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A Survey of the Awareness on the harmful effect of radiation emitted from Welding machines and Compliance of Welders at Biu on the Use of Eye-Protective Wear when on Duty

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ABSTRACT

In this work, we carried out a survey on the awareness of the harmful effect of the radiation from welding machine and the level of compliance of the welders on the safety practice of using eye-glass wear while at work in Biu and the awareness of sight problem implications, using a well-structured questionnaire which was designed for the purpose and administered to some randomly selected welders within the area covering 105 welders. The data collected was arranged in frequency tables and plotted in bar-chart forms and also analyzed with chi-square test to ascertain the significance levels of the influence of age and experience on the compliance of the participants. And from the analysis, it was seen that there is no statistically significance relating the compliance of the use of the safety eye protective wear with respect to age or working experience.

1. INTRODUCTION

Welding is a profession that has come to stay because of present day technological development. However welding machine of any type emits a wide spectrum of radiations ranging between 200nm–1400nm which includes ultraviolet (UV) rays (200-400nm), visible light (400-700nm) and infrared rays (700-1400nm). All these ranges of radiations being produced by welding machines at various ranges of wavelengths are damaging to various parts of the eyes at different levels [1]. “These radiations and their secondary effects are

responsible causes of some ocular hazards that are seen clinically [2]. Some of these are the factors and conditions that pose a threat to promotion of healthy, wholesome and comfortable vision [3]. This is why in western world like America; the protective act is not just wearing of welding goggle but use of other personal protective equipment [4] because they observed the implications and dangers of welding without proper precautions appropriated. Unprotected exposure of the eyes to these rays is known to cause both acute and chronic ocular disorders. Artificial ultraviolet radiation from welding increases the risk of cortical cataract, conjunctival neoplasm, and ocular melanoma [5]. Welding machines of any type involve open electric arc or flame that is risky as its burn is significant to cause eye problems. However, with the use of proper eye protective wears, the risks of ocular injury associated with welding can be greatly minimized. Full face welding helmets with dark face plates is the best in order to prevent this exposure of any part of the face to arc radiation [6]. As it has been discovered that ultraviolet radiation and far infra-red (IR) are absorbed by not only the cornea but also the eye lens whereas visible light and near infra-red penetrate to the retina [7, 5] that constitute the delicate parts of eyes. It is therefore clear that long term chronic exposure to the radiation can lead to eye problems associated with conditions like pterygium, pingueculae, malignant melanoma, cataract ad age related macular degeneration [10, 11, 12, 13]. When the eyes of a welder are unprotected, the welder may be exposed to his welding arc [14] or the arc of nearby welders [15]. It has been noticed that many causative factors for the increased ocular disorders among the welders is due to chronic exposure to welding light as they do not care to protect their eyes from welding light[4]. As they fail to understand or pay attention to the fact that the eye is the most sensitive and delicate sense organ of the human body and it plays an important role in our daily life. [14, 3] It is said that the eye is the body's window and about 90% of industrial activities are dependent directly or indirectly on visual perception hence, influencing efficiency and output. A seriously impaired eye either from injury or disease may not function well in terms of seeing but one can still make use of a leg or hand that has suffered from a serious injury or disease [16], and as such, the eyes should be guarded and taken good care of judiciously. Most welders are found not to be interested in using protective equipment because they are not aware of the adverse and long term health implication of welding without the use protective eyewear, but because of the nonchalant attitude towards their health, disregard the importance of the advice on the occupational safety measure relating to their job.

Sequel to this, we intend to survey the awareness of the harmful effect of light from welding machines to assess the level of compliance of the welders here at Biu to the use of protective eye-glass wear when on duty, and further to ascertain if it is based on the lack of experience of the job, age group of those practicing welding or whether it is due to negligence of the adverse effect and long term implications which leads to eye problem as a result of radiation from the welding light and other injuries that may come from flashes of particles from welding arc, then to create awareness by stressing on the implications, if they are negligent in the use of the protective eyeglass wear while welding.

2 MATERIALS AND METHODS

A well-structured questionnaire was prepared for this study and was distributed to 105 welders in their workshops within Biu, and the aim of this study was clearly spelt out and explained to the participants; they were explicitly detailed on the need to give honest response to the questions contained in the questionnaire. The data for this study was randomly obtained from selected participants through interviewing and administration of questionnaire which was structured to suit the objectives of the study centered on the welders population of 105 in Biu Local Government Area.

A consent form was filled by the participants who consented to the study and confidentially was assured of the genuine nature and importance of study. The demographic data of the participants was obtained and the questionnaires were administered in an interview manner.

The data collected from the questionnaire for this study was tabulated into frequency table and put in bar-chart form as well and then analyzed using the scientific package for social sciences (SPSS) version 22 statistical software package. Descriptive statistics was used to analyze the data obtained that were arranged into frequency tables, bar charts and pie charts.

3. RESULTS AND DISCUSSION

Table1; Those who are aware of the harmful effect produced by light from welding

Yes	No
103	02

Table 2; Those who have the knowledge of the implication of failure to make use of the eye-protective wear when welding

Yes	No
104	01

Fig. 1: bar-chart of frquency Distribution of the welders that make regular use of Eye-glass wear and those who do not

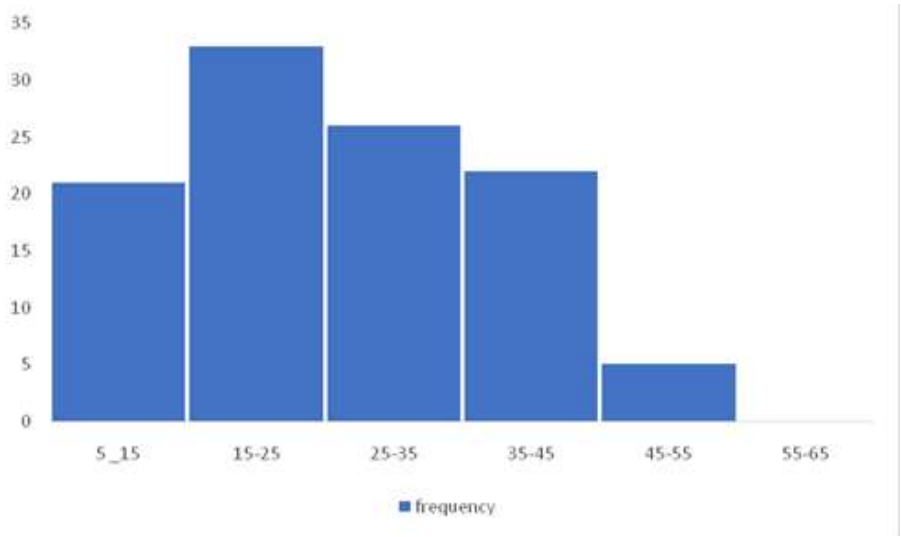

Fig. 2; Bar-chart of frequency distribution of the age range of welders in Biu

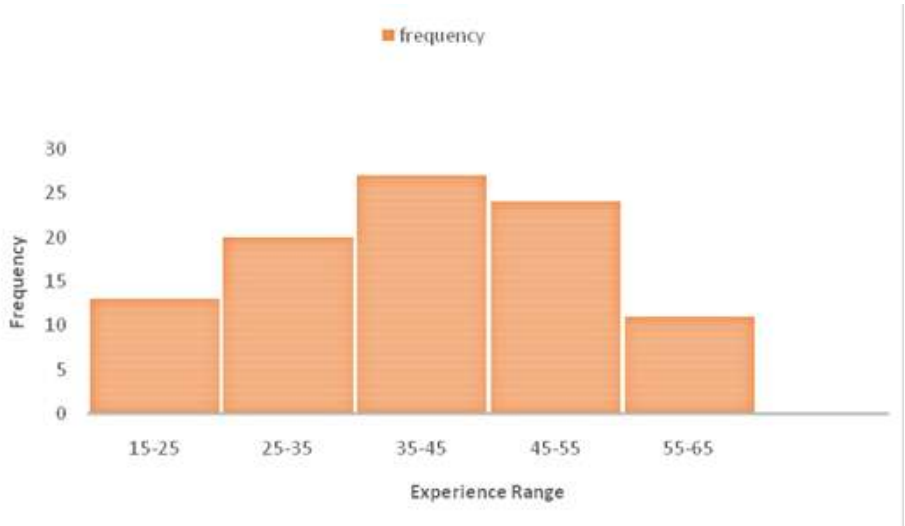

Fig. 3; Bar-chart of frequency distribution showing years of experience of the welders in Biu

Table 1 depicts the number of the sampled welders who are aware of the harmfful effect of radiation from the light emmited from the welding machine of any type[1] and those who are not, while table 2 conversly indicates those who understand the anticipated implication of not using eye-protective wear while welding. With the responses from these tables, there is quite an appreciable indication that a reasonable number of them knew and appreciate the harmful effect of the radiation from welding machine and thus are expected to comply effectively to the use of eye-protective wear, but unfortunately there are some deviants who for reasons best known to them ignore the use of eye wear. This could be termed a disregard to the risk factors that will result based on such negligence.

Fig.1 shows the bar-chart of frequency distribution of the years of experience of the welders in relation to the level of compliance; it was observed that some welders within a certain age range complied more than those with the other age range. For instant, those within 15-25 showcased higher level of compliance than those within other age range. Those between 45-65 seemed to be worst. Although many of them are no more effectively active on the job because they have many apprentice under them who handle majority of the welding and as such they just observe and issue instruction to those apprentice on what to do.

In a similar manner, fig. 2 shows the bar-chart of the frequency distribution in terms of years of experience on the job which also indicated that the level of compliance to the use of protective wear did not conform to the years of experience on the job.

A chi-square test of independence performed to examine the relation between age and the compliance with the use of the eye protective wear indicates that there is no relation between these variables, to the level of the significance, [X^2=28.81, p<.057]. It was obvious that age has no effect on the level of compliance with the use of protective equipment. In a similar manner, the test that was also carried out on the frequency of compliance level based on the year of work experience as presented in bar chart in figure 3 to ascertain the level of compliance based on age. From the chi-square test performed to examine the relation between experience on the job and the compliance level with the use of eye protective wear, it is revealed that there is no relationship between these variables, there is no statistical significance [X^2=8.949; p< .347] between the experience on the job and compliance to the use of eye protective wear by the welders while on duty.

4 CONCLUSION

Therefore in the final analysis, results from this study shows that there was a high awareness of the harmful effect of radiation emitted from welding machines[17] and the need for compliance with the use of the protective eye wear because of the ocular risk associated with the occupational nature of welding as a profession among the welders[18], because there is need for the eyes to be protected while welding, but some welders still do not care with the compliance to the use of the eye protective wear. The level of compliance to protective eye wear usage among the welders at the age ranges of 55-65 and 15-25 is found to be relatively low. However, irrespective of the age and experience on the job, it is still commendable that the welders in Biu seem to comply more as to when compared with those in some other places where this type of study had been carried on in other places[19]. Conversely, when compared with similar survey as was done in Abakaliki [20,21], it was also observed that the level of compliance is more and commendable because in some cases those who unfortunately do not comply, often resort to use of ordinary sunglasses which is not the correct type of welding protective eyewear. Generally as observed, the welders that have worked for more than 5 years comply less with the use of protective eye wear than those who have more years of work experience in all the cases.

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