

Ocular Injuries Among Welders in A Rural Community in Nigeria

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ABSTRACT

Welders are a high risk group for eye injuries due to their occupational exposures to metals and ultraviolet radiation. This study was aimed at determining the prevalence and pattern of eye injuries and rate of use of protective eyewear at work among welders in Ekwulobia community, Anambra State. A cross sectional study of ocular injuries was conducted between June 2013 and February 2014 among welders in Ekwulobia, Aguata Local government Area of Anambra State, Nigeria. Information was obtained using a pre-tested questionnaire and ocular examinations were conducted on all the subjects. A total of 110 consenting welders within the age range of 19-78 years (mean age 37.77±12.02 years) and

comprising of 65(59.1%) electric welders and 45(40.9%) gas welders were seen. All

the subjects were males. 93(84.5%) of the subjects had ocular injury and flying objects (47.3%) were the major cause. 4 major

types of ocular injuries were recorded and superficial foreign body 51(43.6%) was the most common type. The occurrence of ocular injury increased with number of years in service as a welder, from 4.3% for 1-2 years in service to 39.3% for 11 years and above in service. Only 33(35.5%) of the injured welders wore protective eyewear at the time of the injury. Ocular injuries are thus a common occurrence among welders in Anambra State of Nigeria. Eye protective devices and educational programmes stressing the importance of using them are essential.

Keywords: Eye injuries, welders, superficial foreign body, Anambra.

INTRODUCTION

The eyes of the worker in every occupation are his most valuable asset.

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Despite the fact that the eyes represent only 0.27% of the total body surface area and 4% of the facial area, they are the third most common organ affected by injuries after the hands and feet¹. Eye injury as a facet of everyday life is presumably fast becoming a common cause of presentation and admission at health centres in Nigeria. Studies have shown that approximately one half of patients who present to an eye casualty department are cases of ocular trauma^{2, 3}. However these injuries do not usually surface as random events as some population groups or certain activities of daily living have increased risk of eye injury because of greater exposure to hazards⁴. Annually, over 2.5 million Americans suffer an eye injury and globally more than half a million blinding injuries are reported every year⁵. Eye injuries also account for a substantial proportion of all work related injuries⁶. Unlike other major blinding disorders such as cataract, trachoma, onchocerciasis or xerophthalmia where epidemiological studies have contributed significantly to a better understanding of the disease patterns, ocular injuries epidemiological data are scarce or totally lacking in large parts of the world. Infact, eye injuries have been considered a clinical issue and are mostly addressed

within the context of clinical eye care delivery system including emergency case management.

However like any other eye disorder, eye injuries do not occur as random events, there is evidence that some population groups are at increased risk because of greater exposure to hazards and / or decreased ability to avoid or detect hazards⁷. Some individuals are also at increased risk of eye injury as a result of their occupation⁸. This is usually due to occupational exposure to hazards and/or inability of individuals to avoid or detect hazards. Small-scale and large-scale industrial workers constitute a group of individuals at high risk and welders, miners and other artisans constitute a subset of this group⁷. Welding is the second leading cause of consumer product related ocular injury⁹. 15% of the most common types of injuries are welding related¹⁰ and 21% of all eye injury claims are made by welders¹¹. The arduous nature of these jobs makes the workers vulnerable to accidents¹² as the workers are exposed to such hazards as flying metal chips, burns in the eye and injury from radiation.

Most eye injuries are avoidable and a greater proportion is believed to be superficial in

Ocular Injuries Among Welders in A Rural Community in Nigeria [Nwala Onyinye R1](#), [AhuamaOkezie C2](#), [Ikoro Nwakaego C3](#), [Azumamah Young C4](#), [Ohiri Martin O5](#) , [Anene Chiamaka6](#)

nature and transient in their effects. However, serious eye injury requiring hospitalization gives rise to irrevocable structural damage or functional loss most times. Subsequently ocular injury has been identified as an avoidable cause of blindness and visual impairment¹³ and has been highlighted as a major cause of visual morbidity more recently¹⁴. Worldwide there are approximately 1.6 million people blind from eye injuries, 2.3 million bilaterally visually impaired and 19 million with unilateral visual loss; these facts make ocular injury the most common cause of unilateral blindness¹⁵. Ocular injury occurs frequently in developing countries and constitutes a major health problem¹⁶. For the afflicted person, who is usually in the active years of life, the visual, vocational and economic consequences are quite enormous and cannot be overemphasized¹.

Due to the recognition of the public health implications of ocular injuries especially in developing countries like Nigeria, a growing interest in studies on eye injuries has been recorded^{17,18}. Ekwulobia is the most densely populated and the highest industrialized area in Aguata Local Government area of Anambra. In the context of eye injury no one

has characterized this area in Nigeria thus the need for this study. The findings of this study would provide a recent baseline data for the development of effective safety policies, programmes and strategies for promoting eye health and preventing welding related occupational hazards in Anambra State and Nigeria in general.

MATERIALS AND METHODS

A cross-sectional study was carried out over an 8-month period from June 2013 to February 2014. A total of one hundred and ten (110) consenting welders in Ekwulobia, Aguata Local government Area of Anambra State, Nigeria who were within the age range of 19-78 years (mean age 37.77 ± 12.02 years) and comprising of 65 (59.1%) electric welders and forty five 45 (40.9%) gas welders were seen. All the subjects were males. Ethical clearance to carry out the study was given by the Abia State University ethical committee. Consent of the welders was obtained prior to the commencement of the study and confidentiality of the information provided was guaranteed.

Information was obtained by administering a pre-tested questionnaire. All patients underwent a comprehensive

ocular examination including visual acuity (using Snellen chart), examination of the anterior segment using penlight and funduscopy using direct ophthalmoscope. Data collected were analysed using descriptive statistical methods. Frequency distribution tables were generated for all data collected. Findings were illustrated as tables, bar charts and pie charts where appropriate. The means and standard deviation were determined.

Subjects were informed about the findings and appropriate referrals were made for remarkable cases. Eye health talk was given and the use of proper eye care protection was emphasized at the end of the screening sessions.

RESULTS

A total of one hundred and ten (110) welders were screened and all the workers were males. The mean age of these welders was 37.77 ± 12.02 years. The age distribution of the subject with and without ocular injury is shown in figure 1. The prevalence of ocular injury among the welders was 84.5% (93 welders). 17 (15.5%) of the welders had no ocular injury. There were four (4) major types of ocular injuries among the welders and most of them had more than one type of

ocular injury (figure 2). A total of one hundred and seventeen (117) ocular injuries were recorded among the 93 subjects who had ocular injury. Superficial foreign body 51 (43.6%) was the most common type of ocular injury. Flying object (47.3%) was reported by the welders with ocular injury to be the major cause of ocular injury followed by ultraviolet rays (45.2%) while gas splash accounted for 7.5% (table 1). 76.9% of all the injuries recorded occurred among electric welders (table 2). More ocular injuries (39.3%) were recorded among welders who had spent longer number of years on the job (11 years and above) than those who had only spent 1-2 years (4.3% of ocular injuries) on the job (table 3). Only 33 (35.5%) of the 93 injured welders were using protective eyewear at the time of the injury (table 4).

DISCUSSION

In this study, 93 welders had ocular injury giving a prevalence of 84.5% (figure 1). A similar study in eastern part of Nigeria showed the prevalence of ocular injuries to be 28.5%¹⁹. Our prevalence thus appears to be higher than that reported in this other study and could be attributed to increasing industrialization in our study area. Ekwulobia presently is the largest

commercial town in Aguata Local Government area of Anambra State, Nigeria and boasts of high level engagement in welding work by individuals in the town. Majority of the welders were between 29-38 years (43.6%) and this compares favourably with the 35.9% reported between 25-34 years by Lombardi et al²⁰. This was followed by the welders 19-28 years of age (21.8%). These two age groups (29-38 and 19-28 years) also had the highest population of welders with ocular injury (35.4% and 18.2% respectively). This is very similar to the 24.4% finding of a study²¹ in Edo State, Nigeria which reported that the age group most affected by ocular injury is 21-30 years. This could be attributed to the fact that these are the active years of life and most individuals are found to be engaged in one vocation or the other at this stage. Only few of the welders were aged 59 years and above (4.5%) and this could probably be as a result of old age so that most of them retired before this age.

Superficial foreign body (43.6%) was the most common ocular injury. This agrees with previous studies^{21, 22} which also reported superficial foreign body to be the commonest injury among welders. Welding involves the use of metals which are usually beaten into a desired shape before use. Metal

chips can in the process may find their way into the eye and cause ocular injuries. Rokickiet al²³ also emphasized that injuries complicated by ocular foreign body should be particularly suspected in high-velocity metal events and welding is one of them. Photokeratitis (41.0%) was the second leading ocular injury among these welders. This particular ocular injury could largely be due to the high thermal effect of ultraviolet radiation emissions from welding²⁴.

The causative agents of ocular injury in this study were flying objects (47.3%) such as metal chips and work tools, ultraviolet ray (45.2%) and gas splashes from welding gas (7.5%). Similar studies have reported the same sources of injury^{19, 25, 26}. However, this finding differs from that reported by Edema et al²² where sand dust was found to be the commonest cause.

A larger number (76.9%) of ocular injuries occurred among the electric welders while only 23.1% occurred among the gas welders (table 2). This is contradictory to the report of another study²¹ which reported that gas welders were more likely to have a history of work-related injury compared to electric welders and could be attributed to the fact that more welders in this area engaged in electric welding than gas welding.

It was observed that there is a higher risk of superficial foreign body embedment and photokeratitis as the number of years in service as a welder increased (table 3). This could be attributed to the increased exposure to flying objects and the accumulation of ultraviolet radiation emission over time²⁴.

Findings also showed that majority of the welders 67(60.9%) do not use protective eye wears because of reasons ranging from ignorance, inconvenience, discomfort, interference with visibility, lack of money to buy protective eye wears to lack of felt need. while only 39.1% of them used protective eye wear. The number of welders who used protective eye device in this study was low. It is however comparable to the 37.6% reported by Okeigbemen et al²¹ but is much lower than the 65% reported by Alakija²⁷. Also 60 out of the 93 welders with ocular injury had no protective eye wear at the time of the injury (table 4). 33 of those who had ocular injury used protective eye wear and the occurrence of eye injury among them could be as a result of recall bias or donning of protective eye

FIGURES AND TABLES

device. Studies have shown that eye injuries are frequent when protective eye devices are not used and are highly preventable by using the correct safety wear^{28, 29}. This therefore highlights the need to institute and enforce policies on the regular use of protective eye devices in the work place.

CONCLUSION

There is a high prevalence of work-related ocular injury among welders in Anambra State, Nigeria. It is important to recognize conditions in the work pattern of welders which predispose them to injuries; such as lack of use of protective eye devices. Safety policies should be instituted and occupational safety intervention programs designed and carried out by eye care providers to prevent the occurrence of ocular injuries among welders in the area. Periodic evaluation should also be carried out to assess the efficacy of and compliance with safety devices by welders. Injury surveillance system should be established by the relevant authorities for monitoring and reporting of occupational ocular injuries.

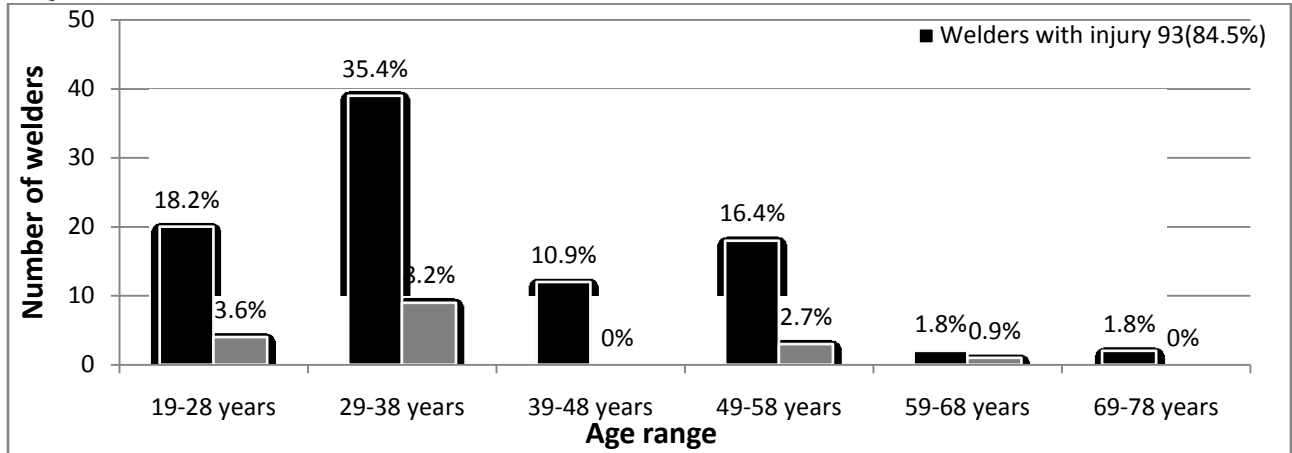


Fig 1: Age distribution of welders with and without ocular injuries

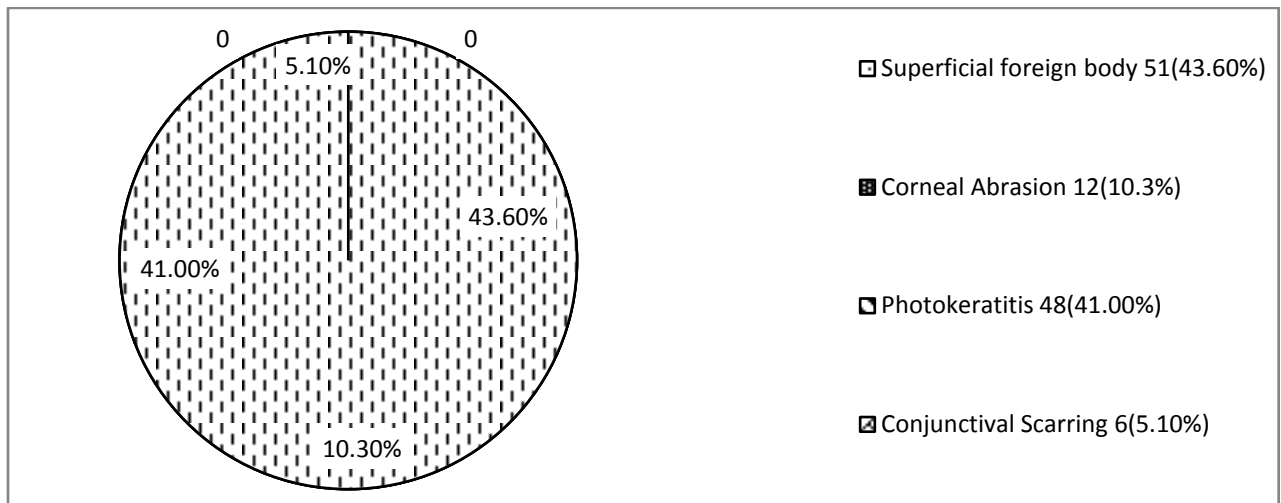


Fig 2: Distribution of ocular injuries

Table: 1. Agents causing ocular injury among injured welders

Causes of injury	Frequency	Percentage (%)
Flying object	44	47.3
Ultraviolet rays	42	45.2
Splashes	7	7.5
Total	93	100

Table: 2. Distribution of ocular injuries according to type of welding process

Ocular Injuries Among Welders in A Rural Community in Nigeria [Nwala Onyinye R1](#), [AhuamaOkezie C2](#), [Ikoro Nwakaego C3](#), [Azumah Young C4](#), [Ohiri Martin O5](#) , [Anene Chiamaka6](#)

Type of welding process	Superficial foreign body	Corneal abrasion	Photokeratitis	Conjunctival scarring	Total	Percentage (%)
Electric welding	45	9	30	6	90	76.9
Gas welding	6	3	18	-	27	23.1
Total	51	12	48	6	117	100
Percentage (%)	43.6	10.3	41.0	5.1	100	

Table: 3. Distribution of ocular injuries according to years of service

Years of service (years)	Superficial foreign body	Corneal abrasion	Photokeratitis	Conjunctival scarring	Total	Percentage (%)
1-2	2	-	-	3	5	4.3
3-4	2	-	3	3	8	6.9
5-6	3	-	12	-	15	12.8
7-8	11	3	3	-	17	14.5
9-10	8	6	12	-	26	22.2
11 & above	25	3	18	-	46	39.3
Total	51	12	48	6	117	100
Percentage (%)	43.6	10.3	41.0	5.1	100	

Table: 4. Use of protective eye wear among all the welders

Use of protective eye wear while working	Ocular Injury		Total
	Present	Absent	
Yes	33	10	43 (39.1%)
Nil	60	7	67 (60.9%)
Total	93 (84.5%)	17 (15.5%)	110

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