Research Article

Determinants influencing health status of welders in a sub-urban slum of Mumbai, Maharashtra, India

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Received: 24 August 2016

Accepted: 16 September 2016

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ABSTRACT

Background: One of the jobs that contribute to occupational injuries is the welding process, especially in developing countries. The welders are exposed to risk factors such as metallic fumes, thermal burns, mechanical stress etc. which make them susceptible to certain occupational diseases. Lack of knowledge regarding the personal protective measures puts them at higher risk of occupational hazards. Hence the study was conducted to assess the health status and morbidity patterns in welders and evaluate the epidemiological determinants influencing them.

Methods: A cross-sectional study was carried out amongst 113 welders working in the area during the study period of December 2015 to February 2016. Socio-demographic profile and work related problems and addictions details were collected. Data was analysed for descriptive statistics.

Results: In this study, 82.3% workers suffered from eye-related symptoms as well as musculoskeletal pain, and 16.8% suffered from dental caries. Majority 21 (18.5%) had either one or more smoking/tobacco habits. Most of the welders (16.8%) gave a history of tobacco chewing followed by 15.9% alcohol.

Conclusions: Eye problems and musculoskeletal problems are a major concern among welders. Nearly all workers use at least one protective equipments but still suffer from eye problems which may be due to the poor quality of the equipment. Their poor socio-economic status and health seeking behaviour makes them more vulnerable to occupational injuries.

Keywords: Welders, Occupational injuries, Personal protective measures, Urban slum

INTRODUCTION

According to World Health Organization (WHO), there are about 250 million cases of work-related injuries per year worldwide.¹

One of the jobs that contribute to these occupational injuries is the welding process, especially in developing countries.

The International Standard Classification of Occupations (ISCO) defines welders and flame cutters as welding and cutting metal parts using gas flame, electric arc and other

sources of heat to melt and cut, or to melt and fuse metal.² The occupational hazards to which welders are exposed can be classified as under

1. **Physical and mechanical hazards** such as ultraviolet (UV) and infrared (IR) radiation exposure, thermal burns, electrocution, etc.³ Chronic exposure to ultra violet radiation can lead to ocular morbidities.⁴ Association between working environment and musculoskeletal symptoms has been widely reported.⁵

2. **Chemical hazards** welders are also exposed to noxious metal fumes, leading to various respiratory dysfunctions

and influenza-like condition called metal fume fever.⁶ Other short term effects include irritation to eyes, nose, throat, chest and respiratory tract; gastrointestinal symptoms like nausea, vomiting and cramps. Due to lack of education, knowledge and awareness regarding the safety measures, these workers are at higher risk of occupational hazards.³ Welders are part of informal occupational sector in our country.

Hence, they do not have any organized occupational health services. Further, very limited attempts have been made to study occupational exposure and health profile of this population in our country. This study was envisioned to highlight the need for research in the area of occupational health which is a neglected issue in our country.

Objectives

- To assess health status and morbidity patterns in welders.
- To evaluate the epidemiological determinants influencing them.
- To recommend interventions for health promotion and disease prevention.

METHODS

This cross-sectional study was conducted in the slum area during the period of December 2015 to February 2016 which is the field practice area of the urban health centre. All 113 welders practicing in the urban slum pocket during the study period were selected for the study. A semi-structured questionnaire was prepared according to the objectives of the study. The questionnaire was validated by senior faculty in the Department of Community Medicine. Informal discussion was done with the study subjects and owners of the workshop with the help of local NGO, in order to build a rapport. The purpose of the study was explained and consent was obtained from each of the study subjects. Face to face interview method was used to collect data. Workplaces were also observed to get an insight into the ergonomic conditions.

Statistical analysis

Data were entered into Microsoft Excel 2010 version and data was analyzed for descriptive statistics. Mean and percentages were used.

RESULTS

All study subjects were males. The age of the respondents ranged from 17 to 48 years. The mean age was 32.3 years. As shown in Table 1 that 57.5% welders are permanent residents of Mumbai. Education up to 5th standard is most common (47.9%). The knowledge and practice of personal protective equipments was in direct proportion with each other. Among 68.6% workers

knowledge of minimum protective equipment was observed, while 82.3% were using minimum protection. Within first 3 months, 25.6% workers had injuries, while 8.8% suffered injuries after a year's experience.

Table 1: Bio-social characteristics of the study population.

Particulars	No. of workers (n=113)	Percentage
Type of residence		
Permanent	65	57.5
Migrant	48	42.5
Educational status		
Illiterate	29	25.6
Up to 5 th standard	54	47.9
6 th std - 9 th standard	16	14.2
10 th standard	10	8.8
12 th standard	04	3.5
Use of protective equipment's		
1 equipment	93	82.3
1-3 equipments	13	11.4
More than 3 equipments	07	6.3
Injuries among welders against duration of work		
Upto 3 months	29	25.6
3 – 6 months	45	39.8
6 – 9 months	22	19.5
9 months to 1 year	07	6.3
Any time later	10	8.8
Awareness regarding protective equipments		
1 equipment	78	68.6
1-3 equipments	32	28.6
More than 3 equipments	03	2.8

Table 2: Morbidity profile of the study population.

Morbidities	No. of workers*	Percentage
Eye problems	93	82.3
Musculoskeletal problems	93	82.3
Fever	65	57.5
Dental caries	19	16.8
Poor nail hygiene	45	39.8
Injuries on fingers and hands	27	23.9
Burns to fingers	14	12.4
Burns to face	13	11.5
Conjunctivitis	23	20.3
Pallor	22	19.5

*Multiple responses

As seen from Table 2 that workers were currently suffering from musculoskeletal pain and eye symptoms such as redness, watering and burning of eyes was reported by each 93 (82.3%). However, all of them gave history of these symptoms in past one year. The workers were of the general opinion that the intensity of these symptoms increased with the duration of their work. History of recurrently suffering from symptoms such as nausea, vomiting and abdominal cramps in the past year was given by 22.8% workers. Fever at least twice a month was reported by 65 (57.5%) welders. Burn injury to face was reported by 13 (11.5%). Most common injuries reported were cuts, abrasions, burns to fingers and hands.

Table 3: Addictions reported by the study population.

Addictions	No. of workers*	Percentage
Tobacco chewing	19	16.81
Smoking	14	12.39
Smoking and tobacco	21	18.58
Alcohol and smoking	12	10.62
Alcohol	18	15.93
No addiction	34	30.09

*Multiple response

As Table 3 shows that the majority 21 (18.58%) had either one or more smoking/tobacco habits. Most of the patients (16.81%) gave a history of tobacco chewing followed by 15.93% alcohol and 12.39% smoking (cigarette, bidi, or both), while 10.62% had a history of alcohol and smoking.

DISCUSSION

In the present study, all respondents were males with mean age of 32.3 years. This was similar to the findings in the study conducted by Budhathoki SS et al who reported the mean age to be 31.29 years.³

But the study conducted by Ajayi et al reported the mean age to be 39 years which was significantly higher than the findings in present study.⁴ Present study revealed that all the welders belonged to lower middle class of society (mean per capita income- Rs. 2,335.5). The study conducted by Kumar SG et al also reported per capita income below Rs. 3000.⁶ Kumar SG et al reported that the welders were working for less than 8 hours per day whereas our study reveals that the welders are working for more than 8 hours per day (8 to 12 hours).⁶ This difference may be due to the different work cultures present in various parts of the country and the negligence of the state in enforcing work related regulations in this unorganized sector.

Our study shows that only 2.8% workers were aware of multiple (>3) protective equipments whereas the majority (68.6%) knew only about one protective equipment (goggles). The study further shows that 82.3% workers

used at least one protective equipment while working whereas the study by Sabitu K et al in Nigeria reported that only 34.2% of welders used one or more types of protective device.⁷ This variation may be due to more awareness in the city.

Most of the welders (82.3%) stated that they suffered from redness and watering of eyes in the past year and only one person had pterygium. There is a significant variation between our study and the study done by Ajayi Iyiade A et al which states that 17.5% of workers had pterygium and 50.1% had pingueculum.⁴ Such advanced degenerative diseases were not found in our study. The reason for this may be the regular use of goggles by the welders in our study area.

Sabitu K et al reported that the most common injuries sustained by the welders are cuts/ abrasions on fingers and hands which is similar to the findings in present study.⁷ The musculoskeletal pain is a major concern for 82.3% welders. This finding is higher than those conducted by Sabitu K et al and Burdorf A et al.^{5,7} The reason may be the poorer ergonomic conditions to which these workers are exposed to.

CONCLUSION

Welding is a hazardous profession which exposes workers to various kinds of physical and chemical hazards in the absence of judicious and effective use of protective equipments. Welders are a part of the unorganized sector of industry and hence are neglected by the health system of our country and this makes them vulnerable to occupational hazards and its complications.

Eye problems and musculoskeletal pain seem to be a major concern among the welders in this area. Awkward positions while working and frequent bending further compound this issue. Welders in the study area are not trained and have acquired their welding skills while working on the job.

Educating the welders about health hazards may increase the awareness regarding protective measures to be taken while working. As these workers belong to lower socioeconomic status, they are hesitant to seek appropriate medical care for their injuries and other health problems. Of those who seek treatment, it is seen that they prefer private medical practitioners which further aids to the financial stress.

Recommendations

- The workers need to be motivated in order to promote health screening. The need for regular eye check and utilization of ophthalmic eye care services should be emphasized to all welders.
- Structural and ergonomic design of the workplace should be improved. The quality of protective equipment needs to be improved.

- Increasing the duration of rest period after certain hours of work would be desirable.
- Health awareness on occupational hazards and protective equipments should be advocated.
- Workers should be trained to deliver basic first-aid services for common injuries and efforts should be taken by the employers to make first-aid kits available at the workplace.
- A special intervention should be planned for de-addiction services by establishing a link with the urban health centre and workers should be encouraged to enroll in it.

ACKNOWLEDGEMENTS

Authors would like to thank Dean, Seth G. S. Medical College & KEM Hospital, Mumbai for allowing them to conduct this study. YUVA, NGO working in urban slum helped us in collaborating with welders, their contractors for allowing welders to interact with them.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Davuluri P, Kadam D, Shinde R, Borgaonkar C, Dhoundiyal A. Determinants influencing health status of welders in a sub-urban slum of Mumbai, Maharashtra, India. *Int J Community Med Public Health* 2016;3:2712-5.