

Ocular Injuries among Welders in Nekede, Imo State, Nigeria

Chukwuoha Chigozie Mary¹, Nwoke Eunice Anyalewechi²,
Esenwah Emmanuel Chukwudi³, Azuamah Young Christian³,
Nwaigwe Obianuju MaryJane¹

¹Mercy Eye Clinic, 29 Wetheral Road, Owerri, Imo State, Nigeria.

²Department of Public Health, Federal University of Technology, Owerri, Imo State, Nigeria.

³Department of Optometry, Federal University of Technology, Owerri, Nigeria.

Corresponding Author: Chukwuoha Chigozie Mary

ABSTRACT

Welding without use of appropriate eye protector can cause physical, mechanical, chemical and psychosocial hazards/injuries and this has been observed among a large number of the welding workforce who report to eye clinics/hospitals daily with incidence of workplace ocular injuries/hazards.

Aim: To ascertain the ocular injuries among Welders in Nekede, Imo State.

Materials and methods: The study was carried out as a descriptive and cross-sectional survey. Questionnaire was distributed among the 260 welders participating in the study and eye screening exercise also carried out. Data analysis was done with the Statistical Package for Social Sciences (SPSS) Version 21 computer software using descriptive analysis.

Result: Ocular hazards/injuries found among the welders due to non-use of eye protectors included foreign bodies (30.7%), conjunctivitis (20.3%); pterygium (13.4%), arc-eye injury/trauma (12.6%), cataract (10.0%), chemical injury/burns (7.4%), uveitis (4.3%) and corneal abrasion (1.3%).

Conclusion: There was a high rate of occurrence of ocular injuries among the participants, of which foreign bodies, trauma and corneal abrasion, which are related causes of avoidable blindness, additively made up to 44.3% of the ocular injuries/hazards, a very high percentage. This implied that welders in Nekede, Imo State do not maintain Occupational health and safety regulations. Hence, efforts should be made to reduce the risks of ocular problems in their work environment through enlightenment programmes, health education and improved compliance/adherence to occupational health and safety regulations with the help of Health practitioners, State ministry of health and the Government

Keywords: Ocular, injuries, hazards, visual impairment, eye protector, welding

INTRODUCTION

The International Standard Classification of Occupations (ISCO) defined welders as workers who join and cut metal parts using flame or electric arc and other sources of heat. Welding is a joining process that produces a local coalescence of materials by heating or by applying pressure, or both. It encompasses a broad range of joining techniques that include fusion welding, solid state welding, weld

bonding, diffusion welding, brazing, and soldering¹. The more common welding processes can be classified as arc welding, gas welding, resistance welding, energy beam welding and solid-state welding²⁻³. Welding processes employed in Nigeria include gas welding (by the gas welders or the panel beaters) and electric arc welding (by the electric welders). Gas welding involves the use of oxyacetylene and oxy-hydrogen flames which burn at high

temperatures and emit ultraviolet radiation mostly in the UV-A region. Electric arc welding requires a continuous supply of electric current which is used to create an electric arc which generates enough heat to melt metal. These processes expose the welders to ocular injury from carbon arc burns and metal chips if protective eye devices are not worn. They also produce significant levels of ultraviolet radiation. Damage from ultraviolet light can occur very quickly. Normally absorbed in the cornea and lens of the eye, ultraviolet radiation (UVR) often causes arc eye or arc flash, a very painful but seldom permanent injury that is characterized by eye swelling, tearing, and pain⁴. Earlier studies from Nigeria have reported work-related ocular injuries ranging from 6.6%-44% of cases with injury from chemical burns, welder's arc burns or corneal foreign bodies^{5,6}. This was mostly due to lack of use of safety devices.

Work-related hazards/injuries account for a substantial percentage of ocular injuries and have been identified as causes of ocular morbidity among industrial workers^{5,7-9}. Occupational eye injuries are most likely to result from work that generates flying particles, fragments, sparks, dust, hazardous substances, or radiation. Tasks with the highest risk of eye injuries are grinding, welding, and hammering. Other high-risk activities include cutting or spraying, smelting, sanding, chipping or chiselling. People working with metal are most at risk¹⁰. Ocular injuries vary from mild to severe, which could threaten vision. While most welding-related eye injuries are reversible, with more than half of injured workers returning to work in less than two days and 95 percent in less than seven days, some eye injuries are irreversible and permanent visual impairment occurs. This is especially true with infrared and visible spectrum (bright light) radiation. Both can penetrate through to the retina and can cause permanent retinal damage (although this is rare), including cataracts, diminished visual acuity, and higher sensitivity to light and

glare. The best way to control eye injuries is also the most simple: proper selection and use of eye protection⁴. While majority of work-related injuries are preventable, absent, inadequate or inappropriate use of Personal Protective Equipment (PPE) remains an important risk factor. Protecting the eyes from injury is one of the most basic things required to keep vision healthy throughout life. Potential ocular hazards, such as flying particles and chemical splashes, should be eliminated or controlled at source. If this is not possible, the appropriate type of eye-protection must be provided and worn. Screens or fixed shields can be used alone or in addition to eye-protectors to guard against potential hazards. The work environment is the commonest setting in which ocular injuries occur, and more than 90% of these injuries are preventable by the adoption of safety measures, and the appropriate and consistent use of PPE¹¹. This therefore implies that the cost of treating ocular injuries, through hospital admissions, surgeries and medications; work hours lost during such treatment; the greater likelihood of recurrence of ocular injury, and loss of family income, may all be avoidable and unnecessary.

MATERIALS AND METHODS

This study was carried out using the descriptive and cross-sectional survey design. The sample size comprised all 260 welders from Nekede mechanic village as the population size was not large. Nekede is an Igbo speaking community located near the city of Owerri in Imo State. The mechanic village has an area of 550,362m² of land¹². It started with few workshops which have grown into many more shops. Activities conducted at the mechanic village are typical of auto-mechanic repairs and invariably involves working with and spilling of oils, grease, petrol, battery electrolyte, paints and other materials which contain heavy metals.

The instrument for data collection was semi-structured interviewer

administered questionnaire consisting open and closed ended questions on demographic data and incident(s) of ocular injury. Questionnaire was preferred in this study because of its suitability for gathering information from a large number population. The questionnaire was distributed to the participants with the help of research assistants after verbal informed consent was obtained from each participant. Those who could not read or write were assisted by the researcher/research assistants in completing the questionnaire. Snellen's literate and illiterate visual acuity charts,

Bjerrum tangent screen, Ophthalmoscope, Pen-torch and Schiottz indentation tonometer were used during ocular examination. Verbal informed consent was obtained from each participant. However, the eye tests were conducted and treatment administered where indicated at no cost to the participants as a motivation during the data collection exercise. Data analysis was done with the SPSS (Statistical Package for Social Sciences) Version 21 computer software using descriptive statistics. Results were reported in the form of graphs.

RESULTS

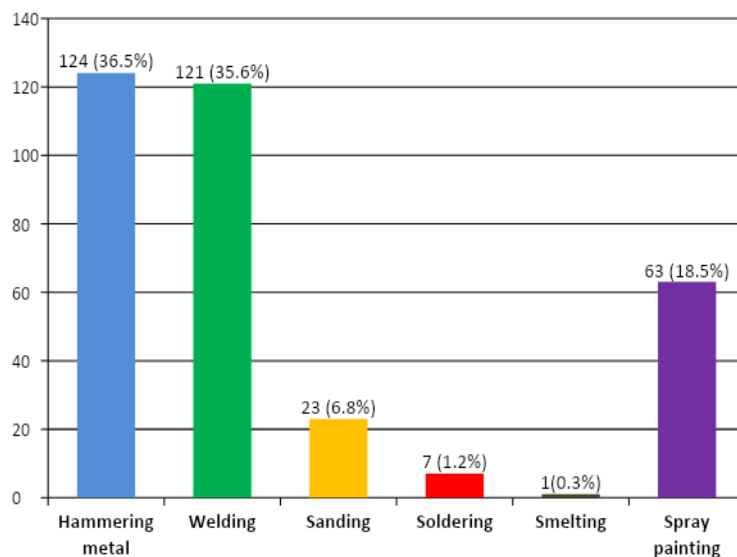


Fig. 1 Activities of Welders in Nekede, Imo State, Nigeria

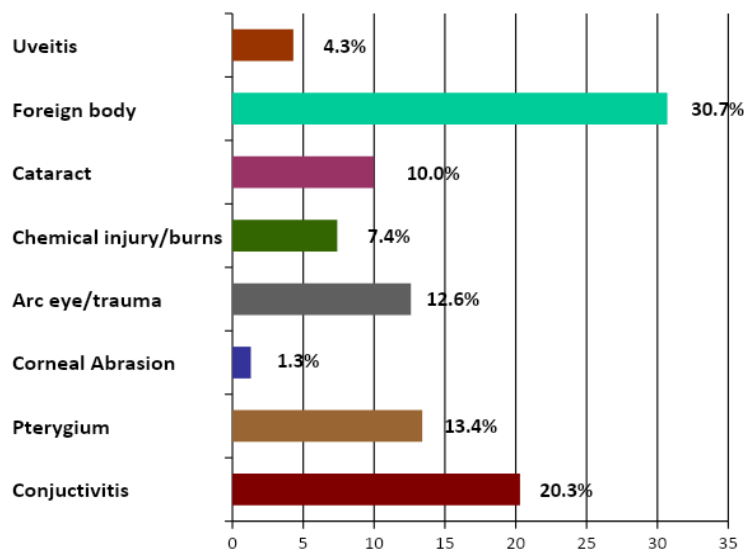


Figure 2: Ocular hazards/Injuries among Welders in Nekede, Imo State, Nigeria.

Results from this study showed there were six (6) different activities that welders in Nekede, Imo State, were engaged in. These activities include hammering metal, welding, sanding, soldering, smelting and spray painting. The highest frequency of occurrence, 36.5% was seen among those who were into hammering of metal that is, the panel-beaters, followed by those who were into welding. There also those who were into spray painting and sanding The least frequency, 1(0.3%), was seen among those who were into smelting (figure 1).

The most prevalent ocular hazard/injury was foreign body injury. Others were conjunctivitis, pterygium, arc-eye injury/trauma, cataract, chemical injury/burns, uveitis, and corneal abrasion (figure 2).

DISCUSSION

All participants in this study were males aged between 11 – 60 years with a mean age of ± 3.5 years. A high occurrence (88.8%) of work-related ocular injuries/hazards among these welders was recorded in this study. Majority of the welders had history of more than one ocular hazards/injury due to non-use of eye protector and/or due to the use of poor quality eye protectors and/or due to inappropriate selection of the correct eye protector for their work. The most implicated ocular hazard/injury was foreign bodies. The foreign bodies were mainly particles of dust, gaseous fumes, sand and flying objects such as metals arising from machines used mainly for filing. Others were conjunctivitis, pterygium, arc-eye injury/trauma, cataract, chemical injury/burns, uveitis and corneal abrasion. This high morbidity rate of ocular hazards/injuries points to the fact that welders in Nekede, Imo State, do not observe safety regulations and other proper measures for prevention of work-related ocular hazards/injuries. Unfortunately, these ocular hazards/injuries resulted in slight reduction of vision and in few cases, total

loss of vision mostly in one eye. Majority of these ocular hazards/injuries could have been prevented if protective eye equipment were constantly used.

The result of this study supports the study carried out by Omolase and Mahmoud¹³ in their study to determine the degree of compliance by some welders in Ondo State, where they found out that most of the respondents (50%) reported foreign bodies as the most implicated ocular injury. Other work-related injuries reported in their study were eye irritation and facial burns. This study also aligns with another study by Fiebai and Awoyesuki¹⁴, where it was found that the commonest ocular injuries among welders were foreign bodies (22%). Another study corroborated by this research is that by Okeigbemen et al¹⁵ in their study among welders in Ego Local Government Area, Edo State, Nigeria, where it was reported that majority of the respondents had reported cases of superficial foreign bodies (78.8%), and others reported corneal burns from welders' arc-rays. However, the study by Megbele et al³ to assess the risks of cataract in Nigerian metal arc-welders reported cataract to be most implicated work-related ocular hazard, though there were also cases of pterygium.

CONCLUSION

Ocular problems could lead to visual impairment, which is a serious significant health burden worldwide. Estimates by the WHO¹⁶, show that 314m people worldwide were visually impaired, of whom, 45m are totally blind. 90% of these blind and visually impaired people live in low and middle income countries, i.e. the developing world. However, 80% of these blindness and visual impairments are preventable and/or treatable, if there is adequate care, use of eye safety equipment and availability of eye-care services. This study showed a high rate of occurrence of ocular injuries among the welders in Nekede, Imo State, of which foreign bodies, trauma and corneal abrasion, which are related causes of

avoidable blindness, additively made up to 44.3% of the ocular injuries/hazards, a very high percentage. Most of the welders who used eye protectors but sustained ocular injuries during work had not chosen the appropriate eye protector suitable for the work. Workplace ocular hazards can be controlled and /or avoided by proper selection and use of appropriate protectors. Hence, efforts must be made to reduce the risks of ocular problems in the work environment of the welders in Nekede, Imo State, through enlightenment, education, improved compliance and/or adherence to occupational safety regulations.

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