

## Musculoskeletal disorders in Brick kiln workers: Incidence and effectiveness of workers education program.



### Medical Science

**KEYWORDS :** Musculoskeletal disorders, Brick kiln workers.

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### ABSTRACT

*Background: Brick kiln is one of the universally spread small scale industry in India Because of the heavy manual labor they are more prone to develop musculoskeletal disorders such as low back pain, neck pain, knee pain, shoulder pain hand and foot pain. This study is an attempt to know the incidence of musculoskeletal disorders in Brick kiln workers and importance of health education of workers to reduce the incidence of musculoskeletal disorders.*

*Methods: 159 Brick kiln workers aged between 20 and 60 years were included in the present study. Their through clinical examination was done according to the format of medical examination specially prepared. Treatment was given to the workers having musculoskeletal disorders and at the same time workers were educated regarding compulsory use of personal protective measures such as safety shoes, hand gloves and also regarding importance of correct posture while working. During follow up visit after 3 months incidence of musculoskeletal disorders were reduced by 55%.*

*Results: Descriptive analysis of data reveals that a total of 27% of the workers suffered low back pain 8% workers reported knee pain, 6% workers experienced shoulder pain 14% of the workers experienced neck pain and 10 % had hand and foot pain. Health education and training of workers helped to reduce the incidence of musculoskeletal disorders and during follow up visit after 3 months incidence of musculoskeletal disorders was reduced by 55% and 89% of the workers were following measures to reduce development of musculoskeletal disorders.*

*Summary: Finding of the present study shows that the incidence of musculoskeletal disorders in Brick kiln workers is very high. Health education and training of workers helped to reduce the incidence of musculoskeletal disorders.*

### Introduction:

Brick kiln is one of the universally spread small scale industry in India. Over last 50 years construction of residential complexes, commercial complexes, corporate sections, roads, dams and factories are on increasing scale in India. Therefore the demand of bricks has been increasing many folds. Workers in this industry are poor, ill-literate, unorganized and not covered by occupational health and safety regulations.<sup>1,2</sup> Various steps in brick manufacturing such as carrying raw material, moulding, coal handling, firing, etc are done manually and involves great human labor. Because of the heavy manual labor such as bending forward, lifting heavy weight, carrying heavy weight and kneeling they are more prone to develop musculoskeletal disorders such as low back pain (LBP), neck pain, osteoarthritis (OA) of the hip and knee, and trauma. Musculoskeletal disorders could result in pain, injury, illness, poor quality of life and reduced productivity. Study conducted on steel workers in Iran also concludes that musculoskeletal disorders constitute the most prevalent occupational disorder and disability in developing countries.<sup>3</sup> The prevalence of musculoskeletal disorders among Indian Brick kiln workers is not well documented. This study is an attempt to know the incidence of musculoskeletal disorders in Brick kiln workers, and health education of workers regarding importance of good posture and use of personal protective equipments to reduce the incidence of musculoskeletal disorders.

### METHODOLOGY:

Bodkewadi Brick kiln industry, Pune is selected for the study. The industry owner and workers were informed about the study and its benefits to the workers and to the industry. Workers recognized the benefits of the project and willingly given the consent for conducting the study. Every step of Brick manufacturing process was made familiar to recognize the occupational health hazards associated with each process. Laborers, drivers and supervisors were included in the study. Administrative staff doing office work were excluded from the study. A sample of 159 workers aged between 20 and 60 years were included in the present study Workers who were diabetic or had any known neurological and psychiatric disorders and those who had musculoskeletal disorders due to previous trauma not related to their work were also excluded.

Medical examination of the workers was done at the industry at a suitable place given by the owner. Their through clinical examination was done according to the format of medical examination specially prepared.

Treatment was given to the affected wrkers. Workers requiring further investigations and treatment were referred to hospital for further treatment. At the same time workers were educated regarding compulsory use of personal protective measures such as safety shoes, hand gloves and also regarding importance of correct posture while working. During follow up visit after 3 months incidence of musculoskeletal disorders were reduced by 55% and 89% of the workers were following measures to reduce development of musculoskeletal disorders.

### Results:

The study was conducted to find the incidence of musculoskeletal disorders in the Brick kiln workers. Total Number of workers in the industry is 172 .13 workers were excluded as per exclusion criteria mentioned above. Hence 159 workers were included in the study. Various steps in brick manufacturing such as carrying raw material, moulding, coal handling, firing, etc are done manually by workers. Most of the female workers were doing heavy work of carrying bricks.

Descriptive analysis of data reveals that a total of 27% of the workers suffered low back pain 8% workers reported knee pain, 6% workers experienced shoulder pain 14% of the workers experienced neck pain and 10 % had hand and foot pain.

Workers were educated regarding compulsory use of personal protective measures such as safety shoes, hand gloves and also regarding importance of correct posture while working. During follow up visit after 3 months incidence of low back pain was reduced to 12% knee pain 4%, neck pain 6%, shoulder pain 3% and hand and foot pain 4%. and 89% of the workers were following measures to reduce development of musculoskeletal disorders.

**Table-1: Incidence of various musculoskeletal disorders in Brick kiln workers-**

Sr.	Musculoskeletal disorder	Before health education and training.	After health education and training.
1	Back pain	27%	12%
2	Knee pain	8%	4%
3	Hand / foot pain	10%	4%
4	Neck pain	14%	6%
5	Shoulder pain	6%	3%

**DISCUSSION:**

Heavy manual labor, kneeling, carrying heavy weight for long distance working in adverse conditions, twisting, squatting, extremes of temperature, vibration from transport, exposure to dust, static and awkward stoop postures are the predisposing risk factors associated with various musculoskeletal disorders in Brick kiln workers.( Figure 1A and 1B about here ) The risk of slipping, tripping and fall on uneven fields is also responsible for development of musculoskeletal disorders in workers.,4,5

Present study has successfully identified five of the most common musculoskeletal disorders affecting the Brick kiln workers. There are many researches which document the prevalence of various musculoskeletal disorders in occupations like mine workers, stone cutters, sanitary workers, military personnel, aircrew workers, shoe factory workers, goldsmiths, etc.6-11 But much less has been documented about musculoskeletal disorders in Brick kiln workers of India.

Workers involved in making gara and sizing Bricks were reported more of knee pain, hand and foot pain. Workers involved in carrying Bricks were reported more of lower back pain and workers involved in molding reported relatively more pain in neck and shoulder region. The possible reason of this variation in musculoskeletal disorders is due to difference in nature of work done by them.

Workers who are mainly involved in making gara and sizing Bricks need to squat for most of the time. This type of posturing puts excessive pressure on knee joints. Activities like squatting involve eccentric contraction of quadriceps muscles group leading to development of knee pain. Forward bending, twisting movements and carrying heavy load predispose the workers carrying Bricks to development of low back pain. Tissue stress induced by heavy load carrying may result in disc prolapse.

Although in the present study investigations were not done, findings of the present study provide important information regarding the presence of musculoskeletal disorders in Brick kiln workers.

These workers were educated regarding how to maintain good posture, use of personal protective measures such as hand gloves and gumboots and importance of good nutrition. Most of the workers followed these measures and during follow up visit incidence of musculoskeletal problems was reduced by 53%. Hence primary prevention could be very effective in reducing the incidence of musculoskeletal disorders.

**Summary:**

Finding of the present study shows that the incidence of musculoskeletal disorders in Brick kiln workers is very high. Low back pain is the most prevalent type of musculoskeletal disorders in Brick kiln workers. Knee pain, shoulder pain, neck pain, hand and foot pain are other important musculoskeletal disorders affecting them. Observations made during the present study suggest that poor postures and lack of health education in the Brick

kiln workers are the two principal causative factors contributing to the development of musculoskeletal disorders Health education and training of workers helped to reduce the incidence of musculoskeletal disorders.

**LIMITATIONS OF STUDY:**

- 1) Illiteracy rate among the workers was very high, only supervisors were literate. This was a great problem while interacting with workers and to get proper answers to our questionnaires.
- 2) Many workers were migrated suggesting highly migrant nature of workers. Hence follow up at later date may become impossible.

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**Figure 1A:** Photograph showing dried bricks are being carried by female worker to the firing site.



**Figure 1B:** Photograph showing workers arranging moulded bricks in specific pattern called as cage for sun drying.

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