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Assessment of the Use of Safety Eye-Glass Wear among Welders in Abakaliki Metropolis, Ebonyi State of Nigeria.

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ABSTRACT

In this work, we consider the assessment of the compliance of the welders to the safety practice of eye-glass wear while at work in Abakaliki Metropolis with a well-structured questionnaire which was designed for the purpose and administered to some randomly selected participants. That is welders with population of 101 were randomly selected from 67 workshops within the area of study. The data collected was arranged in the tale and also carefully analyzed with chi-square test to ascertain the significance level of age, educational level and experience on compliance of the participants and it was seen that there is no statistically significant relation (X2= 42.911, p < .000) between level of education and the compliance with the use of protective equipment. Level of education influenced compliance with the use of protective equipment. There is also no statistically significant relation (X2= 8.949, p<.347) between working experience and the compliance with the use of protective eye wear. Working experience has no effect on compliance with the use of protective equipment. There is also no statistically significant relation (X2= 30.81, p<.057) between age and the compliance with the use of protective equipment. Age has no effect on compliance with the use of protective eye wear.

1. INTRODUCTION

Welding is a process of joining two metal parts together by applying intense heat between them which causes the parts to intermix after melting [1]. A welder is a tradesman who specializes in welding materials together [2] or a trades person who specializes in fusing materials together[3](en.m.wikipedia.org Wikipedia Welder). Welding, according to Davies et al[4], 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). And all these rays and radiations are being produced at damaging levels [4,5]. "These radiations and their secondary effects are responsible for the ocular hazards that are seen clinically"[5] and these are those factors and conditions which pose a threat to promotion of healthy, wholesome and comfortable vision[6].In the developed world, the protective act is not just wearing of welding goggle but use of other personal protective equipment [7] because they observed the implications and dangers of welding without proper precautions appropriate. Unprotected exposure of the eyes to these rays is known to cause both acute and chronic ocular disorders [4]. Artificial ultraviolet radiation from welding increases the risk of cortical cataract, conjunctival neoplasm, and ocular melanoma [8] and this is why the use of proper protective eyewear is called for in other to minimized the risks of ocular injury associated with welding. Full face welding helmets with dark face plates are worn to prevent this exposure is well advocated for as a better option [9] since some researchers) have discovered that ultraviolet radiation and far infra-red (IR) are absorbed by the cornea and lens whereas visible light and near infra-red penetrate to the retina [10,11].The hazards associated with the welding process depend on the type of welding, the materials (base metals, surface coatings, electrodes) to be welded, and the environmental conditions also play their own role [12],though it is clear that long term chronic exposure to ultraviolet radiations has been assumed to be associated with conditions like pterygium, pingueculae, malignant melanoma, cataract and age related macular degeneration[13,14,15,16]. When the eyes of a welder are unprotected, the welder may be exposed to his welding arc [17] or the arc of nearby welders [18,17}] which may seriously lead to impaired eye either from injury or disease may not function well in terms of seeing [19],If the welders on their parts really appreciate their eyes as the engine of the body, they should have been jealously guarding their eyes and taking good care of it judiciously while at work by using protective eyewear. Based on this we now tend analyzed whether their negligence on the use of the eyes protective device is due to on the experience on the job, age group, educational background or whether it is based on unawareness of the adverse effect and long term implications of continuous exposure of the necked eye to the radiation from the welding arc over a long period.

2. MATERIAL AND METHOD

The major occupations engaged the populace in this area which is the main city of Abakaliki are small/medium scale businesses, petty trading, self-employed artisans (welding and fabrication, auto mechanics, hair stylist, barbers, etc.) and based on this we randomly sampled just few population of welders within the town, and prepared a well-structured questionnaire which was administered to the sampled population for the purpose of this study .However, the aim of this study was clearly explained to the participants as well as the need to give honest response to the questions contained in the questionnaire. The structured 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 with population of 101 in the Abakaliki metropolis with 67 workshops.

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

The data collected for this study which was carried using a well-structured questionnaire was tabulated in the frequency distribution form and were all expressed as the percentage of the distribution .Chi square was used to test for the relation of the demographic characteristics, while the analysis was carried out 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

Table 1 Frequency distribution of age of participants

Age	Frequency	Percentage (%)
16 – 25	18	17.82
26 – 35	40	39.60
36 – 45	24	23.76
46 – 55	9	8.91
56 – 65	6	5.94
66 – 75	4	3.97
Total	101	100

The table above shows the frequency distribution all age groups considered in our study in which it is observed that those within 26-35 has the highest frequency and 66-75 has the least.

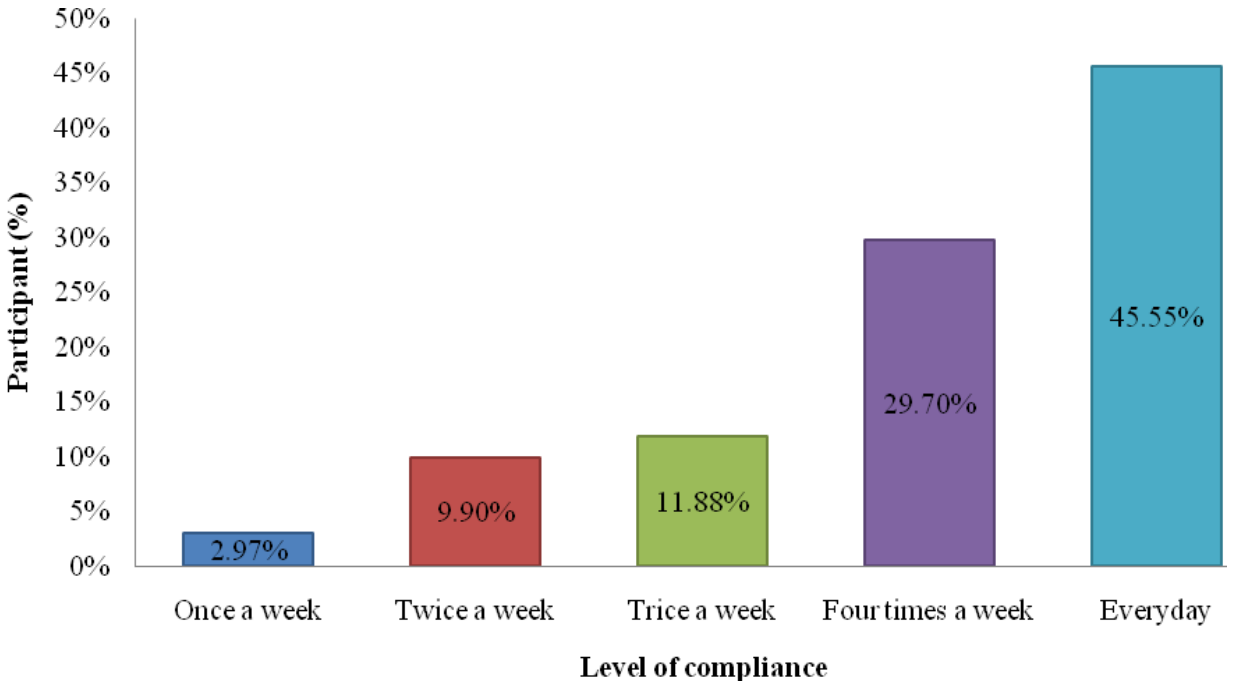

Figure 1; Bar Chart showing the compliance level based on the regular use

Table.2; Frequency of most preferred type of protective eye wear used

preferred type of eye wear used	Frequency	Percentage (%)
sun shade	73	72.28
plane transparent glasses	1	0.99
Welding goggles	27	26.73
Spectacle correction	0	0
Total	101	100

Table 2 shows the frequency of the preferred type of protective eye wear employed based type of the eyewear where it is seen that the highest percentage use of sun shade, which the wrong type another one in use goggle eyewear which is not also the appropriate type of protection that should be used.

Table 3; Compliance Level of the participants based on the age

Period		26-35 years	36-45 years	46-55 years	56-65 years	66- 75 years	Total
Once a week	2	1	0	0	0	0	3
Twice a week	3	3	3	1	0	0	10
Three times A week	2	5	4	1	0	0	12
Four times a week	9	13	0	3	4	1	30
Everyday	2	18	17	4	2	3	46
Total	18	40	24	9	6	4	101

Table 4: The analysis of relation between age and compliance with protective equipment based on Experience.

Compliance level	16-25 YRS	26-35 YRS	36-45 YRS	46-55 YRS	56-65 YRS	66- 75 YRS	Df	X^2	P-value
Once a Week	2	1	0	0	0	0			
Twice a Week	3	3	3	1	0	0			
Thrice a Week	2	5	4	1	0	0	4	30.812	.057
Four times a week	9	13	0	3	4	1			
Everyday	2	18	17	4	2	3			

A chi-square test of independence was performed to examine the relation between age and the compliance with the use of protective equipment. The relation between these variables was not significant, X^2=30.81, p=.057. Age has not much effect on compliance with the use of protective equipment.

Table 5; Frequency of compliance level based on years of experience

Compliance level	1 – 5 years	6 – 10 years	11 – 20 years	Total
once a week	3	0	0	3
twice a week	5	3	2	10
trice a week	3	5	4	12
four times a week	11	13	6	30
everyday	22	11	13	46
Total	44	32	25	101

Table.6;The analysis of relation between working experience and compliance with protective equipment.

Compliance level	Years of Experience			Df	X^2	P-value
	1 – 5 years	6 – 10 years	11 – 20 years			
Once a Week	3	0	0			
Twice a Week	5	3	2			
Thrice a Week	3	5	4	4	8.949	.349
Four times a week	11	13	6			
Everyday	22	11	13			

A chi-square test of independence was performed to examine the relation between working experience and the compliance with the use of protective equipment. The relation between these variables was not significant, X^2=8.949, p=0.347.Working experience has no significant effect on compliance with the use of protective equipment.

Table 7; Analysis of the relation between level of educational and compliance with protective eyewear.

Compliance level	Level of Education				Df	X^2	P-value
	None	Primary school	Secondary school	Tertiary			
Once a Week	3	0	0	0	4	42.911	.000
Twice a Week	4	5	1	0			
Thrice a Week	6	2	3	1			
Four times a week	5	7	15	3			
Everyday	2	22	10	12			

A chi-square test of independence was performed to examine the relation between level of education and compliance with the use of protective equipment and it was observed that there is no relation between the educational level and the use of eyewear protective equipment based on the analysis; X^2= 42.911, p< .000 Level of education influenced compliance with the use of protective equipment.

Table.8; The compliance level based on educational level

compliance level	level of education				
	none	primary school	secondary school	tertiary	Total
once a week	3	0	0	0	3
twice a week	4	5	1	0	10
trice a week	6	2	3	1	12
four times a week	5	7	15	3	30
everyday	2	22	10	12	46
Total	20	36	29	16	101

4. DISCUSSIONS

From our study, it was clear that up to 95.05% of the population of the welders in our study sample were aware of the ocular hazard of non-compliance concerning the use of the eye protective wear while at work, Though 5.95% of them claimed ignorant, but all were pre-informed before the administration of the questionnaire and by this it was seen that the percentage agreed with the work of Ajayi (21) bordering the awareness on the use of protective eyewear by welder in the South-Western Nigeria.

Based on the population, it was observed from our study in Abakaliki metropolis that the compliance level among the welders in the study area is not high as also found in the study done by Ogunleye (22) at North-Western Nigeria where up to 71.6% appeared to comply with the use of their protective eye-wear regularly while at work.

It was also noticed from the work that even up to 72.2% who seem to comply with the use of eye protective wear predominantly use the inappropriate type. This disagree with the claim that they use regular protective eyewear, and it is found that only 26.73% use goggle eye glass which is better than what most of

them make use of. Imperatively, it implies that in accordance with the work of Ganesh (23) in the Coastal South of India where up to 67.5% wear inappropriate protective eyewear and still claim to comply.

In terms of age group, it was it is clear from our work that up to 38.8% of those between the 26-35 years age group comply, though they form the majority of age group among the population sample among the welders in the area. However, this contradicts the report from the work of Boissin (24) as he presented in his article titled the impact of welding on vision of welders in France in which the largest age group that complied was those between 36-45 years where we had up to 40.2% compliance.

On the issue of compliance based on the experience on the job, it was seen that 43.36 % complied and when compared to other group it appears as if there is a decrease on compliance with increase on the years of experience on the job. Similarly, it was clearly indicated that the compliance level in terms of educational level also decreased with increase on educational level contrary to the expectation that those who are more educated should have been more apprehensive of the implication of the effect on the eye for failure in compliance

4. CONCLUSION

The study here reveals that the compliance level is independent of any of the parameters outlined in the study; age, experience in the work and educational level. This was shown from the data analysis which indicated statistically that there is no effect of age, experience on the field of work and educational level on their compliance to the use of protective eyewear.

Therefore in the final analysis, results from this study showed that there was a high awareness to protective eye wear usage and ocular risk associated with the failure in compliance to the use of the protective eyewear at while at work among the welders, but they still go ahead to adopt lesser faire attitude towards the compliance to the use of protective eyewear at work. In fact it is seen from this work that on the average less than 54.55% comply to the use of protective eye wear among the welders as compared to the developed countries. It was clear that irrespective of age or experience on the job by the welders there was no significant difference. Imperatively, it was observed that up to 72.28% that were inclined to make use of the protective eye wear unfortunately do not make use of the correct type of protective eyewear. Secondly it was also observed that the welders that have worked for more than 5 years comply less than those who are just new on the job to the use of protective eye wear. Those who have worked for less years probably feel that it does not matter as they might have regarded the effect as no meaningful since it has no immediate resulting effect and thus, the work reveals that there is no reasonable significant effect of age, educational level and experience on the job in relation to the level of compliance since statistically the analysis did not exhibit a reasonable significant result on any of the parameters tested as observed from the Chi Square analysis.

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