



## AWARENESS AND UTILIZATION OF PERSONAL PROTECTIVE EYE DEVICES AND EYE HEALTH HAZARDS AMONG WELDERS IN QUETTA

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### ABSTRACT

**Objective:** To assess the awareness and utilization of personal protective eye devices and eye health hazards among Welders of Quetta.

**Study design:** Descriptive cross sectional study design was used.

**Place and duration of study:** Study was carried out at Quetta city among welders from March to July 2022

**Methodology:** A cross-sectional study was conducted at welding sites from unorganized sector situated in Quetta. 129 welders of age group 14-50 years were selected through probability simple random sampling following informed consent. The welders were interviewed. Data was collected, entered and analysed on SPSS version-24.

**Results:** All of the respondents were male with a mean age of 32 years. My finds showed that 84% welders doesn't had any training of welding. Approximately 57 (44.2%) of the 129 participants had completed primary level education, and 49 (38%) never attended an education system. the most common complaint of the respondents reported having a foreign body in their eye i.e. 58.9% complaint it to be occasionally and 6.20% said frequently. Other common concerns reported by respondents were arc eye injury, which was reported by 71.2% of welders. Most of the welders were well aware of occupational health hazard except hazard of photophobia (87.59%)

**Conclusion:** The health of welders in Pakistan is significantly impacted by a lack of safety measures. The risk of acquiring life-threatening conditions might be reduced by taking easy precautions such as wearing eye protection, heat- and particle-resistant clothing, face masks, and administering fast first aid. My research indicates that welders had limited understanding of occupational health risks and frequently complained about them, thus it is advised to take preventive

measures. The study emphasises the necessity for welders to receive education, training, and encouragement in order to cover this gap.

**Keywords:** Awareness, Ocular Health, Reported Complaint, Utilization, Welders.

## INTRODUCTION

Welding is the most practical way to permanently unite metals. While there are around 60 distinct welding technologies, gas and arc welding are the most often used in underdeveloped countries<sup>1</sup>. Welding is related with a variety of health concerns like burns, electric shock, lacerations and wounds from sharp metals, and eye injuries damage from bright sunlight and flying metal fragments. Among the ophthalmic problems are corneal damage, photophobia, diplopia, and retinal degeneration<sup>2</sup>. These injuries can be avoided if proper safety precautions are implemented. Although welders work in the unorganised sector, the adherence to safety procedures is mostly reliant on private owners who run small scale companies or the expertise and safety practises adopted by free lancers<sup>3</sup>. however, employees claim to use safety glasses, It is uncomfortable, especially while using welding helmets, and visibility is compromised through sweat and fogging<sup>4</sup>. According to studies conducted in industrialised nations, human factors are the causal agent of 88-90% of occupational injuries, with just 10-12% attributed to an inadequate environment and tools. Lack of knowledge, low motivation, poor attitude, dangerous conduct, and ineptitude are all examples of human factors<sup>5</sup>. Welding fumes were classed as "carcinogenic to humans" by the International Agency for Research on Cancer (IARC) in 2017<sup>6</sup>.According to an Indian research, using personal protective equipment by welders provided 67% protection against ocular morbidities<sup>7</sup>.It is not surprising, therefore, that welding adds considerably to the 2.3% disability adjusted life years lost in developing nations related to occupational risks<sup>8</sup>. Informal work accounts for 48% of non-agricultural employment in North Africa and 51% in Latin America, 65% in Asia, and 72% in Sub-Saharan Africa, while estimates for industrialised nations are around 15%. In Pakistan, there are 20,416,000 persons working in the informal sector, with non-agricultural areas accounting for 73.0%<sup>2</sup>.

The purpose of this study was to determine whether safety precautions are used at work and whether respondents have the equipment required to safeguard their general and eye health. Additionally, to evaluate the welders' use of protective equipment, their understanding of work risks, and their pattern of morbidity.

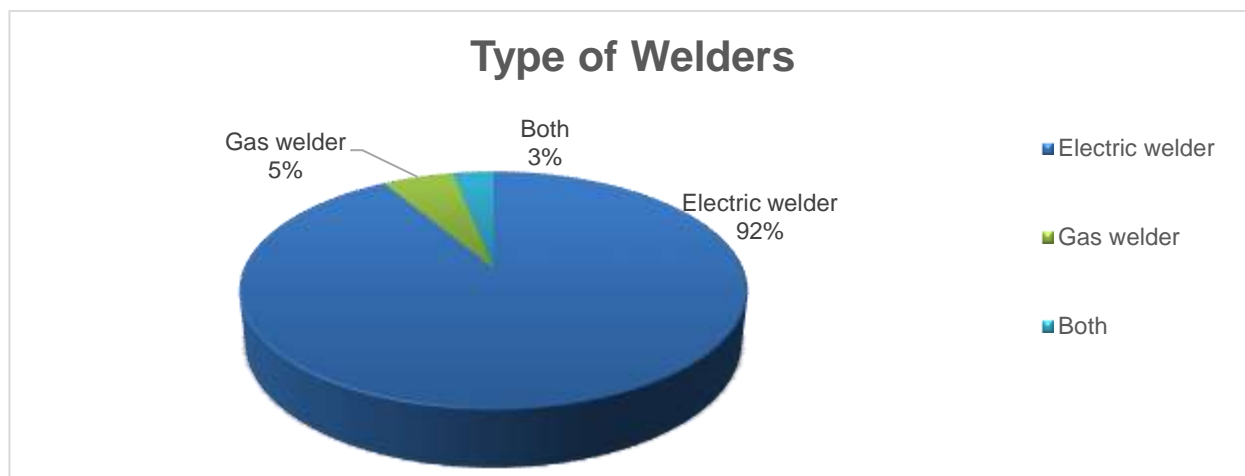
## METHODOLOGY

This cross-sectional study was carried out at Quetta city among welders from March to July 2022. The WHO sample size calculator was used to calculate the sample size by considering 10.9% prevalence<sup>5</sup>. The calculated sample size was 150, out of which 129 consented to participate in the study. The IRB of AFGMI CMH Rawalpindi Pakistan evaluated and approved for this study (Certificate no. RE: 242-AAA-ER-AFGMI dated 10 Dec 2021) prior to initiation of study.150 welders were selected using probability simple random sampling following informed consent.

**Statistical analysis:** The data was analysed using the Statistical Package for Social Sciences (SPSS) version 24.0. For quantitative variables such as age, mean and standard deviation were computed and for categorical variables e.g. education status, type of welders' etc. frequency (percentage) were calculated.

## RESULTS

A number of 150 Quetta welders from various markets were engaged. Out of 150 welders, 129 volunteered to participate in the study, resulting in an 86% overall response rate. In this study, total participants were 129, mean age of the participants were  $32 \pm 1.016$ .Most of the study participants were electric welders 118 (91.54) as shown in fig.1.



**Fig.1: Type of Welders**

The most of the study participants (89.1%) didn't have any other means of income and relied solely on welding for a living. Respondents chose welding for a variety of reasons, including 31.0% of them working since infancy in welding shops, 14% have turned to welding because they lack the education to acquire any other employment, 30.2% have become welders owing to a lack of work opportunities, and 24.8% have chosen welding since it is their family business. In terms of welding training, 84.9% of those polled had no particular training or professional certification and practical apprenticeship training by mentors. Table 1 shows the socio-demographic characteristics of welders.

**Table-I: Socio-Demographics characteristics of the study participants (n=129)**

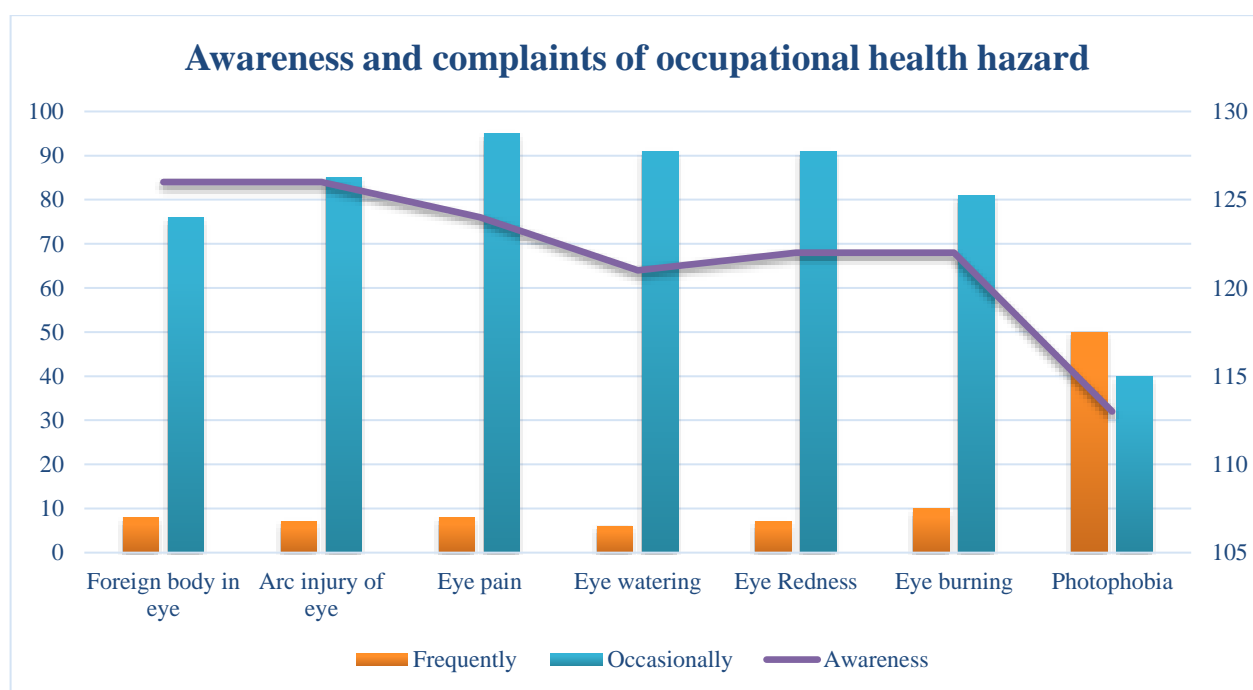
Variables	Frequency (%)
<u>Age(years)</u>	
≤20	30 (23.3)
21–30	61(47.3)
31–39	14(10.9)
40>	24 (18.6)
<u>Gender</u>	
Male	129 (100.0)
Female	--
<u>Marital status</u>	
Single	57 (44.2)
Married	72 (55.8)
<u>Education</u>	
Illiterates	49(38.0)
Primary	57 (44.2)
Secondary	21(16.3)
Higher	2 (1.6)
<u>Income(PKR)</u>	
<10000	10 (7.8)
10,000–14,999	33 (25.6)
15,000–19,999	27(20.9)
20,000–24,999	33(25.6)
≥20,000	26 (21.2)

The most common complaint of the respondents reported having a foreign body in their eye.i.e. 58.9% complaint it to be occasionally and 6.20% said frequently. Other common concerns reported

by respondents were arc eye injury, which was reported by 71.2% of welders (Table-2). Most of the welders were well aware of occupational health hazard except the hazard of photophobia (87.59%) as shown in fig.2.

**Table- II: Awareness and complaints of occupational health conditions reported by the welders of Quetta**

Occupational health hazard(n=129)	Awareness of the health hazard		Reported complaints of the health hazard		
	Aware n(%)	Not aware n(%)	Frequently n(%)	Occasionally n(%)	Never n(%)
<b>Short-term hazards</b>					
Foreign body in the eye	126(97.67)	3 (2.32)	8 (6.20)	76(58.9)	45(34.88)
Arc injury of the eye	126(97.67)	3(2.32)	7(5.42)	85(65.8)	37(28.68)
<b>Long-term hazards</b>					
Eye pain	124(96.12)	5(3.87)	8(6.20)	95(73.6)	26 (20.15)
Eye Watering	121(93.79)	8(6.20)	6(4.65)	91(70.5)	32(24.80)
Eye Redness	122(94.57)	7(5.42)	7(5.42)	91(70.5)	31(24.03)
Eye Burning	122(94.57)	7(5.42)	10(7.75)	81(62.7)	38(29.45)
Photophobia	113(87.59)	16(12.4)	50 (38.7)	40(31.0)	39(30.23)



**Fig.2: Graph bars shows the complaints of welders regarding occupational health hazard, graph line shows the awareness of welders regarding occupational health hazard**

**DISCUSSION**

All 129 respondents were male, ranging in age from 14 to over 40 years, with a mean age group of 32 years.in accordance with other studies conducted in Lahore, mean age of 25.7 ± 10.4 yrs<sup>2</sup> and other study also support mean age of respondents was 25 years, and the mean (SD) age of respondents was 24.67 ± (4.9)<sup>9</sup>.A study in Nepal support too mean age of 31.29 years<sup>10</sup>. Finding that the 57 (44%) were Single and 72 (55%) were married couples. The huge majority 209 (63.3%) were married couples<sup>11</sup>. Approximately 44.2% of the 129 participants had completed primary school. A study almost have same result regards the education level,(44.2%) had basic education <sup>12</sup>.The most of the study participants 115 (89.1%) didn't have any other means of income and relied solely on welding for a living. Respondents chose welding for a variety of reasons, including 31.0% of them

working since infancy in welding shops, 14% have turned to welding because they lack the education to acquire any other employment, 30.2% have become welders owing to a lack of work opportunities, and 24.8% have chosen welding since it is their family business.

128 (99%) eye protective goggles and 120 (93%) hand gloves participants' possessed. A study in India suggest that he most (95%) of welders were knowledgeable that welding might cause eye injury, and they were also aware of the need of wearing PPE while welding<sup>3</sup>. According to the survey conducted in Nepal, 90.7% of welders were aware of one or more welding dangers<sup>10</sup>. 125 (96%) eye protective goggles and 103 (79%) hand gloves are used frequently. A survey in Indonesia, (76%) welding gloves and goggles are often used as PPE<sup>13</sup>. Face mask are used 24 (18%), Welders in this research wore cotton masks, which are also frequently used which do not meet the criteria. Face shields are worn by 8 welders (26.67%)<sup>13</sup>. There are several reasons why people do not use PPE. Fogging, itching, and somatic difficulties such as headaches or nausea are all key drawbacks of not wearing personal protective eyewear.<sup>14</sup>

In our finding participants reported 91 (70%) eye tearing. A Study suggested that the watering 20 (54.1%) among the welders, which was conducted in Nigeria<sup>7</sup>. 85 (65%) ARC eye injury. Study in Nigeria suggest that the most common complaints were arc eye injuries (75.7%)<sup>15</sup>, and 76 (58%) Foreign body in the eye complaints are occasionally faced by welders. A study conducted in Pakistan, the most prevalent form was foreign body in the eyes, which was reported by 29 (40.3%) individuals<sup>16</sup>. Other study in India though history of corneal foreign body was seen in 22 (36.7%) welders<sup>3</sup>.

Duration of work from 5-9 year 21.7% and 10-14 year 24.8%. A study in Nepal there were 16.3% of welders working for more than 10 years<sup>10</sup>. A study in Nigeria from 5 to 9 years 120 (36.4%) and 10 to 14 years 91 (27.6%) work experience<sup>11</sup>. In terms of welding training, 84.9% received training through hand-on apprentice and no particular training or professional certification neither gone any welding institutes/workshops. A study finds out that 91.4% of the respondents did not have any welding training<sup>2</sup>. Majority of 284 (99.6%) had a training apprenticeship<sup>12</sup>. The findings that the vast (79%) were in the age category of 15-39 years was most likely related to the apprenticeship context, where younger apprentices work under their mentors<sup>17</sup>. A study in Nigeria, the bulk of welders 302 (91.5%) got their education through practical apprenticeship training. The remaining 28 (8.5%) went to a recognised welding school<sup>11</sup>. The cast of eye goggles mentioned by 78 (60%) participants that they used low cost 50 to 100 (Pakistani Rupees) price eye goggles. 29 (22.5%) mentioned 101-150 (Pakistani Rupees) and 14(10.9%) mentioned 151-200 (Pakistani Rupees) prices of goggles. The employer may provide sunglasses since they are inexpensive, widely available, and comfortable. In addition, the sunglasses utilized were not UV-protected<sup>10</sup>. Welding is only earning way of 115 (89.1%) participants. Welding was the primary source of income for 84.3% of welders, keeping them in this sector<sup>2</sup>.

In case of illness 33.3% approach Health professional and 32.6% go through home remedies<sup>18</sup>. A survey also demonstrates the difficulty welders have in getting health care, as just 38.6% of welders would seek medical attention if they were injured or had a health concern. Gathering all the data 44.3% welders cannot afford private medical services or drugs, they turn to home cures<sup>2</sup>. Total of 96 (74.4%) welders stated that welding is harmful to their health. A study half of the welders polled thought their job was detrimental to their health<sup>16</sup>.

In Pakistan, a lack of safety precautions has a significant impact on welders' health. Simple protective measures such as wearing eye goggles, wearing protective heat and particles resistant clothes, wearing face masks, and providing quick first aid would reduce the danger of developing life-threatening problems. However, there are no data on the overall number of welders or occupational injuries in this industry. This research can only estimate the level of occupational health risk that welders in the unorganised sector are currently exposed to. Larger sample size investigations are required by both government agencies and research institutions. A census of the informal sector for welding and other departments is required in order to give reliable figures for the planning and execution of health and safety requirements.

## LIMITATION OF STUDY

We must acknowledge that our study has limitations. First, our study was restricted to Quetta and so may not reflect the situation throughout Baluchistan province. Second, recall bias might have influenced the results to be under or exaggerated.

## CONCLUSION

The health of welders in Pakistan is significantly impacted by a lack of safety measures. The risk of acquiring life-threatening conditions might be reduced by taking easy precautions such as wearing eye protection, heat- and particle-resistant clothing, face masks, and administering first aid. My research indicates that welders had limited understanding of occupational health risks and frequently complained about them, thus it is advised to take preventive measures. The study emphasises the necessity for welders to receive education, training, and encouragement in order to cover this gap.

**CONFLICT OF INTEREST:** None.

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