed on 100 car repair mechanics, Mechanics with 5 years of work experience, ranging between 20-40 years of age with minimum 8 hours of working period per day, selected by purposive sampling. Exclusion Criteria: Any neurological disorders, systemic illness, deformities, acute injuries, Major surgeries, Performing regular exercise, Lorry mechanics, painters etc.

**5. Materials:** Nordic questionnaire scale.

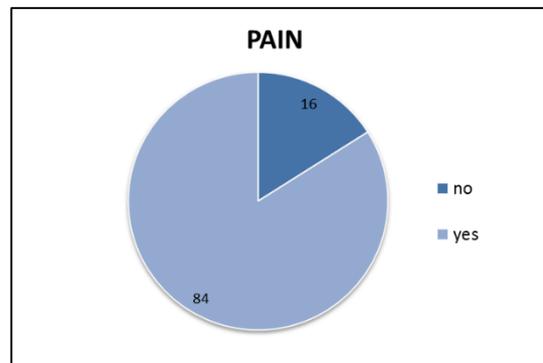
**6. Outcome Measure:** Standardized Nordic Questionnaire.

**7. Procedure:** Ethical approval was taken. Subjects were selected by purposive sampling. Procedure was explained to the subject. Informed consent was taken. The subjects were asked to answer the given questions in YES or NO.

**8. Data Analysis and Result:** A total of 100 car mechanics were taken for the study. Standardized Nordic Questionnaire was used. All of the analyses were performed with EpiInfo biostatistics software. Chi square test was used for statistical analysis.

**Table 1:** Total number of mechanics with and without pain

Pain	Frequency	Percentage%
Yes	84	84%
No	16	16%
Total	100	100%



**Fig 1:** Pain Pie Chart

The above table and pie chart shows the frequency and percentage (%) of number of mechanics that have reported with 'Yes' and 'No' pain. Out of the total of 100 subjects 84 i.e. 84% have reported with 'Yes' pain whereas the rest 16 i.e. 16% have reported with 'No' pain.

**Table 2:** Exact 95% confidence limits

Yes	75.32%	90.57%
No	9.43%	24.68%

The above table shows the Exact 95% CI of fig-1: Pain Pie chart.

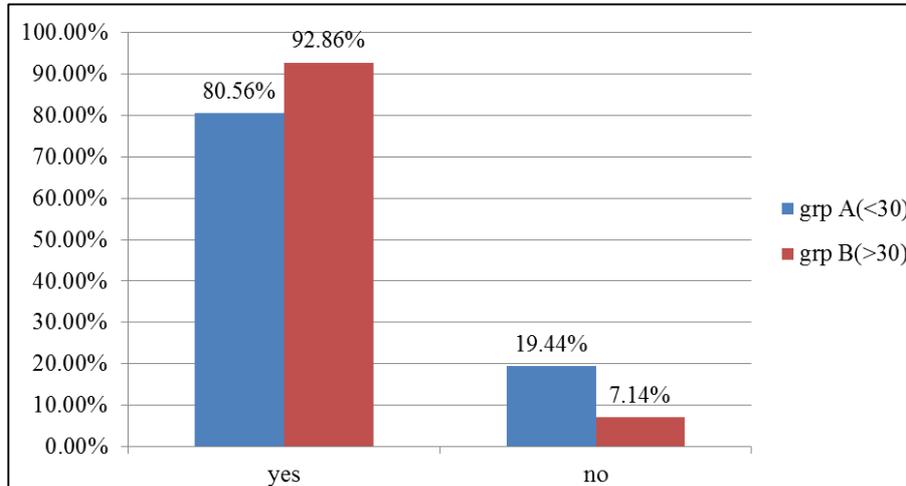
According to the Exact 95% Confidence Limits, the pain value i.e. 84% reported by the car mechanics with 'Yes' Pain can vary ranging between 75.32% - 90.57%.

And 'No' Pain can vary ranging between 9.43% - 24.68%.

**Table 3:** Relationship between specific age group and pain intensity accordingly.

Age Group	Yes	No
Group-a (<30 yrs)	58 (80.56%)	14 (19.44%)
Group-b (>30 yrs)	26 (92.86%)	2 (7.14%)

Out of the total 100 subjects participated in the study, of age group ranging between 20-40 years were divided into two groups respectively.



**Graph 1:** % of pain reported by Group- A and Group- B

In the above graph Group-A reported of 80.56% of mechanics with pain whereas Group-B with 92.86%. The ODD's RATIO of the above table and graph summed up to 0.3187 with a 95% CI of 0.07. The above calculation was done with the help of Chi Square test using a Two by Two Table (table 4).

**Group A:** Mechanics of age group below 30 years of age from which a total of 58 mechanics out of the 84 had reported of experiencing pain whereas,

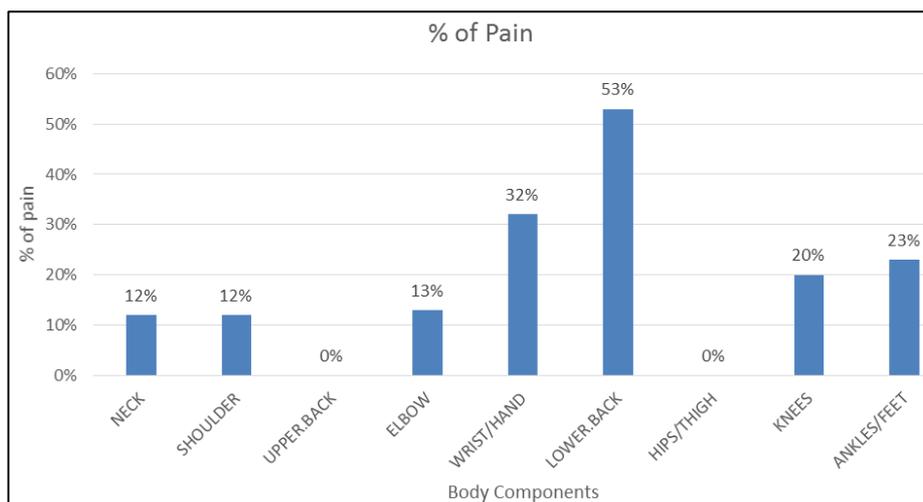
**Group B:** Mechanics of age group above 30 years of age; a total of 26 mechanics out of the 84 had experienced pain.

**Table 4:** Chi Square test using a Two by Two Table

<b>Chi Square</b>	<b>1.45</b>
<b>DF</b>	<b>1</b>
<b>P Value</b>	<b>0.23</b>

With the p value being 0.23, the relation between the age group and pain stands insignificant. Since the distribution of car mechanics in each group were not of equal number, where Group-A consisted of more number of car mechanics compared to Group-B.

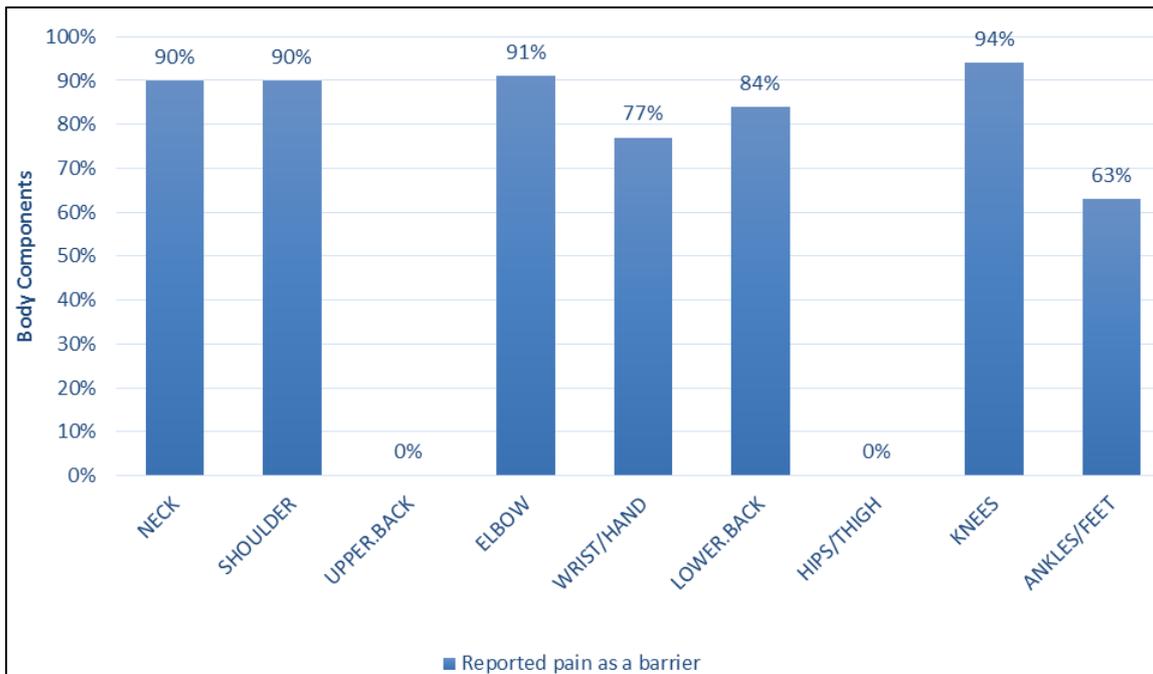
**Q1:** Have you at any time during the last 12 months had trouble (Ache, pain, discomfort, numbness)



**Graph 2:** % of pain in respective body components.

The above graph shows that majority of the car mechanics in the last 12 months experienced pain in the lower back (53%) followed by pain in the wrist (32%), ankle (23%), knees (20%), elbow (13%) and neck and shoulder (12%) each.

**Q2:** During the last 12 months have you been prevented from carrying out normal activities (job, housework, hobbies) because of this trouble in:

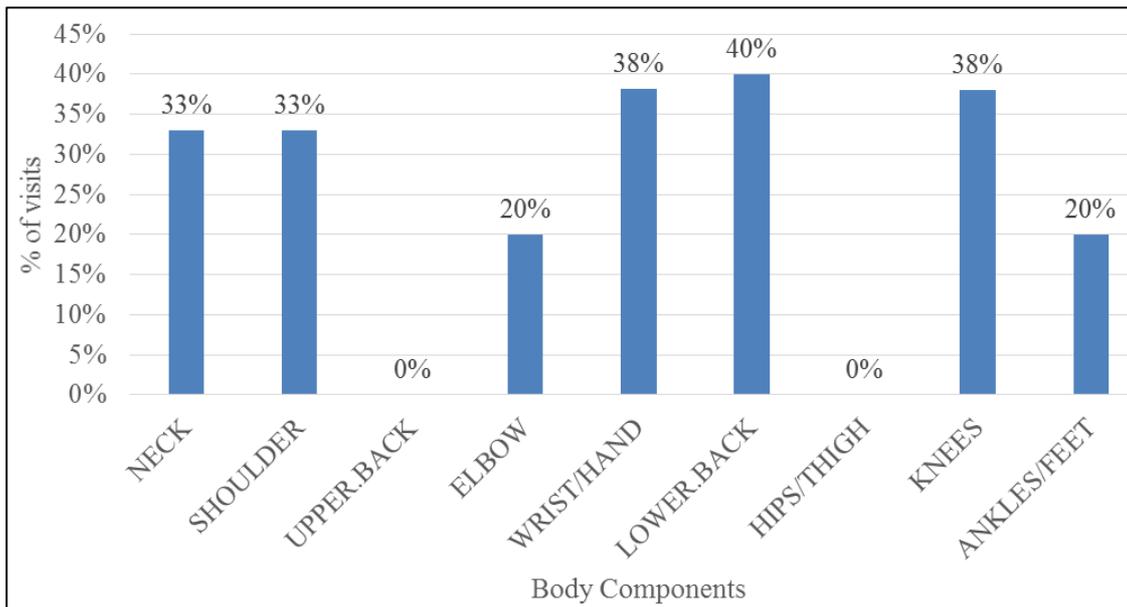


**Graph 3:** % of mechanics who have reported pain as a barrier in their ADL's.

The above graph shows that many of the car mechanics in the last 12 months complained of experiencing pain as a barrier in carrying out their normal activities i.e. household work and job activities-84% reported pain as a barrier in

lower back, similarly 77% with wrist pain, 63% with ankle pain and 94% with knee pain.

**Q3:** During the last 12 months have you seen a physician for this condition.

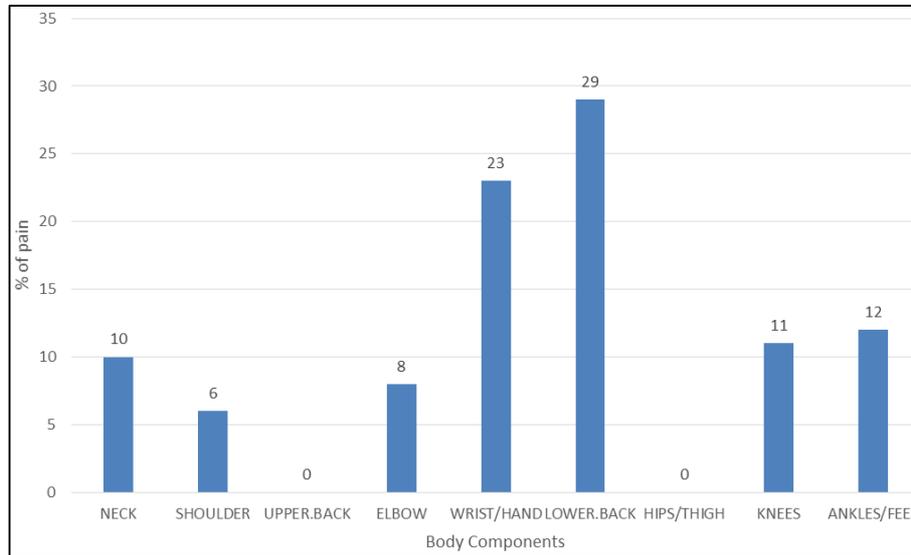


**Graph 4:** % of mechanics that visited the physician in last 12 months.

The above graph shows that Owing to the complaints reported during the last 12 months, it shows that very few of the total mechanics who have complained of pain had

visited a physician for the same, For: lower back-39%, wrist-38%, knees-37%, ankle-16%.

**Q4:** During the last 7 days have you had trouble



**Graph 5:** % of pain experienced in last 7 days.

The above graph shows the % of pain that was experienced among the car mechanics during the last 7 days which reports of highest in-Lower back > wrist > ankle > knees.

**9. Discussion:** The most commonly reported occupational health problems by the mechanics were musculoskeletal diseases, and this could be due to the discomforting positions they are forced to adapt in the process of their work<sup>[1]</sup>.

According to Torp S, Riise T, Moen BE<sup>[4, 16]</sup>, In Malaysia, the study shows that MSD\*\* prevalence among Malaysian auto repair mechanics is higher than prevalence in developed country such as Norway<sup>[2]</sup>

A study conducted in Nigeria, one among the non-developed countries showed a rate of 78% of mechanics with lower back pain<sup>[5]</sup>

Based on a study conducted by Ahmad Nasaruddin, Mohd Tamrin and Karupiah<sup>[1]</sup>, around 64% of them complained of having pain pertaining to joints in knee area<sup>[1]</sup>.

Principally, in Indian automobile sector, mechanics usually adopt standing, bending and twisted, seated, stooping, supine and overhead working postures in awkward working condition<sup>[4]</sup>.

Our study shows high prevalence of musculoskeletal symptoms among car mechanics with extended duration of working hours and flexed posture.

In the present study, majority of them experienced pain in the lower back (53%) followed by pain in the wrist (32%), ankle (23%), knees (20%), elbow (13%) and neck and shoulder (12%) each.

Many of them complained of experiencing pain as a barrier in carrying out their normal activities i.e. household work and job activities-84% reported pain as a barrier in lower back, similarly 77% with wrist pain, 63% with ankle pain and 94% with knee pain.

Owing to the complaints reported, it has been studied that very few visited a physician for the same, for: lower back-39%, wrist-38%, knees-37%, ankle-16%.

In the last 7 days when enquired about their pain, major complains reported were of:-

**Lower back > wrist > ankle > knees.**

In the present study, mechanics reported experiencing lower back pain more than the other components as they have to constantly lift heavy items which strains their back, attaining awkward postures and long hours of bent over posture. A study done by Ofonime Effiong Johnson<sup>[2]</sup>, reported with similar results in lower back<sup>[5]</sup>.

The wrist was the second most pain reported by the mechanics; a study done by Pragya Oja and Deepa Vinay<sup>[3]</sup> also reported that due to high repetitive demands and requiring multiple dynamic movements, there are possibilities of incurring Cumulative Trauma Disorders<sup>[4]</sup>.

**10. Conclusion:** The prevalence of MSS obtained in car mechanics was of 84% and the ratio of LBP in these subjects was high (53%) compared to the other joint involvement. With the p value being 0.23, the relation between the age group and pain stands insignificant as the number of subjects in each group were unequal.

**11. Conflicts Of Interest:** there was no conflict of interest.

**12. Funding:** no funding issue.

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