

Original Article

Prevalence of musculoskeletal disorder among agricultural workers in rural area of Tamil Nadu: A cross sectional study

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Abstract

Introduction: Agriculture is one of the major occupations in India and millions of workers are involved in agriculture related activities. Due to exposure to multiple external factors, these workers are prone to develop various health problems and musculoskeletal disorders are one among them. **Objectives:** The study focused to find the prevalence and the factors associated with musculoskeletal disorders (MSDs) and to identify the remedies used by the agricultural workers to relieve the problems associated with MSDs. **Methodology:** A community based cross sectional study was conducted among 300 agricultural workers in a rural area of Tiruchirappalli, Tamil Nadu. Nordic Musculoskeletal Questionnaire was used to identify the presence of MSD and information on socio-demographic details, occupation, work activities and duration of work, self reported co morbidities and anthropometric measurements were taken. The data was analyzed using Epi info 7.2. The results of descriptive analysis and chi square test were presented in the form of mean and percentages. **Results:** Out of 300 agricultural workers, 53.7% were males. The mean age of the study group was 50.64±8.4 years. Musculoskeletal disorders were present among 84.3% of the study group. Low back ache was the most common (30.83%) musculoskeletal disorder followed by knee pain, problems in the shoulder, neck, upper back, hip, wrist and elbow. Significant association between the presence of MSD and age of the individuals, years of involvement in agricultural work was observed and there was no significant relation between MSD and gender and body mass index of the workers. Routine activities of 28% of the workers were affected due to presence of MSD. Only 56% of the workers with musculoskeletal disorder had medical consultation for their problem. **Conclusion:** Musculoskeletal disorders are significant health problem among agricultural workers which has potential to interfere with their occupational activities and also the routine work. **Key words:** agriculture, factors, musculoskeletal disorders, prevalence, workers

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This article may be cited as: Hemalatha K, Bharanidharan G, Anusha T. Prevalence of musculoskeletal disorder among agricultural workers in rural area of Tamil Nadu: A cross sectional study. HECS Int J Com Health and Med Res 2017;3(3):26-31

INTRODUCTION

Musculoskeletal disorders include almost 150 various health problems and syndromes.¹ These disorders comprises of health problems related to multiple locomotor apparatus including bones, muscles, tendons, ligaments, cartilages and nerves.² Musculoskeletal disorders (MSDs) most often occurs when the work load exceeds the capacity that the locomotor apparatus can bear. There are multiple risk factors related to the occurrence of musculoskeletal disorders. Occupation as a risk factor of musculoskeletal disorder was recognized in early 18th century and the causal association between occupation and

MSDs was proved later in 1970s.² Health problems due to musculoskeletal disorders occur due to the factors like mechanical over load, repetitive movements, improper posture, long duration of work and chronic exposure to all the above factors.^{3,4} Agricultural farmers and workers engage in activities which requires physical labour for long duration of time and they are exposed to multiple risk factors of MSD including abnormal posture, lifting heavy loads, exposure to vibration, slips and falls and other manual labour which makes them more prone to develop MSDs.⁵ Based on the International Labour Organization, Globally 74% of the agricultural workers are living in Asia

and Pacific regions.⁶ Since 68% of the population is living in rural areas, agriculture based activities play an important role in improving the rural economy of India.⁷ Agriculture and its related activities have provided nearly 60% of the employment opportunities in India.⁸ Work related musculoskeletal disorders are found to be associated with work absenteeism, loss of productivity and economic loss to the worker, industry and the nation.^{9,10} Agriculture and its allied sectors have contributed to 18.2% of the Gross Domestic Product (GDP) of India for the year 2013-14.¹¹ Presence of MSDs among agricultural workers will result in reduction in their work capacity which may reflect in reduction in economic contribution from agriculture sector. Agriculture sector in India is mainly unorganized with only 2.4% of the agricultural activities are being formal.^{12,13} Though measures have been taken by Government of India to enhance the availability of social security measures to large section of informal agricultural workers, coverage of health insurance and other social security services remains less for these workers¹⁴ and hence the health of the farmers is more or less neglected. The present study was conducted to find the prevalence and factors associated with musculoskeletal disorders among agricultural workers and to identify various remedies sought by them to overcome the problem.

MATERIAL AND METHOEDS

A community based cross sectional study was done for a period of 3 months from December 2016 to January 2017 in the rural health training centre(RHTC) service area of the Chennai Medical College Hospital and Research Centre. This tertiary care teaching institute is located in the rural area of Tiruchirappalli district of Tamil Nadu. The study included agricultural workers aged more than 20 years residing in RHTC area at least for the past one year. Using convenient sampling method, 300 agricultural workers were selected from the RHTC service area. House visits were made by the study investigators and one adult member in each family was selected randomly for the study purpose. In the households where family members were not available during first visit, two more visits have been made to ensure data collection. After obtaining informed written consent a pretested, structured, interviewer administered questionnaire was used for data collection. Modified Nordic musculoskeletal questionnaire was used for

assessing the presence of musculoskeletal problem in each individual.¹⁵ The questionnaire assesses the troubles faced by an individual due to musculoskeletal problems in the last 12 months and 7 days. The Nordic questionnaire has been proved to identify significantly more MSDs when it is administered as a part of focused study than in a general examination.¹⁶ In addition to Nordic questionnaire, socio-demographic details of the participant, occupation details, and anthropometric measurements were also taken. The collected data was entered and analyzed using Epi info version 7.2. The results were presented in the form of mean and percentages using a simple descriptive analysis. To assess the association between independent variables and MSD, chi-square test was performed.

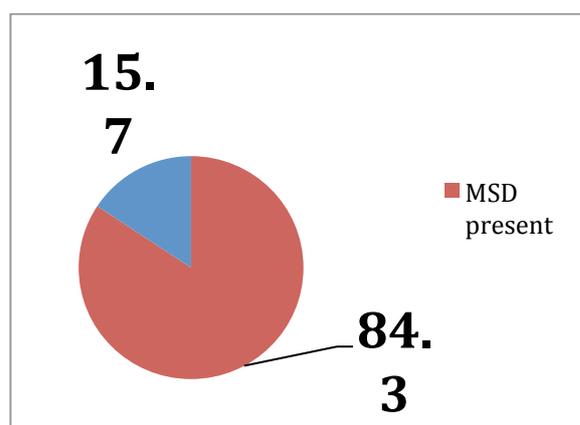
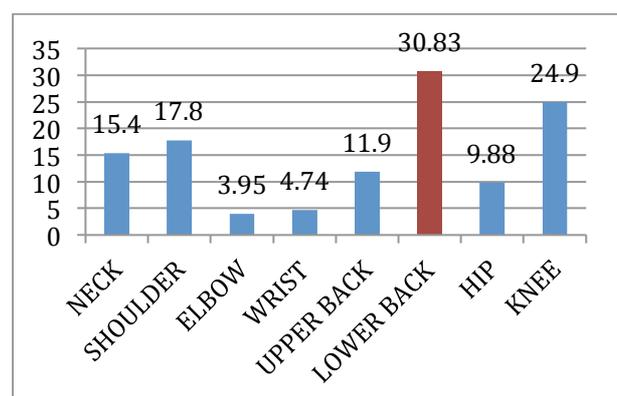
RESULT

Among the 300 agricultural workers participated in this study, majority of were in the age group between 40 to 60 yrs (55%). The mean age was 50.64±8.4 years. Almost 54% of the study group was constituted by males. Only 2% of the agricultural workers participated in this study were unmarried and the rest were married. The mean body mass index of the surveyed agricultural farm workers was 23.78± 3.22. Body mass index was normal in 75.7% workers and 21.7%, 2.6% were overweight and obese respectively. Majority of farmers (70.3%) did not have any associated systemic illness and 18.7% had Type 2 diabetes mellitus and 8.7% of them had systemic hypertension. With regards to the duration of involvement in agricultural activities, a maximum of 32.7% have been working for a period of about 5-10 years, 27.7% for a period of 10-15 years and 15%, 13% and 11.7% of the participants were agricultural workers for <5 years, >20 years and 15-20 years respectively. About 59.3% people participated in the survey used to work for about 4-6 hours a day and 0.3% were working for 8-10 hours. Another 18% and 22.3% were working for 6-8 hours and 2-4 hours per day respectively. Out of the 300 workers surveyed, about 84.3% people (253) had at least one musculoskeletal disorder (Figure 1). Based on the NORDIC questionnaire, of all the farm workers who suffered from musculoskeletal disorders, 30.83% people had low backache which was most common MSD reported followed by knee pain in 24.9% and elbow was the least affected site (3.95%) [Figure 2]. Among those who had at least one MSD, almost two-third of the

Table 1: Association between independent variables and musculoskeletal disorders

| Independent variables | MSD present N(%) | MSD absent N(%) | Total N(%) | χ^2 value | p value |
|---|---------------------|--------------------|------------------|-------------------|---------|
| Age (years) | | | | | |
| 20-39 | 39 (63.9) | 22 (36.1) | 61 (100) | 33 | 0.00* |
| 40-59 | 140 (84.8) | 25 (15.2) | 165 (100) | | |
| ≥60 | 74 (100) | 0 (0) | 74 (100) | | |
| Gender | | | | | |
| Male | 132 (82) | 29 (18) | 161 (100) | 1.45 | 0.22 |
| Female | 121 (87.1) | 18 (12.9) | 139 (100) | | |
| Body Mass Index | | | | | |
| Normal | 191 (84.1) | 36 (15.9) | 227 (100) | 0.69 | 0.7 |
| Overweight | 56 (86.2) | 9 (13.8) | 65 (100) | | |
| Obese | 6 (75) | 2 (25) | 8 (100) | | |
| Years of involvement in farming activity | | | | | |
| 1 to 9 | 113 (79) | 30 (21) | 143 (100) | 5.84 | 0.016* |
| ≥10 | 140 (89.2) | 17 (10.8) | 157 (100) | | |
| Total | 253 (84.3) | 47 (15.7) | 300 (100) | | |

*p value significant

Figure 1: Proportion of agricultural workers with musculoskeletal disorder**Figure 2: Distribution of musculoskeletal disorder based on the anatomical site affected**

*percentage exceeds 100 due to multiple MSD in one single worker

individuals were suffering from the problem for the past 1 to 5 years. Remaining 14.5%, 11.03% and 8.4% suffered with MSD for less than 6

months, 5 to 10 years and 6 months to 1 year respectively. Out of all farmers who were suffering from musculoskeletal disorders, 33.57% had a

history of trauma to the affected site. The participants were asked whether they have felt any variation in the discomfort felt due to the MSDs with change in climate and 64.88% did not have any variation related to climate but 20.16% said that they have experienced pain more during winter season and 15.06% had more pain in summer. Out of all the study participants who had musculoskeletal disorders (253), 28.1% farmers had to reduce their routine activities because of the limitations in the activities caused due to the presence of MSDs. Among those who were suffering from MSDs, 14.9% have planned to change their job because of the inability to continue with agricultural work due to pain and discomfort caused by MSD. When it comes to health care seeking for MSDs, only 56.1% have consulted a doctor for their problems due to MSD. Persons those who suffered with MSD also used other measures like hot fomentation (23.2%), taking rest (22.5%), massage (20.1%), self medication (17.1%), and consuming alcohol (17.1%) as a remedy for their problem. More than one-fifth of the study group with MSD (2.5%) was hospitalized due to the problems related to MSD in the past 1 year. With chi square test, age of the individual had statistically significant association with the occurrence of musculoskeletal disorder. Presence of MSD increased with increase in age of the individuals. (χ^2 value 33; p value 0.000). Prevalence of MSD was high in female workers compared to male workers. However, the difference was not statistically significant (χ^2 value 1.45; p value 0.22). There was no statistically significant association between the body mass index and musculoskeletal disorder among the participants (χ^2 value 0.69; p value 0.7). With increase in years of involvement in agricultural activities as prime occupation, there was a significant increase in the occurrence of MSD (χ^2 value 5.84; p value 0.016) [Table 1].

DISCUSSION

Agriculture related activities are associated with highly demanding physical labour and it encompasses tasks like carrying heavy loads, persistent bending during work, repetitive activities.¹⁷ In the present study prevalence of musculoskeletal disorder among the agricultural workers was 84.3%. Prevalence of MSD in the present study was higher than the prevalence reported by another study by Osborne *et al*.¹⁸ Low back pain was the most common MSD which was present in the participants of the present study. Pain in the knee was the next common problem

identified. Multiple other studies carried out elsewhere have shown that low back ache and knee pain were the most common MSD among agricultural workers.^{18,19,20,21,22} Elbow was the region which was least affected among the workers involved in this study. Similar reports were presented by few other studies^{18,19,20,21} with an exception of a study done by *Gangopadhyay et al* where highest proportion of MSD was observed in upper extremity among agricultural workers.²³ Low back ache was present in 30.83% of the individuals who were suffering with MSD. The proportion of individuals affected with low back pain in this study was less than the results observed in multiple other research studies.^{18,20,21} More than 50% of the study group was aged between 40 to 60 years. Presence of MSD increased with increase in age of the workers. Similar positive association between age and MSD was identified and presented in other studies.^{18,21,24} Though higher proportion of females had MSD than males, the result was not statistically significant. In their study, Xiao *et al* also found that more females were affected with MSD in all anatomical sites examined for the presence of MSD.²⁴ Body mass index of the agricultural workers did not have a significant effect on presence of musculoskeletal disorders. A study done in Iran by Omran *et al* also reported that MSD among farmers was not significantly related to BMI of the individuals.²¹ In the present study, long duration of involvement in farming activities was associated with high prevalence of MSD. When an individual is involved in agriculture related activities, over years the occurrence of MSD increases with increase in years of involvement in farming work which was proved by other studies.^{18,25,26} Climatic factors, particularly cold temperature was shown to increase the occurrence of work related MSD among workers of various sectors.²⁷ In the present study, 20% of the workers have experienced more pain and sufferings due to MSD during winter season.

CONCLUSION

The prevalence of musculoskeletal disorder was high with low rate of health care utilization for the problems associated with MSDs. Musculoskeletal disorders were severe enough to interfere with the occupational activities and also daily routine activities of the workers which warrant immediate medical attention and rehabilitation measures for change in occupational work of the affected individuals.

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Conflict of Interest: None

Source of Support: None

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