



AWARENESS OF OCCUPATIONAL INJURIES AND SAFETY MEASURES AMONG WELDERS IN A SOUTH INDIAN CITY

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Abstract:

Aim: This study aimed to assess the level of awareness regarding occupational hazards and the adoption of safety measures among welders in Shimoga, a city in South India, who were visiting the outpatient department of McGann District Teaching Hospital.

Methodology: this study was a cross-sectional analysis conducted among 210 welders in Shimoga city, who reported to the Department of Ophthalmology at our tertiary healthcare facility during December 2023 to June 2024.

Results: All participants in the study were male, with most falling within the 20 to 40-year age group. Only one-third of the welders had completed secondary education. Awareness and knowledge regarding personal protective eyewear stood at 68.4%. While nearly 80% of the welders had access to such protective gear, regular usage remained low.

Conclusion: The low level of awareness among welders underscores the need to strengthen safety regulations to prevent serious complications. In a developing country like India awareness and availability of ocular protective devices will help reduce ocular morbidity and improve patient's quality of life.

Keywords: ocular protection practice, personal protective eyewear, welders, India.

Introduction

Worldwide, around 1.6 million individuals are blind, and 2.3 million suffer from vision impairment in both eyes because of work-related eye injuries. ⁽¹⁾

Welders represent a key occupational group, particularly in developing nations, where rapid urbanization and industrial growth are driving labor markets toward increased automation and mechanization.

Welding is a high-risk occupation that involves separating and rejoining metal using heat sources such as flames or electric arcs.

Welders are exposed to various hazards, including flying sparks, hot metal particles, ultraviolet radiation, and metal fumes—all of which can pose significant health risks to those performing arc welding. ⁽²⁾

The mere availability of standard personal protective eyewear is not sufficient to prevent or minimize these risks. Effective strategies are needed to improve welders' knowledge, attitudes, and consistent use of protective eyewear during welding activities.

Awareness of occupational hazards and associated safety measures among welders is a significant public health concern, particularly in developing countries, where there is often limited understanding of the risks involved and the necessary precautions.

With this background, the current study was conducted to assess the awareness and practice of various types of safety measures among welders in a south Indian city.

Aims and objectives:

1. To evaluate the level of awareness regarding occupational hazards and associated safety precautions.

2. To assess the availability and usage of safety measures among welders.

Materials and Methods

All cases of ocular trauma in welders of Shimoga city who reported to the Department of Ophthalmology in Mcgann District Teaching Hospital, Shimoga over a period of 6 months (December 2023 to June 2024) were included in the study. Hence this study included a total of 210 welders.

Exclusion Criteria-

- a. Cases with previous history of trauma due to causes other than welding were excluded.
- b. Cases with previous history of other ocular diseases were excluded.
- c. Non-compliant patients were excluded from the study.

Institutional ethical committee approval was obtained. Informed consent was taken from all patients.

The data was collected by administering a pre-tested questionnaire. The baseline data were collected regarding socio-demographic variables including: age, education level, and income.

Data on awareness regarding injuries like eye injuries, mechanical injuries, pulmonary conditions, body ache, skin problems, cancer and hearing defects were also assessed.

Awareness regarding safety measures like wearing goggles, face mask, gloves, boots, aprons, ear plugs, air filter and their availability and utilization were also evaluated. Utilization was classified according to use as “months,” “days,” and “never” among those to whom the safety measures were available.

Statistical analysis

The collected data were entered in SPSS® for Windows® ver 16. Various factors associated with awareness of hazards including age, education level, utilization of safety measures, training, and work experience were assessed by uni-variate analysis. The statistical analysis for the collected data was done. Variables were expressed in frequencies and represented in Tables.

RESULTS

All 210 selected welders completed the study, hence a response rate of 100%. All of the welders were males. The majority of them aged between 20 and 40 years (80%). 77% had education of primary school and below. Majority of them (68%) had a monthly income of 2100Rs or more.

Table 1. Socio-Demographic details of patients

VARIABLES		FREQUENCY	PERCENT
AGE (in years)	< 20	12	5.7
	21-40	184	87.6
	≥ 41	14	6.6
SEX	Male	210	100
	Female	0	0
EDUCATION STATUS	Primary school and below	162	77.14
	Secondary school and above	48	22.8
MONTHLY INCOME (in Rs)	2100 Rs or less	67	31.9
	2101 Rs or more	143	68.1

More than half of the welders were aware of eye injuries (68.4%), less than 33% of them were aware of other hazards (eg, mechanical injuries, pulmonary injuries, skin disorders, etc) (Table 2)

Table 2. Number of patients aware of occupational hazards

OCUPATIONAL HAZARD	FREQUENCY	PERCENT
EYE INJURIES	144	68.4
MECHANICAL INJURIES	56	26.6
PULMONARY CONDITIONS	42	20
MYALGIA	53	25.2
SKIN DISEASE	32	15.2
CANCER	4	1.9
HEARING PROBLEM	15	7.1

In terms of safety measures, more than half of the welders (62.8%) were aware of importance of wearing goggles, while only one-tenths (10.6%) were aware of importance of protective devices. None of the welders were aware of protective effect of apron, ear plugs, and air filter (Table 3)

Table 3. Number of people awareness of safety measures

PROTECTIVE MEASURES	FREQUENCY	PERCENT
GOGGLES	132	62.8
SHEILD/MASK	34	16.1
GLOVES	21	10
BOOTS	12	5.7
APRON	0	0
EARPLUG	0	0
AIRFILTER	0	0

Although goggles were available to more than 80% of the welders, 49% used it only for a few days during work, 42% of them used it for a month or more, while 7.6% had never utilized it. (Table 4)

Table 4. Availability and utilization pf protective goggles

SAFETY DEVICE	AVAILABILITY	UTILIZATION		
		For a month or more	For days	never
Protective goggles	(168) 80%	(90) 42.8%	(104) 49.5%	(16) 7.6%

DISCUSSION

Welding-exposure-related ocular health hazards remain a critical occupational health and safety issue for welders in the developing countries. ⁽³⁾

Welders are particularly susceptible to moderate to severe eye injuries such as perforations, photokeratitis, pterygium, cataracts, and macular degeneration due to the nature of their work. Welding is among the most intense artificial sources of flying debris, sharp objects, thermal burns, and harmful ultraviolet and infrared radiation. ⁽⁴⁾

Welding-related ocular injuries are largely preventable by adequate and proper use of eye protection devices. ⁽⁵⁾

Despite welders having a good availability of protective eyewear, most welders do not regularly use protective devices.

In one such similar study done by S Ganesh Kumar et al they come to the conclusion that age group, education level, and utilization of safety measures are significantly associated with the level of awareness of hazards. ⁽⁶⁾

The low awareness of safety measures and the infrequent use of protective equipment observed in our study are concerning. This may be attributed to factors such as limited education, lack of formal training, the age distribution and work experience of the welders, as

well as the failure of authorities to enforce safety regulations. Since most welders work in the informal sector and earn low wages, it is understandable that their focus may be on priorities other than using safety measures.

In the study Budhathoki S S et al (Awareness of occupational hazards and use of safety measures among welders: a cross-sectional study from eastern Nepal), it showed that Level of education had a significant relationship with awareness of hazard, awareness of personal protective equipment and use of personal protective equipment. ⁽⁷⁾ It was noted that with an increase in the level of education among the population, awareness and safety practices also increased.

The study provided valuable information for comparison on prevailing situation analysis of welder's awareness of occupational risks and safety precautions, which can be utilized for implementing appropriate interventional measures.

CONCLUSION

Education and raising awareness are the best way to prevent severe complications and eventual loss of vision. Awareness of occupational hazards and utilization of safety measures is low among welders, which highlights the importance of strengthening safety regulatory measures to prevent severe complications. In a developing country like India awareness and availability of ocular protective devices will help reduce ocular morbidity and improve patient's quality of life.

AUTHOR CONTRIBUTIONS

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