

A STUDY OF PREVALENCE OF MUSCULOSKELETAL DISORDER AMONG THE RICE MILL WORKERS IN KARIMNAGAR

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ABSTRACT

BACKGROUND

Rice mill industry is the oldest and largest agro based industry. Load handling, i.e. lifting and carrying heavy load of grain filled sacs is the major job component. One of the most common work-related injuries is the development of musculoskeletal disorders caused by heavy lifting and performing the task that required repetitive motions. This made us to study the prevalence of musculoskeletal disorder among the rice mill workers.

AIMS AND OBJECTIVES

To study socio-demographic profile of rice mill workers. To study the prevalence of musculoskeletal disorder among the rice mill workers. To study the association of duration of work in rice mill and musculoskeletal disorders in rice mill workers.

MATERIAL AND METHODS

Study Design: Cross-sectional study. Study Setting: Rice mills of Karimnagar Mandal. Study Period: 12 months. Study Population: All the permanent workers working were included.

RESULTS AND DISCUSSION

Among the total study subjects 34% were illiterate, 66% were belonging to class IV and V socio-economic status. Majority (50.7%) of the male workers have an occupational history more than 10 years. Similarly, majority (38.9%) of the female workers have an occupation history of <5 years. Among them predominantly pain in the Low Back is common in 27.1% followed by Knee pain in 25%, Ankle/Foot pain in 20.5%, Hips/Thigh pain in 17.6%, Upper Back pain in 15%, Shoulder pain in 25.6%, Elbow in 22.4%, Neck pain in 20.8% and pain in wrist/hands in 11.7%. In the study subjects, 45.7% (125/273) workers having musculoskeletal manifestations and more than half of them (57.6%) are working in rice mills >10 yrs. followed by 25.6% in 5-10 yrs. and 16.8% in < 5 yrs.

CONCLUSION

Musculoskeletal complaints (45.7%) in rice mill workers were significantly associated with duration of work (Years).

KEYWORDS

Prevalence, Musculoskeletal Disorder, Rice Mill Workers.

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INTRODUCTION

Asia accounts for 90% of the production and consumption of rice. Only about 35 million tons of rice is traded through international market. Leading rice exporting countries are Thailand, Vietnam, USA, India and Pakistan. Thus, it is imperative that rice production and supply for domestic consumption is entirely the national responsibility.⁽¹⁾

India has the world's largest area under rice with 44.0 million ha and is the second largest producer (96.0 million tonnes - 2010) next only to China. It contributes 21.5 percent of global rice production. During 2007-08, India exported a record of 6.5 million tons of rice worth Rs. 12000 crores and was second to Thailand. Rice export contributes nearly 25% of total agriculture export from the country. However, productivity of rice is only 2.1 tons/ha (Milled rice) which is lower than world's average productivity of 2.9 tons/ha (FAO, 2009).⁽²⁾

Around 58.45% of the Indian population mainly depends on agriculture for their livelihood.⁽³⁾ Andhra Pradesh is the fifth largest state in India accounting for 9 and 8 percent of the country's area and population respectively. Andhra Pradesh is one of the major paddy cultivated state in India.

Karimnagar is the fifth largest district in Andhra Pradesh based on rice production and cultivation. It occupies 16% of rice area of the state. Karimnagar district has 1, 87,576 hectares of area for cultivation of rice. It produces 6, 02,047 tons of rice and 3210 kg/ha is the yield. There are totally 1,24,347 rice mills in India.⁽⁴⁾

Rice mill workers are potentially exposed to organic and inorganic dusts and synthetic chemicals that may have adverse effects on respiratory health. Several reports have suggested that unprotected dust exposures in agricultural settings may lead to pulmonary fibrosis. There have been many reports on health effects of grain dust exposure. Grain dust has a long history of association with disease and its adverse effects on various organs such as eyes, nose, skin, lung and the airways have been described. Asthma has been well documented as being a result of exposure. However, a few studies have been reported on the effect of rice-husk dust exposure. Rice husk is known to have high silica content.

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This biogenic silica may cause pulmonary disease resembling asbestosis, namely pleural thickening, fibrosis and possibly bronchogenic carcinoma.⁽⁵⁾

Load handling, i.e. lifting and carrying heavy load of grain filled sacs is the major job component. Often, the workers have to adopt awkward postures to carry out the job. Working with heavy load in awkward posture leads to physiological strain and musculoskeletal problem. Only a few report of ergonomic study on grain handling workers is available.⁽⁶⁾

One of the most common work-related injuries to occur globally is the development of musculoskeletal disorders caused by heavy lifting and performing tasks that require repetitive motions.⁽⁷⁾

Labour shortage is another major limitation in view of migration of poor from Rural to Urban. There is depletion of their health status with direct or indirect exposure to the dust at different places of work in the workplace (Rice mill). This morbidity pattern may disturb their regular work, which may affect the gross production of most needed commodity (Rice) of the state. This made me to focus on the morbidity pattern and the working condition among the workers in rice mill industry.

AIMS

To "Study of Prevalence of Musculoskeletal Disorder among the Rice Mill Workers in Karimnagar."

OBJECTIVES

1. To study socio-demographic profile of rice mill workers.
2. To study the prevalence of musculoskeletal disorder among the rice mill workers.
3. To study the association of duration of work in rice mill and musculoskeletal disorders in rice mill workers.

MATERIALS AND METHODS

Study Setting

There are 29 Rice mills in Karimnagar Mandal scattering within 35km stretch from Karimnagar Town.

Study Design

It is a cross-sectional study.

Study Period

From October 2011 to October 2012.

Study Population

Type of Sampling

Rice Mills

The present study was conducted in 20 Rice mills out of 29 Rice mills. These were selected by taking into consideration the administration and operational issue during the study period from Oct 2011-Oct 2012.

Workers

All the supervisors, clerks, operators, weighers, coolies and helpers working permanently in the 20 Rice mills of Karimnagar Mandal are included in the study. Total 284 permanent workers were available in 20 Rice mills. Out of 284, 11 subjects were not available after repeated attempts to interview them. Finally, 273 subjects included for the study.

Inclusion Criteria

Only permanent workers were included.

Exclusion Criteria

Those who were not ready to give consent were excluded from the study.

Study Tools

A semi-structured pre-tested questionnaire was used to collect relevant information through interviewing study subjects. The questionnaire was divided into four parts.

- Socio-demographic profile.
- Brief occupational history.
- Physical examination (Anthropometric measurements and vitals).

Study Procedure

There are 29 Rice mills in Karimnagar Mandal during the study period (Oct 2011-Oct 2012). Institutional Ethical Committee permission was taken. Before starting the study, a prior permission was taken from Karimnagar district Rice millers' welfare association to conduct the study in all the 29 Rice mills available in Karimnagar Mandal. Even though after taking permission when approached individually, 9 out of 29 rice mills did not give consent to conduct study with their workers due to various reasons. In 9 rice mills which were excluded from the study, the working hours, working hierarchy, socioeconomic conditions of the workers seemed to be similar to the remaining 20 rice mills, so the study was conducted in remaining 20 rice mills. Each rice mill enrolled 12-18 permanent workers (Supervisors, clerks, operators, weighing workers, coolies and helpers).

The regular attendance of contract employees to the rice mill is inconsistent and highly irregular, so only the permanent workers employed in rice mills were considered as study subjects. Totally, 284 permanent workers were available in the 20 rice mills. Of the 284 study subjects available, 11 subjects were not available after repeated attempts to interview them. Three attempts were made to cover missing subjects and each rice mill was visited 2-4 times to cover all the study subjects. Finally, a total of 273 study subjects were concluded to take part in the study. All the subjects who are supposed to be studied in the setting are included in the study.

Each rice mill was informed one day prior about our visit through the phone call as their numbers were taken from the association. Prior to the data collection, the purpose of the study was clearly explained to the study subjects and consent was taken from everyone. A good rapport was developed with study subjects and strict confidentiality was assured before starting the interview process.

Data Analysis

Data was entered into Microsoft Excel version 2007. The data then transferred to SPSS version 20 and analysed by using the following statistical test wherever necessary and the P value <0.05 was considered significant among the difference observed in the groups.

Ethical Review

The Institutional Ethical Committee of Chalmeda Anand Rao Institute of Medical Sciences, Karimnagar, after examining the study proposal has approved it. Before the study was actually started, written permission was taken from Rice Millers' Welfare Association of Karimnagar district.

Informed consent of all study subjects were taken to confirm willingness to participate in the study.

RESULTS AND DISCUSSION

In this study among Rice Mill workers in Karimnagar Mandal, majority of the study subjects (67%) are falling in the age group of 28 yrs.-47 yrs. and 74% of these are males. (Table No. 1) The Predominant religion followed among study subjects is Hinduism (71%) followed by 18% are Muslims, 8% Christians and 3% Buddhist (Table No. 2).

In this study, 65.6% of the rice mill workers are rural residents and rest are urban residents; 67.7% of the males are rural residents, whereas female rural residents are 59.7%. (Table No. 3) The distribution of rice mill workers according to education status shows 34% of the study subjects are illiterates (Table No. 4).

In this study, the study subjects are grouped based on Modified BG Prasad's Socio-Economic Scale. According to this, 66% of the subjects belong to low socioeconomic status (Class IV and V). (Table No. 5) The type of work is categorized among the study subjects in rice mills are helpers (19%), Coolies (47%), Weighers (7.7%), Operators (16%), Clerks and Supervisors (12.4%) (Table No. 6).

In this study, majority of the workers have worked in the rice mills (Occupational History) for more than 10 yrs. (45%), 5-10 yrs. (29%) and <5 yrs. are 26%. Majority (50.7%) of the male workers have an occupational history more than 10 years. Similarly, majority (38.9%) of the female workers have an occupation history of <5 years (Table No. 7).

In the study subjects 70% are the Coolies, 33.3% are weighers, 31% of Helpers, 25% of Operators, 17.6% of Supervisors and 11.7% of Clerks are having musculoskeletal disorders at the time of interview (Table No. 8).

In this study, 125 subjects have musculoskeletal disorders since last 12 months. Among them predominantly pain in the low back ache is common in 27.1% followed by Knee Pain in 25%, Ankle/Foot pain in 20.5%, Hips/Thigh pain in 17.6%, Upper Back pain in 15%, Shoulder pain in 25.6%, Elbow in 22.4%, Neck pain in 20.8% and pain in Wrist/Hands in 11.7% in decreasing order of frequency (Table No. 9).

In the study, subjects having musculoskeletal manifestations are 45.7% (125/273) among the workers having musculoskeletal manifestations, more than half of them (57.6%) are working in rice mills >10 yrs. followed by 25.6% in 5-10 yrs. and 16.8% in <5 yrs. With increased duration of work in rice mill from <5 yrs. to >10 yrs., the musculoskeletal manifestations are increasing in the study subjects and the results are statistically significant ($P=0.0002669$) (Table No. 10).

Musculoskeletal complaints (45.7%) in rice mill workers were significantly associated with duration of work (Years).

The most common musculoskeletal complaints being low back pain 74 (27.1%) and knees pain 68 (25%). Overall, prevalence of musculoskeletal complaints among rice mill workers is 45.7% in Karimnagar Mandal.

Similar results were observed in recent study conducted in South India by Prakash S, et al. 2010. That study revealed that prevalence of respiratory morbidity [32 (42.66%)] was significantly higher among the workers and the prevalence of chronic bronchitis could be attributed to occupational exposure to dust and smoking habits among the rice mill workers and also the duration (Years) of working.

Other important morbidities included low backache and knee joint pain, which was found in around 20 (26.66%) workers followed by musculoskeletal pain in 15 (20%), conjunctivitis and allergic skin diseases. He further even observed both non-specific irritant and allergic responses seem to be involved, manifesting acutely as irritation of the eyes, skin and upper respiratory tract in some cases as well as allergic nasal catarrh, respiratory difficulty and eosinophilia in others. Chronic irritant effects are seen predominantly in the eyes, whereas cases of occupational asthma are probably found in hypersensitive individuals.⁽⁸⁾

A study done by Pradhan et al. 2007 in West Godavari district in Andhra Pradesh, found similar findings of 59% suffering from knee joint pain and 61.5% from low back and knee joint pain.⁽⁹⁾

The high percentage of musculoskeletal complaints significantly associated with rice mill workers may be due to carrying heavy loads of rice bags more than their weight and due to repetitive bending at the knee to load the sacs and carriage of heavy load in awkward postures adopted by the workers.

Since application of force is required for handling loads (Lifting, lowering, holding, carrying loads, pushing and pulling weights, etc.). The force requirements vary with the posture adopted during work.⁽¹⁰⁾

Awkward body posture also causes the work to become strenuous and the physiological costs are higher in non-erect postures than in erect postures.⁽¹¹⁾

The occupational work of handling loads requires high muscular effort in awkward postures giving rise to musculoskeletal strains and low back signs and symptoms.⁽¹²⁾ Turning, twisting and bending are also associated with increased incidence of low back disorders like pain, ache and discomfort.⁽¹³⁾

It was found that most of the activities of these workers are in the category of moderate to very heavy. The findings of the present study corroborates with the reported values of Samanta and Chatterjee.⁽¹⁴⁾

However, workloads of the jobs like spreading paddy on the unshaded floor with a wooden spreader for drying and lifting and taking off of rice sac (50 kgs.) from weighing machine were moderate or heavy.⁽¹⁵⁾⁽¹⁶⁾

But all the workers in Karimnagar Mandal are lifting paddy bags from 50-70 kgs., rice bags of 25 kgs., 50 kgs., 100 kgs. and rice husk bags of 25 kgs. in 30-45 min in this region, which are all considered to be heavy work categorization.

Bhat, et al. 1991 study showed that there was comparative decrease in PEFR/min within 1 year after the workers joined the job.⁽¹⁷⁾

Age Group	Males		Females		Total	
	No.	%	No.	%	No.	%
18-27	40	19.9	10	13.89	50	18.31
28-37	62	30.8	23	31.95	85	31.13
38-47	68	33.8	31	43.05	99	36.26
>=48	31	15.4	8	11.11	39	14.3
Total	201	100	72	100	273	100

Table 1: Table showing distribution of study subjects according to Age and Gender

Religion	Males		Females		Total	
	No.	%	No.	%	No.	%
Hindu	143	71.1	51	70.84	194	71.06
Muslim	36	17.9	13	18.06	49	17.95
Christian	16	7.96	6	8.33	22	8.05
Buddhist	6	2.98	2	2.77	8	2.94
Total	201	100	72	100	273	100

Table 2: Table showing distribution of study subjects according to Religion

Residence	Male		Female		Total	
	No.	%	No.	%	No.	%
Urban	65	32.3	29	40.3	94	34.4
Rural	136	67.7	43	59.7	179	65.6
Total	201	100	72	100	273	100

Table 3: Table showing distribution of study subjects according to Residence

Qualification	No.	%
Post Graduate	2	0.74
Graduate	12	4.39
Diploma	44	16.12
Secondary Level	54	19.78
Middle School	27	9.89
Primary	42	15.38
Illiterate	92	33.7
Total	273	100

Table 4: Table showing distribution of study subjects according to Education status

Socio-Economic Class	No.	%
Class I	17	6.22
Class II	47	17.21
Class III	30	10.98
Class IV	127	46.53
Class V	52	19.06
Total	273	100

Table 5: Table showing distribution of study subjects according to B.G. Prasad Classification

Type of Work	No.	%
Supervisors	17	6.22
Clerks	17	.22
Operators	44	16.13
Weighers	21	7.69
Coolies	122	44.68
Helpers	52	19.06
Total	273	100

Table 6: Table showing distribution of study subjects according to Type of Work

Duration of Work	Male		Female		Total	
	No.	%	No.	%	No.	%
<5 yrs.	43	21.4	28	38.9	71	26.0
5-10 yrs.	56	27.9	23	31.9	79	28.9
> 10 yrs.	102	50.7	21	29.2	123	45.1
Total	201	100	72	100	273	100

Table 7: Table showing distribution of study subjects according to Duration of work in years

Type of Work	Musculoskeletal Disorders					
	Yes	%	No	%	Total	%
Supervisors	3	2.4	14	9.5	17	6.2
Clerks	2	1.6	15	10.1	17	6.2
Operators	11	8.8	33	22.3	44	16.1
Weighers	7	5.6	14	9.5	21	7.7
Coolies	86	68.8	36	24.3	122	44.7
Helpers	16	12.8	36	24.3	52	19.0
Total	125	100	148	100	273	100

Table 8: Table showing distribution of Study Subjects according to Type of Work and Musculoskeletal Disorders

Musculoskeletal Manifestations						
Site	Yes	%	No	%	Total	%
Neck pain	26	9.5	247	90.5	273	100
Shoulder pain	32	11.7	242	88.3	273	100
Elbow pain	28	10.2	245	89.8	273	100
Wrists/Hands pain	23	8.4	250	91.6	273	100
Upper back pain	41	15	232	85	273	100
Low back pain	74	27.1	199	72.9	273	100
Hips/Thighs pain	48	17.6	225	82.4	273	100
Knees pain	68	25	205	75	273	100
Ankles/Feet pain	56	20.5	217	79.5	273	100

Table 9: Table showing distribution of subjects having Musculoskeletal Manifestations since last 12 months

Duration of Work	Musculoskeletal Manifestations					
	Yes	%	No	%	Total	%
<5 yrs.	21	16.8	50	33.8	71	26.0
5-10 yrs.	32	25.6	47	31.8	79	28.9
>10 yrs.	72	57.6	51	34.5	123	45.1
Total	125	100	148	100	273	100

Table 10: Table showing association of Musculoskeletal manifestations with Duration of Work

Chi Square = 16.46, df = 2, p-value = 0.0002669

CONCLUSION

The study was conducted on 273 rice mill workers in 20 rice mills; it was found that 201 workers were males (73.3%) and 72 (26.7%) were females, majority of study subjects 183 (67%) were in the age group of 28 to 47 years. Religion wise 194 (71%) are Hindus. Total 179 (66%) rice mill workers live in the rural area and 94 (34%) were living in urban area; 179 (66%) study subjects were falling under low socio-economic status (Class IV and V); 92 (34%) study subjects are illiterates.

124 (45%) study subjects have habit of drinking alcohol; 89 (33%) workers are smokers, 77 (28.2%) were current smokers; 12 (4.4%) were former smokers. Among 77 current smokers, 73 (36%) are males and 4 (5.5%) are females; 123 (45%) rice mill workers are having an occupational history of more than 10 years; 102 (51%) Male workers have 10 and >10 years work experience; 28 (39%) Female workers have work experience less than 5 years.

103 (38%) of rice mill workers are symptom free and rest have symptoms. Body mass index of 56 (78%) females is <23 kg/m², 111 (55%) males are <23 kg/m². Newly diagnosed hypertensives are Grade I-19 (7.4%), Grade II-4 (1.6%) and pre-hypertensives are 21 (8.2%). Association of hypertension with years of working is significant with $P=0.0028$.

The prevalence of low back ache is 27% (74 workers) and knee pain 25% (68 workers). Association of musculoskeletal complaints with duration of work was found, observations are significant ($P=0.0002669^*$).

Limitations

- The study results reflect only 20 (69%) rice mills in Karimnagar Mandal.
- Poor maintenance of records in the rice mills is the reason why we could not study Sickness Absenteeism.

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