

Original article

Prevalence of musculoskeletal disorders among sugarcane workers – a cross sectional study

¹Miss. Smita Yashvants Vasave* , ²Dr. Deepak B. Anap

¹Physiotherapy Student, PDVVPF's, College of Physiotherapy, Ahmednagar (M.S.)

²Associate Professor, PDVVPF's, College of Physiotherapy, Ahmednagar (M.S.)

Corresponding author*

Abstract

Background: Work related musculoskeletal disorders affect millions of people around the world and are the most common cause of severe long-term pain and physical disability. Sugarcane workers are involved in heavy lifting, bending, cutting and twisting activities. Our study objective was to find out the prevalence and identify most commonly affected body regions among sugar cane worker.

Procedure: The Ethical clearance was obtained for the study from Institutional Ethical Committee of PDVVPF, COPT, Ahmednagar. Written informed consent was obtained from all the subject fitting in inclusion criteria. Initially the demographic data i.e Name, Age, Gender, Height, Weight & BMI was assessed and standardized Nordic questionnaire was filled up by every participant.

Result: The descriptive statistical analysis of data (N=100, Workers, Males-57 & Females-43).The most commonly affected body regions are low back pain(50%) & knee pain(29%).

Conclusion: The result shows that prevalence of MSDs is high in sugarcane workers. The highest prevalence of MSDs for the last twelve months is on the low back & knee.

Key words: Work related Musculoskeletal disorders, Standardised Nordic Questionnaire

INTRODUCTION

MSDs are defined as a group of disorders that affect the musculoskeletal system including the nerves, tendons, muscles & supporting structures such as intervertebral discs ^[1]. MSDs affect millions of people around the world and are the most common cause of severe long-term pain and physical disability. In addition to their physical effects, MSDs affect the psychosocial status of individuals and impact on their families and carers ^[2]. The MSDs problems are associated with work related physical risk factors such as repetitiveness, work environment and psychosocial factors ^[3]. The WMSDs problems

are the major complaints received from the workers performing repetitive task ^[4].

The symptoms of MSDs are typically stress, sickness, a noticeable decrease in overall physical activity levels, the inability to perform certain other physical activities, decreased working efficiency, and a low quality of life. ^[5] The disorder takes on a more serious dimension when it becomes chronic.

Sugarcane workers are directly involved in the production process and are therefore exposed to most of the associated risk factors. The few existing studies show that sugarcane work is characterized by extreme repetition, forceful movements, continuous

body contortions, awkward postures, high workloads, and psychosocial pressures.^[6] Examples of some of the physical hazards that workers face include lifting and carrying heavy loads, working with the trunk frequently flexed, risk of trips and falls on slippery and uneven walkways, risk of accidents caused by the unpredictable actions of livestock and exposure to vibration from farm vehicles and powered hand tools.^[7]

As sugar cane farms are highly heterogeneous workplaces, workers are exposed to different types of health risk depending on the type and level of working activity. As a consequence, it may be expected that the incidence and nature of MSDs will vary between sugar cane workers.

There was hardly any literature available on prevalence of WMDs in sugarcane workers in rural Maharashtra. Hence this observational study was

undertaken to find out prevalence of work related musculoskeletal disorders and identify most commonly affected body regions among sugar cane worker.

Material and Method

Ethical clearance was obtained from institutional ethical committee, PDVVPF'S College of Physiotherapy. Written inform consent was taken from all participants. Demographical characteristics were assessed in the beginning (Name, Age, Height, weight, BMI). All participants included in the study were asked to fill up the Nordic questionnaire. The Nordic Musculoskeletal Questionnaire is suitable for application in work places and for a large number of workers very quickly and cheaply. This questionnaire included nine body areas including neck, shoulders, back, elbows, wrist/hands, thighs, knees, and ankles. Depending on the Reponses the result was analyzed.

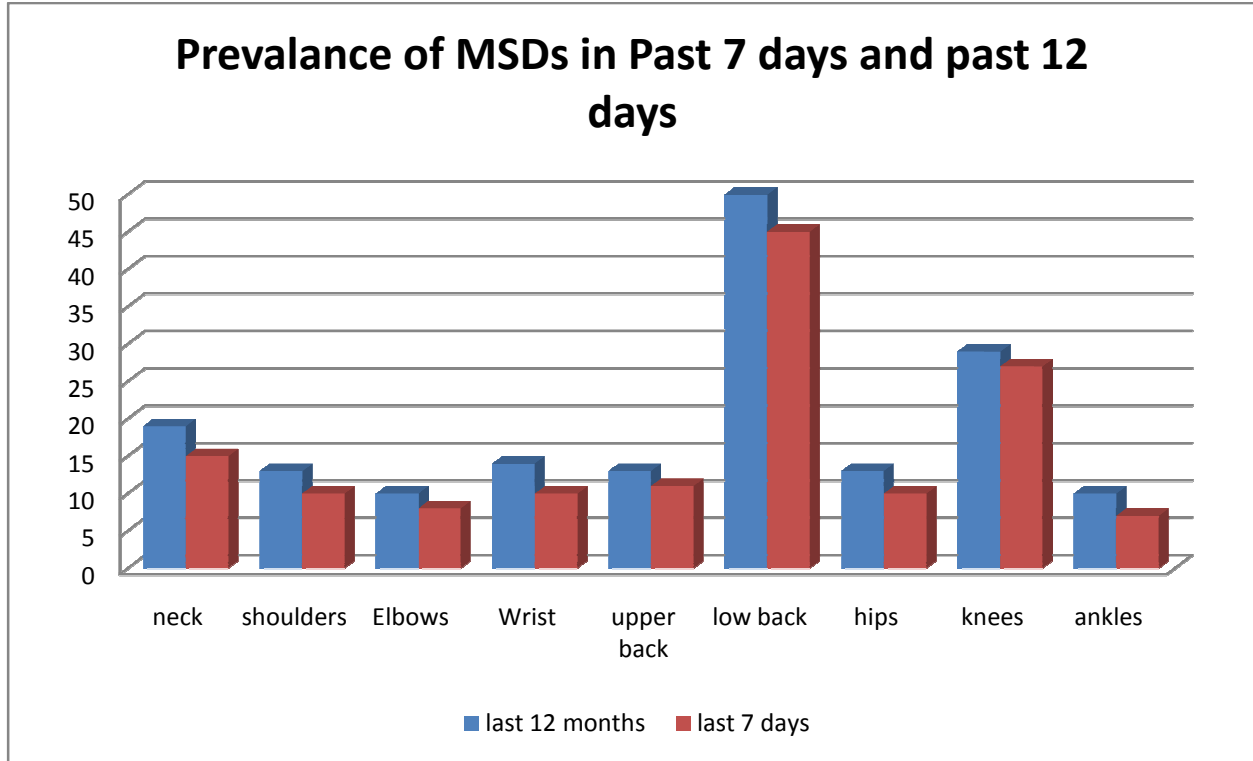
RESULT:

Baseline Characteristics:

Table Table1 shows the basic characteristics of the study population.

Parameter	MALE (n= 57)	FEMALE (n =43)
Age	36.36 ± 10.27	37.56 ± 9.75
BMI	22.64 ± 3.34	20.14 ± 3.01
Years of working	10	6

Body region wise analysis of weekly (short-term) and yearly (chronic) prevalence of musculoskeletal discomforts:(Graph 1)



Neck: Descriptive analysis of data reveals that a total of 19% of the workers experienced neck pain, which included both weekly and yearly prevalence. Out of 100 workers 16 % males were affected & 3 % females affected with neck pain.

Shoulders: Descriptive analysis of data reveals that 13% workers experienced shoulder pain, which again included both weekly and yearly prevalence . Out of 100 workers 7 % males were & 6 % females were affected.

Elbow: Descriptive analysis of data reveals that a total of 10% of the workers experienced elbow pain, which included both weekly and yearly prevalence. Out of 100 workers 7% males were affected & 3 % were females affected .

Wrists: Descriptive analysis of data reveals that 14% workers experienced wrist pain, which again included both weekly and yearly prevalence. Out of 100 workers 8 % were males & 6 % were females.

Upper Back: Descriptive analysis of data reveals that 13% workers experienced upper back pain, which again included both weekly and yearly prevalence. Out of 100 workers 6 % males were affected & 7 % females were affected.

Low back: Descriptive analysis of data reveals that 50% of the workers suffered low back pain, which included both weekly and yearly prevalence. Out of 100 workers 23 % males were affected & 26 % females were affected.

Hips: Descriptive analysis of data reveals that a total of 13% of the workers experienced hip pain, which included both weekly and yearly prevalence. Out of 100 workers 9 % males were affected & 4 % females were affected.

Knees: Descriptive analysis of data reveals that 29% workers reported knee pain, which included both weekly and yearly prevalence. . Out of 100 workers

16 % males were affected & 13 % females were affected.

Ankle: Descriptive analysis of data reveals that 10% workers experienced ankle pain, which again included both weekly and yearly prevalence. Out of 100 workers 7 % males were affected & 3 % females were affected.

Most of the workers in this study worked for more than 6 years & their daily working shift was 7-8 hrs.

Their common repetitive actions during cutting are extending or twisting the wrist, prolonged standing, stooping, exerting or twisting the torso, lifting objects.

This set of body movements were repeated continuously during their 7-8 hr shift. This work was extremely exhausting, heavy & repetitive, leading workers to exhaustion by the end of their shift.



1&2



3&4

DISCUSSION

In this cross-sectional study, we found high prevalence of WMD's in sugarcane workers. From the results we found that prevalence was more in low backs (50%), knee (29%), neck (19%), hip (13%), ankle (10%), upper back (13%), shoulders (13%), elbows (10%) and wrists (14%). However,

this particular study found results different from other similar studies in which workers had high prevalence of wrists pain. Workers engage in sugarcane cutting activities, they work approximately for 7-8hr. Such activity usually happens for many consecutive days. The first factor related to WMSDs was that of repetitive motions.

In our study, during the sugarcane cutting, the sugarcane workers swung their arms over their heads and bent their bodies repetitively when they cut sugarcane and moved residual grasses for approximately 4 hours per day. Such motions place the average sugarcane workers at risk of developing WMSDs because they often lead to both muscle spasms and poor blood circulation. Moreover, tendons, joints, and other soft tissues eventually became fatigued and subsequently injured^[8]. This finding is in agreement with previous studies, which also indicated that repetitive motions will eventually result in WMSDs^[9].

The second factor related to WMSDs was awkward posture. Sugarcane workers repetitively pulled bunches of sugarcane, lifted them, and then threw them into trucks. As they were doing that they continually contorted their bodies and lifted their hands above their heads. They also tiptoed on their feet. When the farmers did the work, they repetitively moved their arms and legs in manners that were inconsistent with natural anatomical postures. All this led to excessive workloads for both their muscles and tendons as the workers continually need to maintain their body balance. This finding was similar to previous studies among both rubber workers in Malaysia^[10] and farm workers in the United States^[11].

The third factor that was related to WMSDs was forceful exertion. For example, sugarcane workers had to engage in work that required various strenuous such as lifting the bunches of sugarcane. Lifting and forceful movements also put these individuals at risk of developing WMSDs as they repeatedly lifted, pushed, and pulled large and heavy objects. When those objects were moved, the workers' spines were repeatedly subjected to high-pressure forces. When

their spines received high pressure for excessive periods of time, the workers were at risk of losing their balance. In this case, the workers experienced muscle strain, muscle stress, and pain in their back^[12]

This was in accordance with other studies that show a relationship between forceful exertion and WMSDs^[13]

The repetitive movements resulting from manual sugarcane cutting make the attention and concentration required for this activity very difficult, which raises the probability of musculoskeletal disorders. The symptoms reported are work-related and the prevalence of MSDs would increase over time due to cumulative exposure.^[14] The workers involved in this study use to perform repetitive tasks. Low back pain was found the highest symptoms followed by the hip & knee (Low back & knee pain is associated with prolonged standing, exerting or twisting the torso). The result of this study showed that, the highest prevalence of MSDs pain was found on the low back, knee, and then less commonly affected the neck and the hand/wrist.

The workers in our study performed highly repetitive tasks and maintained static posture for up to an hour at a time. Other studies also showed that repetitive tasks have been found to be associated with WMSDs^[15]. The symptoms of neck and shoulder pain is also significantly related to the repetitive work^[16]. Repetitive activity in short period of time also increases the prevalence of hand and wrist injuries^[17]. The result of the study found that the prevalence of MSDs pain on the hand/wrist is minimum with 14%. The result might relate to the flexing or extending the wrists during cutting the sugarcane.

CONCLUSION

The result of our study showed that the overall prevalence of MSDs is high in sugarcane workers.

The highest prevalence of MSDs for the last twelve months is on the low back, followed by knee, neck.

REFERENCES

- 1) NIOSH. Musculoskeletal Disorders and Workplace Factors. A Critical Review of Epidemiologic Evidence for Work related Musculoskeletal Disorders of the Neck, Upper Extremity, and Low Back. Cincinnati, OH: NIOSH, 1997. Publication No. 97-141.
- 2) Woolf AD, Pfleger B. Burden of major musculoskeletal conditions. Bull World Health Organ 2003.
- 3) Escorpizo, R. Understanding work productivity and its application to work-related musculoskeletal disorders. International journal of Industrial Ergonomics, 2007; 38(3-4), 291-297.
- 4) Linton, S. J., & Kamwendo, K. Risk Factors in the psychosocial work environment for neck and shoulder pain in secretaries. J Occup Med. 1989 ;31, 609-613.
- 5) Adams MA. Biomechanics of back pain. Acupunct med. 2004; 22:178-188.
- 6) Walker-Bone K, Palmer KT. Musculoskeletal disorders in farmers and farm workers. Occup Med (Lond). 2002; 52:441-450.
- 7) Nilvarangkul K, Adler Collins JK, Thawenonngiew K, Clanglang R. Community Participation in Health Service System for Informal Sector Workers in Primary Care Units: A Case Study of Sugarcane Farmers. Bangkok, Thailand: Thai Health Promotion Foundation; 2009.
- 8) Crawford JO. The Nordic Musculoskeletal Questionnaire. Occupational medicine. 2007; 57: 300-301
- 9) Martha J, Sanders M. Ergonomics and the Management of Musculoskeletal Disorders. 2nd ed. Saint Louis, MO: Butterworth-Heinemann. 2013.
- 10) Shan CL, Bin Adon MY, Rahman AB, Hassan ST, Ismail KB. Prevalence of neck pain and associated factors with personal characteristics, physical workloads and psychosocial among male rubber workers in FELDA settlement Malaysia. Glob J Heal Sci. 2011;4:94-104.
- 11) National Institute for Occupational Safety and Health. Simple solutions: ergonomics for farm workers (Report No. 2001-111). Accessed March 5, 2014.
- 12) Hoogendoorn WE, Bongers PM, de Vet HC, et al. Flexion and rotation of the trunk and lifting at work are risk factors for low back pain. Spine. 2000; 25:3087-3092.
- 13) Rosecrance J, Rodgers G, Merlino L. Low back pain and musculoskeletal symptoms among Kansas farmers. Am J Ind Med. 2006; 49:547-556.
- 14) Engström, T., Hanse, J. J., & Kadefors, R. Musculoskeletal symptoms due to technical preconditions in long cycle time work in an automobile assembly plant: a study of prevalence and relation to psychosocial factors and physical exposure. (1999).
- 15) Moore A., & Wells, R. Effect of cycle time and duty cycle time on psychophysically determined acceptable levels in a highly repetitive task. Ergonomics, 2005 ;48(7), 859-873.

- 16) Silverstein, B., Fine, L. J., & Armstrong, T. J. Hand wrist cumulative trauma disorders in industry. *British journal of industrial medicine*. 1986;43(11), 779–84.
- 17) Andersen, J. H., & et al. Risk factors in the onset of neck/shoulder pain in a prospective study of workers in industrial and service companies; *Occupational and Environmental Medicine*, 2003;60, 649–654.