



Eye Safety Practices Among Welders in Alimosho Local Government Area in Lagos, Nigeria

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ABSTRACT

Welders are at a high risk of having occupational related eye injuries as a result of exposure to harmful radiations. The purpose of this study was to assess welders' awareness of occupational safety hazards and utilization of personal protective devices, and to know the current level of eye safety practices among welders in Alimosho LGA of Lagos state, Nigeria. Questionnaires were completed by four hundred and seventeen (417) welders in Alimosho LGA, Lagos state. The results obtained showed that 93.3% wear protective devices while 6.7% did not wear. The types of welding performed were arc welding (55.2%), oxyacetylene gas welding (43.9%), and 0.9 % performed others. The duration of practice in the welding industry ranged from 1->12 years with a mean of 3.97 ± 1.07 years and the duration of welding in a day ranged from 1->9 hours with a mean of 3.86 ± 1.01 hours. The most common eye devices used by the respondents were safety goggles (52.5%), face mask (41.7%) and helmet (5.8%). There was a high level of awareness and average frequency of utilization of protective devices among these welders. The Nigerian government and the welders association should organize work-related safety training programs for welders.

Keywords: Welders, Awareness, Utilization, Protective devices.

INTRODUCTION

Welders in developing countries are an important occupational group owing to rapid urbanization and industrialization. Welding processes results in the generation of poisonous gases and fumes such as aluminum, beryllium, cadmium, monoxide, fluorine, nitrogen-oxide which could be dangerous to the eyes (Bradshaw *et al.*, 1998). According to the Canadian center for occupational health and safety (2011), certain type of ultraviolet radiation can produce an injury to the surface and mucus membrane of the eye called "arc eye" or Welder's eye. Apart from UV rays, visible light and infrared radiations are also emitted during welding process. This visible light can overwhelm the ability of the iris to close sufficiently and rapidly enough to limit the brightness of the light reaching the retina, resulting in temporal blindness and eye fatigue. Repeated exposure to ultraviolet radiation can increase the risk of pterygium, pingueculae, cataract, age related macular degeneration and also eyelid degeneration such as squamous cell carcinoma, basal cell carcinoma and malignant melanoma. Ajaiyeoba and Scott (2002) studied the risk factors associated with eye diseases and observed that welders were particularly at risk of eye injuries with potential for blindness because their occupation deals with exploitation of energetic means capable of yielding high temperature. The most prevalent eye disorders reported among the welders are arc eye injuries, pterygium, conjunctivitis, foreign body sensation, watery eyes, persistent after images (Ajaiyeoba and Scott, 2002; Sabitu *et al.*, 2009). Various protective devices such as safety goggles, face shields and helmet are used by welders (Goff, 2006). The importance of protective devices cannot be undermined in the promotion of good occupational health as well as reduction of the impact of occupational hazards among welders. Work related injuries are considered to be largely preventable, especially if adequate eye protection is used and appropriate machine

guards are positioned over obvious hazards, also, these protective devices must be fitted with the right type of filter lens. The welding filters placed on the personal protective equipment come in various optical densities (shade numbers) depending on the type of welding being done.

Despite the high levels of awareness of the work place hazards and existence of personal protective eye devices (PPE), majority of welders use their protective devices occasionally while few rarely use them (Isah and Okojie 2006; Omolase and Mahmoud, 2007; Ajayi *et al.*, 2011; Fiebal and Awoyesuku 2011; Eze *et al.*, 2015). According to Kayode *et al.* (2013) 64.9% of welders had poor knowledge of the health effects of welding smoke. Ganesh *et al.* (2013) surveyed the awareness, knowledge and use of eye safety devices of 209 welders and reported that 83.3% were more aware of hazards than safety measures. Inefficient devices such as sunglasses have been considered protective and used as a personal protective device by some welders (Sithole *et al.*, 2009; Budhathoki *et al.*, 2014). These above findings have prompted the need to assess the level of awareness and utilization of personal protective devices among welders in Alimosho Local Government Area of Lagos State

MATERIALS AND METHODS

The study was a cross sectional descriptive in nature and consisted of 417 practicing welders and apprentices in Alimosho LGA, Lagos State. Convenience sampling method was used to select the various welding shops. A questionnaire was used as the main research tool. The questionnaire covered information on the subjects' bio-data, duration of practice in the welding vocation, exposure to radiation, awareness and utilization of protective eye device. Consenting welders were included in the study while welders outside Alimosho LGA, Lagos were excluded from the study.

Upon arriving at the welders shop, the owners were approached first before going to the other welders in the shop. In other instances, the owners were the only welder. Informed verbal consent was obtained from the study subjects after explaining the need of conducting the study. Thereafter pretested questionnaires were administered to the welders. The questions and options were read out to them and the questionnaires were filled and completed by

the researcher. On completion, the questionnaires were collected from them.

Statistical Analysis

Data was displayed using descriptive statistics with the aid of chart as processed by the Statistical Package for Social Sciences (SPSS) computer software version 22.0.

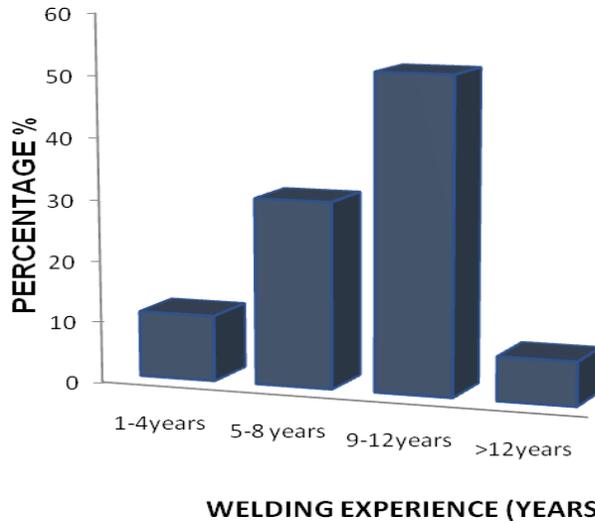


Figure 1: Showing the number of years respondents have been welding. It was observed that out of a 100%, 10.8% fell within the range of 1-4years, 30.5% within 5-8years, 51.5% within 9-12years, and 7.2% above 12years.

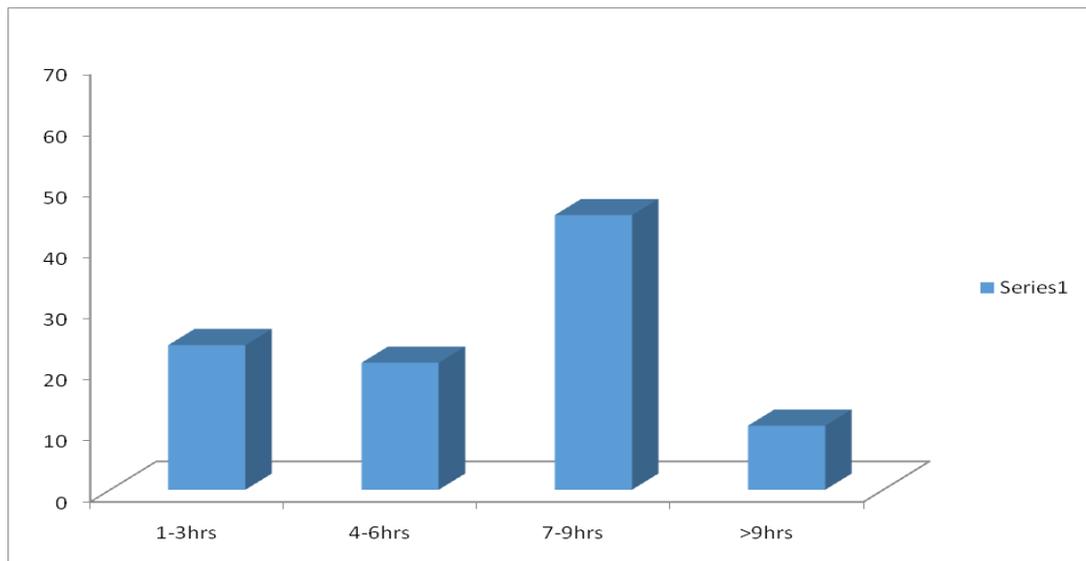


Figure 2: Bar chart illustrating the number of hours spent welding per day
 From Fig. 2, it was deduced that 23.8% of the welders spent 1-3hours, 19% spent 4-6hours, 45% spent 7-9hours and 12.2% spent above >9hours welding.

RESULTS

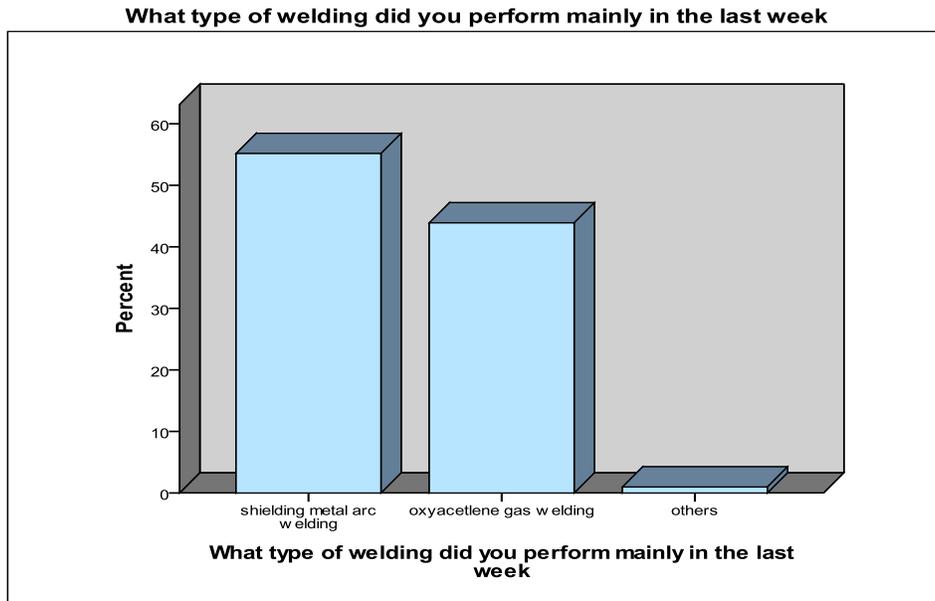


Figure 3: From the chart it was inferred that 55.2% performed shielding metal arc welding, 43.9% performed oxyacetylene gas welding and 0.9 % performed others.

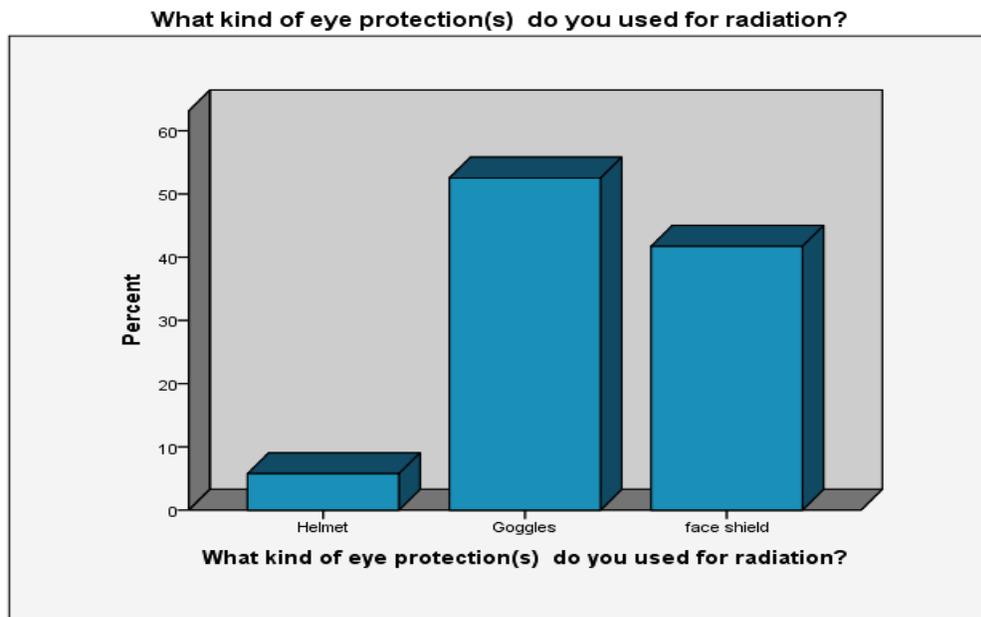


Figure 4: Bar chart describing the types of protection devices use
 From the Fig. 4 it was inferred that 5.8% used helmets as eye protective devise, 52.5% used goggles and 41.7% used face shields as protective devices.

Table 1: Showing the utilization of personal protective devices and the current level of eye safety practices among welders

Questions	Percentage Frequency (%)	Percentage Frequency
	Yes	(%) No
Do you wear protective devices when welding?	389	6.7
Did you spend any time welding without protection last week?	64	36
Do you know what welding shade means?	51.3	48.7
How often are you exposed to nearby welding when you are not wearing eye protective device?	84.2	15.8
Do fumes from welding affect your eyes?	87.8	12.2
Have you had foreign body injury in the last week?	52.5	47.5
Do you notice after images?	55.2	44.8

DISCUSSION

It was observed in this study that there was a high level of awareness among the welders as 93.3% of the welders were aware of the existence of protective eye device that should be used and also wore them. However, studies in different parts of Africa have revealed a low level of utilization of personal protective equipment among welders and industrial workers at large (Abiose and Otache, 1981) shielded metal arc welding has been considered to be the most commonly preferred method of welding due to the non-complexity of the method (Sithole *et al.*, 2009). This agrees with the findings in this study as most welders performed this type of welding (55.2% as compared to oxyacetylene 43.9%). Unfortunately, this type of welding produces full spectrum of ultraviolet radiations therefore one would expect the welders to take adequate precautions.

Goggles (52.5%) were the most common type of protective device used for welding. This may be due to the high level of awareness of its use as a form of protection against hazards. This finding was consistent with the study of Omalose and Mahmoud (2007) conducted in Owo south, western part of Nigeria which reported the use of eye goggles by all the welders interviewed but was comparatively higher than what was obtained from similar studies done by Isah and Okojie (2006) in Benin City, Nigeria where 35.5% of the welders reported the use of eye goggles. It was also observed that 5.8% of the welders used helmet. This contradicts the findings of Sithole *et al.* (2009) in the Limpopo province of South Africa where 57% of the welders made use of helmet and 22% made use of goggles. The use of face masks (41.7%) though higher than the use of helmet (5.8%) was also observed to be low (below average) in this study, this was consistent with the result obtained from another study where poor use of face mask (23%) was also reported by Sabitu *et al.* (2009). The reason for low utilization of face masks is probably due to the fact that the respondents had low awareness of this equipment as a form of occupational safety device, poor economic condition of the country affecting the availability and affordability of these PPE and also because of the kind of

training they received as most of these welders were trained through hand on apprenticeship. Another reason could be due to the variation in work culture and safety practices among welders in this location. The use of face mask reduces the inhalation of welding fume that may result in the development of cancer and it also reduces the adverse effect of welding fumes to the eyes.

The duration of practice of welding may influence the injury inflicted on the eye if precautions are not taken. Those who have spent 8years or below in the vocation utilized protective equipment devices more often when compared to those that have spent over 9 years in the practice. Also, 40% of the welders reported welding for between 7hrs and greater per day. This may not be an everyday occurrence; it is assumed that when they had a task to be completed urgently, they would spend many hours working.

Most of the welders (51.3%) were aware of what shade number is although more than half of this percentage were unable to give the right explanation as to what it really means. 48.7% were ignorant of what shade number is and so bought whatever shade that was available, which may be dangerous, hence the need to emphasize this in the awareness campaign in our country.

Most (76.3%) of the welders in this study were sometimes exposed to welding fumes when not welding. Long term exposure to welding flashes may increase the risk of serious eye diseases. To minimize the risk of exposure to welding arc, plastic welding curtains which are flexible, transparent, tinted to absorb ultraviolet radiations and formulated with a flame retardant should be used to enclose welding operations. Welders also need to be educated on the need for good ventilation in the welding areas to avoid fume irritation.

Fifty two percent (52.5%) of the welders reported foreign body injury. This suggests a deficiency in safety precautions. Poor protective devices and long period of welding may result in high levels of discomfort. It is necessary for welders to take adequate precautions, use appropriate PPE and avoid lengthy welding periods.

We may not generalize our findings to other countries with different socio-demographic, political and regulatory characteristics. Nonetheless, the study provided valuable information for comparison on prevailing situational analysis of welders' awareness of occupational risks and safety precautions, which can be utilized by concerned authorities for appropriate interventional measures.

CONCLUSION

There was a high level of awareness but inadequate use of PPE for the prevention of eye injuries among the respondents. It is recommended that welders use the right PPE and use them all the time because of its effectiveness against work related hazards. The welders association should organize work-related safety training in a manner that will be of most benefit to them. The government should provide eye safety information to specifically target the poor attitude towards occupational eye safety, promote the availability of quality and affordable PPE and ensure that these have been relevantly tested and standardized for safe use locally.

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