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Assesment of the Awareness of Occupational Health Hazards and Practice of Safety Measures among Welders in Maiduguri Metropolis Borno State, Nigeria

***[1]Abubakar, A. M., [2]Gubio, B. S. And [3]Musa, A.**

[1]Department of Physical and Health Education, University of Maiduguri, P.M.B. 1069, Maiduguri, Borno State, Nigeria. [2]Department of Environmental Management, Bayero, University Kano, P.M.B 3011, Kano State, Nigeria. [3]Department of Basic Science and Technology, Mohamet Lawan College of Agriculture P.M.B 1427, Maiduguri, Borno State, Nigeria.

Corresponding Author: ahmedoontop42@gmail.com

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Abstract

Welding is hazardous profession which exposes workers to various kinds of physical and chemical hazards with untoward health effects. This study assessed the awareness of occupational health hazards and practice of safety measures among welders in Maiduguri Metropolis Borno State, Nigeria. Interview on a across-section of 150 welders was done through Systematic random sampling technique was used in choosing the respondents of the study in Maiduguri Metropolis Borno State, Nigeria. All welders were males with a mean age of 37.5 years. The illiteracy rate was 51(34.0%. Almost all the welders were aware of the one or more workplace hazards. This was positively influenced by educational level, age nature training and work experience of the 150 respondents 32(21.3%) and 37(44.7%) was found to be more experience among

welders who had experience for 14 years and above 20 years. The most common injuries sustained were foreign body in the eye 14(84.3%), electric shock 129(86.0%, explosion 63 (42.0%), cut from sharp object 99(66.0%), Burns 89(59.3%) arc eye 141(94.0%), chronic cough 86(57.3%, welding fumes 55(36.7%), impaired hearing 45(30.0%) and back pain 109(72.7%). Respondents practiced safety measures in their work among them were goggle 43.5%, apron 16.1% hand gloves 14.6% and masks 12.5% regular use of safety device, shorted working hours and increasing experience were protective of occupational accident.

Introduction

Welder's are exposed to variety of occupational hazards with adverse health effects. Though, little is known of welder's awareness of health hazards and their compliance to safety precaution in developing countries (Sabitu, *et al*., 2009). Protecting the health of workers cannot be achieved without the workers having adequate awareness of hazard in the workplace. Awareness of these hazards can be affected by making factors. Discovering the factors that affect awareness will help in instituting measures to ensure that the workers have adequate awareness (Awosan *et al*., 2017). Roadside welders are among the most economically viable group of jobs especially in developing countries due to the increasing rate of urbanization and industrialization. Although, the workers are exposed to much of physical, chemical, biological and psychosocial risks during welding (Kodiya *et al*., 2022). According to Iliyasu and Lawan (2010) welding is the process of cutting and joining metal parts using a flame or electric and others sources of heat to meet and cut or to melt and fuse metals. It is an important tool for maintenance and construction in industries, but it has serious health related problems which may potentially cause injury to workers, as in the case most metal working industries, the potential for hazardous situation exists. High electrical currents and voltages are used to operate machinery and welding equipment. Machinery for shearing, farming, and punching various thickness of material area used (Odhiambo *et al.,* 2020). Flammable and other compressed gases are used during flame cutting and

welding operations. Welding may be carried out open, closed and in difficult situation (Adu and Danquah, 2016).

Trauma to eye injury is one of the most apparently and persistent occupational health and safety augment for welders and most welders suffers from skin diseases due to heat burns on their skin in the workplace (Sadiq, *et al*., 2018). Other occupational hazards facing by welders are laceration and pierce form of shape objects, respiratory react disease, risks of cancer, silicosis and explosion from gas cylinder which may lead to death among others (Onumbu and Ebchi, 2022). Welders are exposed to fumes containing metals like zinc, copper, nicked, chromium, platinum and their oxides leading to various respiratory dysfunctions and influenza (Sabitu *et al.,* 2009).

Health and safety related problem in developing countries Nigeria is inclusive, which have always been there and welders are among the most neglected groups of workers suffering from work-related health problems in such countries. In Maiduguri Metropolis, welding have provide Jobs to many individuals especially male youths and they are located along major high ways, around mechanic workshops, specified welder's workshops and motor spare-part markets. Welders do not have any form of organized occupational health service. It is then important to employ safety practices and measures among welders which in turn promote health and wellbeing of workers and also prevent or reduce the levels of health hazards that are associated with the welding occupation in Maiduguri Metropolis. The specific objectives were to assess the level of awareness of hazards among welders and to examine the practice of safety measure among welders in the study area.

STUDY AREA

Maiduguri is the capital of Borno state founded in 1907 by the British colonial masters for administrative purposed. It has long been the largest and dominant city in the north eastern region of Nigeria. It lies in the Sudan-sahel transition zone, located between latitude 11° 25'N and 11° 34'and longitude 13° 35' E and 13° 44'E (Musa *et al.,* 2019).). It is the headquarters of Maiduguri Metropolitan council bounded in the north by Jere Local Government Area, in the south-west by Konduga Local Government and in the North by Mafa Local Government Area.

MATERIAL AND METHOD

The study adopted the descriptive cross-sectional sample design. A sample size of 150 welder's respondents, from Maiduguri Metropolis was selected for the study. Systematic random sampling technique was used in choosing the

respondents of the study. A random starting point was obtained using a random number table with a sampling interval of 5.

DATA ANALYSIS

Data for the study was analyze using descriptive statistics of frequency distribution tables and percentages.

RESULTS AND DISCUSSION

Table 1: Socio-demographic Characteristics of Respondents

Variable	No (%)
Age	
20-30	42 (28.0%)
31-40	58 (38.7%)
41-50	34 (22.7%)
Above 50 years	16(10.7%)
Educational qualification	
Non formal	51 (34.0%)
Primary school	34 (22.7%)
Secondary school	42 (28.0%)
Tertiary education	23(15.3%)
Marital status	
Married	63(42.0%)
Single	49(32.7%)
Separated	25(16.7%)
Divorce	13(8.7%)
Total	**150 100**

The welding occupation provided a means of lively-hood for many Nigerians, but like other occupations it is not without its own occupational hazards. This study revealed (table 1) that all the respondents interviewed were males indicating that males tend to select themselves into more physically strenuous occupation that their female counterparts. It is interesting to note that reports from semi-urban town in South-South Nigeria showed the same gender bias Osagiede *et al*., (2022). The majority of the respondents 58(38.7%) with mean age of 37.5 years were in the 31-40 year's age bracket in their active middle-age in conformity with the studies of Sabitu *et al.,* (2009). The respondents level of

formal education was very low 42(28.0%) had secondary education and 51(34.0%) did not attend formal education not in agreement with finding of Delami *et al*., (2014). The results of this study revealed that 63(43.0%) of the respondents were married. The proportion of married welders in this study were higher than observed in a similar by Iliyasu and Lawan (2010). This might be attributed to socio-economic benefits derived from the welding occupation that help welders earn a leaving and cater for their families.

Table 2: Occupational Status of the Respondents

Variable	No (%)
Rank of working state	
Manager	49 (32.7%)
Work man	72(48.0%)
Apprentice	29 (19.3%)
Type of training received	
Apprenticeship	94 (62.7%)
Welding school	56 (37.3%)
Working experience	
Less than 5 years	24 (16.0%)
5-9 years	42 (28.0%)
10-14 years	32 (21.3%)
15-19 years	15 (10.0%)
Above 20 years	
Types of welding	
Electric arc	114 (76.0%)
Gas	36 (24.0%)
Total	**150 100%**

The occupational status of the respondents (table 2) showed that work-men 72(48.0%) dominated others coteries of welders in the study area. This might be attributed to socio-economic benefit derived from the welding occupation in agreement with studies of Kodiya *et al.,* (2022) majority of the responsibilities in this study had apprenticeship 94(62.7) training. This may be the reason why majority of the respondents in this study were below 50 years. Other reasons are because apprenticeship is the most common form of training welders received in Nigeria, and only a small proportion of welders are trained in the studies of

Osagiede *et al.,* (2020). The working population in welding profession has moderate turnover in the study area. Finding revealed that 42(28.0%) of welders had experience 5-9 years, followed by 37(24.7%) had experience of more than 20 years and 32(21.3%) had working experience of 10-14 years. The level of experience was found more among welders who had worked for 14 years and above 20 years. This was in agreement with studies of Syed *et al.,* (2017) and Berhe *et al.,* (2019). In this study, majority of the welders 114(76.0%) used electric as their source of flame for the welding procedures compared to their counterparts who use oxyacetylene as source of flame in agreement with the findings of joseph *et al.,* (2017).

Table 3: Awareness of Occupational Health Hazard by Respondents

Variable	Aware No (%)	Not Aware (%)
Foreign body in the eye	134 (89.3%)	16(10.7%)
Electric shock	129(86.0%)	21 (14.0%)
Explosion	63 (42.0%)	87 (58.0%)
Cut from sharp object	99 (66.0%)	51(34.0%)
Burns	89(59.3%)	61 (40.7%)
Arc eye	141 (94.0%)	9 (6.0%)
Chronic cough	86 (57.3%)	64 (42%)
Welding fumes	55 (36.7%)	95 (63.3%)
Impaired hearing	45 (30.0%)	105 (70.0%)
Back pain	109 (72.7%)	41 (27.3%)

The results of this study from table 3 showed the respondents awareness of occupational health hazards in the study area. Findings revealed that all the respondents were aware of at least one or more workplace hazard related to welding occupation. Highest percentage of the respondent 141(94.0%) and 134(84.3%) were aware of arc eye and foreign body in their eyes. While electric shock 129(86.0%). This seems to be revealing of the fact that despite their low level of formal education, there is concern about hazards of the welding occupation probably as a result of the fact that they may have been informed during apprenticeship. This find was in agreement with the studies of Onumbu and Elechi (2022). The study also reveals percentage of welding workers are more severally affected by cut from sharp object 99(66.0), burns 89(59.3%), chromic cough 86(57.3%), explosion 63(42.0%) and impaired hearing 45(30.0%) respectively, it was in agreement with the studies of Syed et al., (2017). Considerable percentage of respondents 109(72.7%) aware of back and 55

(36.7%) aware of welding fumes. Because of frequent inhalation exposure to high concentrations of fumes and gas during welding, interest in potential health problems has centered on respiratory effects, particularly lung cancer, which could be caused by effect of metals in stainless steel welding fumes. This study was in agreement with the findings of Oluwole *et al,* 2018).

Table 4 Practice of Safety Measures by Respondents

Variable	Frequency	Percentage
Frequency of using PPE		
Regularly	65	43.3%
Not regularly	85	56.7%
Total	**150**	**100**
Goggle	122	42.5%
Hand gloves	42	14.6%
Foot wear	23	8.0
Helmet	12	4.2%
Masks	36	12.5%
Apron	52	18.1%
Total	287	100

Findings of this study further revealed in table 4 respondents' practice of safety measures that 85(56.7%) were not regularly used personal protection equipment (PPE) which disagree with the findings of Syed *et al.,* (2017). It was found that high proportion of welders 122(42.5%) used goggle regularly. Hand gloves users 42(14.6%) followed by those used masks 36(12.5%) were cautions of using PPE to protect themselves. The study showed that 52(18.1%) used apron, 23 98.0%) used foot wears while 12(4.2%) used helmet. Study reveals that almost all the respondents used personal protective equipment. Variations in the type of PPE commonly used among welders could be due to availability and access to the different types of PPE disagrees with the findings of Berhe *et al.,* (2019). More importantly, it could be due to the fact that working with flame, the welders would feel they could have their eye damage especially with the release of fire particles while the welding process is ongoing in agreement with the studies of Osagiede *et al.,* (2020).

CONCLUSION

Welding is hazardous profession which exposes workers from various kinds of physical hazards in the absence of Judicious and effective use of personal protective equipment's. Finding revealed that most welders were aware of one or more occupational health hazards associated with welding. Despite majority of the welders in the study areas nearly have 10 years of experience in welding

profession, almost all the respondent used personal protective equipment available to them for protection.

RECOMMENDATIONS

i. There should be a sustainable health education information regarding welding hazards and personal protective equipment as well as information on safe work place.
ii. Welding should be performed in well-ventilated areas and use local exhaust ventilation to remove fumes and gases at their source in stell air.

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