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EFFECT OF EIGHT-WEEK INTERVENTION PROGRAMME ON THE KNOWLEDGE, ATTITUDE AND UTILIZATION OF EYE PROTECTIVE DEVICES AMONG WELDERS IN IBADAN NORTH LOCAL GOVERNMENT AREA OF OYO STATE, NIGERIA

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Abstract
The purpose of this study was to investigate the effects of eight-week intervention programme on knowledge, attitude and utilization of eye protective devices among welders in Ibadan, Oyo State, Nigeria. The study sample consisted of 50 welders (test group) at Bodija-Ojurin area and 50 welders (control group) at Agodi-Gate area both in Ibadan North Local Government Area. Knowledge, attitude and utilization of eye protective devices questionnaire was the major instrument employed to gather information. Data collected were analysed using inferential statistics of ANOVA. The post test result showed that the knowledge and attitude in the experimental group after the intervention programme increased significantly but utilization of eye protective devices remained static.

Introduction

Safety at work is not only doing what is right to keep one safe, but it is also being aware of the possibility of unforeseen situations that could lead to accidents and making plans on how to avoid them. For hazard in our places of work to be effectively reduced, there is the need to engage in safe living through a well-planned programme of safety education. Safety at work is a matter of individual adaptation to one's physical environment. It is also having consideration for other individuals who constitute a part of one's working environment.

The welding profession provides a means of livelihood for many Nigerians; but like other professions it is not without its risks or hazards. Awareness of these hazards is the first step towards avoiding them. According to World Health Organisation (2003), 91.5% of welders receive their training through hands-on apprenticeship training. This is a cost-saving measure since formal welding schools charge fees. However, it is of doubt if the apprenticeship training exposed them to all expectations of the job.

World Health Organisation (2003) further stated that majority of the welders (77.9%) are aware that their job is hazardous to their health. This

awareness was positively influenced by educational attainment, increasing age, nature of training and work experience.

Suitable protectors should be used when employees are exposed to hazards from flying particles, molten metals, acids or caustic liquids, chemical liquids, gases or vapours, bioaerosols, or potentially injurious high radiation. Sheikh (1991) added that some welders do not use eye goggles because of the discomfort and poor visibility associated with the usage. The problems of visibility and discomfort of ocular protective devices have been addressed with the improvements made in eyewear new design to reduce the incidence of ocular injuries among welders (Bradshw, 2010). Auto-darkening filters are now being incorporated into the protective devices. This automatically changes from a clear to a darkened state when the welding arc is struck, thus allowing uninterrupted work by the welder.

Ruegger (1995) opined that a generally low perception of occupational risks to vision, auditory and respiratory systems were noticed among those in the welding profession. Only a third of the welder's studied regularly used some form of protective measures against these hazards. Therefore, intervention is essential to prevent further development of negative attitudes and behaviours which may reduce further occurrence of serious health problems among the welders. Introduction of health messages and health counselling into health teaching can be used to disseminate health information to this group of people.

Most researches show that attitudes dictate and depend upon perceived knowledge and developed skills. Therefore, it is paramount that the development of positive attitudes be emphasized among artisans. This study therefore, aimed at using intervention programme to encourage welders to acquire and accept adequate knowledge to develop positive attitude towards utilization of eye protective devices when using welding equipment.

Methodology

The pretest – posttest quasi-experimental research design was used for this study. Specifically, the study was able to compare the participants in the experimental and control group on similar variable: the study was able to reflect the effects of the intervention programme (the treatment) on the experimental group. The study also adopted a procedure involving collecting data and information on knowledge of occupation health hazards associated with welding; compliance and attitude toward utilization of eye protective devices (welding shield, goggles and screen) when engaging in welding.

The knowledge of respondents was assessed on a two scale (true-1 and false-0) rating, having envisaged their levels of educational background. Twelve (12) statements were designed and their responses were cumulated and categorized as:

Poor = 0 – 2 correct responses
Fair = 3 – 4 correct responses
Good = 5 – 6 correct responses
Very good = 7 – 9 correct responses
Excellent = 10 – 12 correct responses

Workers compliance with utilization of eye protective devices was assessed on a three scale (always – 2; sometimes – 1 and not at all – 0) rating. Seven (7) statements were designed and their outcome was cumulated and categorized as:

Very low utilization level	=	0 – 3 point(s)
Low utilization level	=	4 – 6 point(s)
Moderate utilization level	=	7 – 9 point(s)
High utilization level	=	10 – 12 point(s)
Very high utilization level	=	13 – 14 point(s)

While eight (8) statements were designed to assess the respondents' attitude towards utilization of eye protective devices and four point scales (Modified Likert Scale) was used to do the ratings.

The population for this study comprised of all registered welders in Ibadan North Local Government Area of Ibadan, Oyo State, Nigeria. Ibadan is the capital city of Oyo State and it is the biggest city in Nigeria with many welders, both in the construction and automobile workshops. Though no accurate data in Nigeria literature but case reports from University Teaching Hospital (UCH) Eye Clinic indicated that many of patients to be welders mainly males from manufacturing, services and construction industries.

The sample size for this study was 100 welders. Convenient sampling technique was used to select 50 (all) respondents in attendance during the Bodija-Ojurin Welders Association meeting to be in experimental group, while another 50 members of Agodi-Gate Welders Association were in control group. 10 apprentices were purposively selected for focus group discussion. Through the executives of the Welders Association in Ibadan North Local Government Area, the members were met at their two separate bases during their monthly meetings. After explaining the purpose of the study and the benefits they will derive from it, members were recruited to the two groups accordingly.

The instrument for this study was a self-developed questionnaire named "Harnessing Eye Protective Devices Among Welders" which was in four sections. Section A was the demographic data of the respondents, Section B sought information on the variable of knowledge, Section C was on Attitude, while Section D was on utilization of Eye Protective Devices. The reliability value of the instrument was .70 using the Cronbach Alpha method. This study was delimited to the following eye hazards (watering eye, redness of eye, sticking of the eyelid, itching, pain, and blurred vision) associated with welding.

Results and Discussion

The results of the findings are shown below:

Table 1: Age and sex distribution of respondents

Age (in years)	Sex			
	Male		Female	
	No	%	No	%
19 and below	5	5.0	-	-
20 – 29	27	27.0	-	-
30 – 39	32	32.0	-	-
40 – 49	34	34.0	-	-
50 and above	2	2.0	-	-
Total	100	100		

The survey revealed that welders in the age group between 20 and 49 years constituted about 93 percent (Table 1). However, all the respondents were males. That is welding is considered job for men and not for females.

Table 2: Level of education attainment of respondents in percentage

Description	No	%
No formal education	4	4.0
Primary	42	42.0
Post Primary	50	50.0
Tertiary	4	4.0
Total	100	100

Table 2 shows that 4.0 percent of the respondents had no formal education, 42 percent had primary education. 50 percent had post primary education while another 4 percent indicated tertiary education status. This indicated 46 percent respondents with low level of education which can be a risk factor. Consequently, this low level of education might make these welders not to benefit from information concerning the use of equipment and new techniques in industrial safety as there are safety manuals and or instructional booklets accompanying equipment that needed certain level of education to comprehend it.

Table 3: Percentage distribution of the work experience of respondents

Working Experiences	Frequency	Percent	Valid percent	Cumulative percent
Less than 5 years	20	20.0	20.0	20.0
5 – 9 years	42	41.5	41.5	61.5
10 – 14 years	7	7.5	7.5	69.0
15 – 19 years	13	13.0	13.0	82.0
More than 20 years	18	18.0	18.0	100.0
Total	100	100.0	100.0	

Respondents work experience revealed that about 20 percent have less than 5 years, 18 percent had enterprise experience which span for more than 20 years and 41.5 percent had been at the job for between 6 and 19 years. According to Bradhaws, (2010), Contreras (1997) and Jinadu (2006)

educational attainment, maturity and work experience are expected to increase awareness of occupational hazards in all proffession including welders. The awareness can thus prevent, reduce and even curb the increase of health hazards associated with welding occupation.

Table 4: Distribution of respondents according to type of training received

Training Source	No	%
Apprenticeship	69	69.0
Welding school	31	31.0
Total	100	100

Table 4 shows respondents sources of training. 69 percent of respondents received training through apprenticeship, while 31 percent claimed they attended welding school (Technical College or and Polytechnics Institutions). However, adequate training programme before operation perhaps would ensure that welders are aware of risks and health safety associated with their occupation.

Table 5: Type of injuries experienced for non-using of eye protective devices by respondents

Injury	No of Responses	%
Watering of the eye	70	70.0
Redness	72	72.0
Sticking of the eyelid	47	47.0
Itching	23	23.0
Pain	31	31.0
Blurred vision	43	43.0

Six common eye injuries were tested. All respondents agreed that they have one form of eye injury or the other. Redness of eye was the most common complaint by 72% while 70% suffered watering of the eye. Eye itching was the least complain by just 23% of the respondents.

Table 6: Distribution of respondents according to work experience

Years	No of Responses	%
<5	20	20
5 – 9	42	41.5
10 – 14	7	7.5
15 – 19	13	13.0
20>	18	18.0
Total	100	100.0

On work experience, 80 percent of the respondents have been practising for more than five years. This was considered to be long enough to make them understand and obey warnings against hazards of welding operations.

Table 7: Knowledge of welders on occupational health hazards

Knowledge Level	Control Group				Experimental Group			
	Pre		Post		Pre		Post	
	No	%	No	%	No	%	No	%
Poor knowledge	4	8	4	8	10	20	0	-
Fair knowledge	3	6	5	10	1	2	0	-
Good knowledge	8	16	6	12	1	2	6	12
Very good knowledge	32	64	32	64	36	72	32	64
Excellent knowledge	3	6	3	6	2	4	12	24
Total	50	100	50	100	50	100	50	100

The result in table 7 (with reference to the scale indicated previously under methodology) revealed that poor knowledge of occupational health hazard was noticed among respondents in the control group (8%) and remained constant throughout the study period. Likewise the experimental group also possessed poor knowledge (20%) before the intervention programme was conducted. However, when all the respondents within the experimental group were equipped with adequate information, the poor knowledge percent shifted, as the post test result revealed good, very good and excellent knowledge of occupational health hazard associated with welding with a percentage of 12, 64 and 24 respectively. On the overall, the study revealed that 9% of the study population still requires immediate intervention programme as they indicated poor knowledge of health hazard associated with their occupation. Within the population 12%, 64% and 15% were observed from the two groups to possess good, very good and excellent knowledge of health hazard associated with their work.

Although the degree to which the effects of the intervention programme cannot be fully justified by descriptive interpretation, the experimental group revealed a significant disparity between the pre and post knowledge. It can therefore be concluded that intervention programmes aimed at ensuring occupational health safety may increase the knowledge of subjects and aid the utilization of safety measures of which eye protective is one.

Table 8: Utilization of eye protective devices when engaging in welding (n = 100)

Utilization Level	Control Group		Experimental Group		
	Pre	Post	Pre	Post	
Very low	3	3	7	0	Freq
	6	6	14	0	%
Low	6	7	2	0	Freq
	12	14	4	0	%
Moderate	11	5	6	2	Freq
	22	10	12	4	%
High	24	24	18	15	Freq
	48	48	36	30	%
Very High	6	11	17	33	Freq
	12	22	34	66	%
Total	50	50	50	50	Freq
	100	100	100	100	%

Eye protective devices used by respondents when engaging in welding include: welding shield, goggles and screen. On utilization of these devices the control group results (table 8) remained the same as the utilization level of respondents within the period of survey remained static. However, one can notice a shift of 24% of the respondents from moderate to very high utilization which may be as a result of extraneous variables.

Utilization level of the experimental group changed from previous data of very low utilization level 14%, to 0%, low utilization of 4% also changed to 0%, moderate utilization changed from 12% to 4% while high and very utilization changed from 20% and 34% to 30% and 66% respectively.

Table 9: ANOVA Test of between-subjects effects
Dependent variable: knowledge on occupational health hazards

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected model	16.38	3	5.46	5.46	0.00
Intercept	2,642.65	1	2,642.15	2,643.15	0.00
Control Experimental	16.38	3	5.46	5.46	0.00
Error	195.98	196	1.00		
Total	2,855.00	200			
Corrected Total	212.36	199			
R squared = .77 (Adjusted R squared = .630)					

The ANOVA was used to check if the interaction results are statistically significant. Table 9 shows that there was a significant effect at 1% between the tests carried out on knowledge for experimental group and a control group (df = 3; f = 5.46, P value = 0.00). Likewise, the value of R-square was observed to be (0.77). This further explains that the independents variable accounted for 77% of the variance in the dependent variable. The significance value for participation in the intervention programme is less than 0.05, indicating that it has a significant effect on artisans' knowledge. Indeed the significance of this interaction effect was confirmed by the results of the ANOVA. Thus a conclusion is made that there is a significant effect of the intervention programme on knowledge of occupational health hazards associated with welding among artisans exposed to knowledge in the experimental group than their counterpart in the control group.

Table 10: Attitude of welders towards the use of eye protective devices

Attitude		Control Group		Experimental Group	
		Pre	Post	Pre	Post
Negative	Freq	22	36	20	0
	%	44	72	40	0
Positive	Freq	28	14	30	50
	%	56	28	60	100

Similar to the earlier discussed variables (knowledge and utilization) respondents' attitudes (Table 10) revealed a wide range of variation for the pre and post control and experimental groups. The pre test control group results and pre test experimental group results followed similar pattern. The attitude towards the use of protective devices among control group revealed 44% negative attitude and 40% for experimental group. While those with positive attitude towards the use were 56% and 60% respectively. The post test results after the intervention programme revealed that the control group negative attitude towards the use of protective devices had a shift from 44% to 72%; while those with initial positive attitude drop from 28% to 14%. However, in the experimental group all the respondents (100%) show positive attitude towards the use of protective devices. While those in the control group witnessed a loss from positive to negative attitude (56% to 28%), the experimental group improves better. The implication of these results is that many welders before the intervention programme do not bothered about using eye protective devices when working.

Table 11: ANOVA Test of between-subjects effects

Source	Sum of Squares	Df	Mean Square	F	Sig.
Corrected model	39.06	3	13.02	11.31	0.00
Intercept	2,995.38	1	2,995.38	2,602.85	0.00
Control Experimental	39.06	3	13.02	11.31	0.00
Error	225.56	196	1.15		
Total	3,260.00	200			
Corrected Total	264.62	199			
R squared = 1.48 (Adjusted R squared = .135)					

The ANOVA test result on Table 11 also indicated that there was a significant effect at 1% between the tests carried out on the utilization of eye protective devices and attitude of welders in experimental and control groups after an eight-week intervention programme (df = 3; F = 11.31; p value = 0.00). The value of R-square for utilization level on eye protective devices was noted to be relatively lower than that of knowledge as revealed (0.14). This reveals that the independent variable accounted for 14% of the variance on the dependent variable. The significant value for participation in the intervention programme is less than 0.05. The results therefore concluded that the eight-week intervention programme increased knowledge and utilization level of eye protective devices among respondents in the study area.

Table 12: ANOVA Tests of between-subjects effects

Source	Sum of Squares	Df	Mean Square	F	Sig.
Corrected model	63.29	3	21.10	64.92	0.00
Intercept	1,518.01	1	1,518.01	4,670.78	0.00
Control Experimental	63.30	3	21.10	64.92	0.00
Error	63.70	196	0.33		
Total	1,645.00	200			
Corrected Total	127.00	199			
R squared = .498 (Adjusted R squared = .491)					

From Table 12, there was a significant effect at 1% (df = 3; F = 64.92; P value = 0.00). The value of Adjusted R-square was also observed to be 0.491. This explains that the models independent variable has accounted for 49.1% of the variance in the dependent variable. Likewise, the significant value of 0.00 is less than 0.05, indicating the effect of the intervention programme on artisan's perceived attitude.

Table 13: Post Hoc analysis

Factors	Pre Exp. Group	Post Control Group	Pre Control Group	Post Experimental Group
Knowledge	3.38^{a}	3.5^{a}	3.54^{a}	4.12^{b}
Utilization	2.00^{a}	3.48^{a}	3.66^{a}	3.72^{b}
Attitude	2.12^{a}	2.56^{a}	2.68^{a}	3.66^{c}

The post hoc tests show the differences in model-predicted means for each pair of factor levels. In the subset columns the factor levels that do not have significantly different effects are displayed using the same suffix.

The post-hoc result confirms that the knowledge of respondents in the Post Experimental Group differs from other groups with a mean of 4.12 and this is considered high. The result reveals that an intervention programme which seeks to educate artisan on the use of protective devices will increase their knowledge, utilization and attitude on the subject matter. Thus there is need to encourage the respondents to practice safety welding procedures in their various work stations.

Similar to the result on knowledge, the value on utilization of eye protective devices was higher among Post Experimental Group revealing a mean of 3.72. This was also accounted for by the intervention programme. Lastly, perceived attitude of respondents in Post Experimental Group was also higher than the other groups revealing a mean of 3.66 while Post Control Group and Pre Control Group had values which were not significantly different from one another.

Conclusion

From a theoretical point of view, the aim of this study was to show the importance of knowledge and positive attitude towards utilization of protective

devices among artisans. From an applied point of view, it is important to obtain or provide appropriate protective equipment to industrial workers (e.g. welders), stressing the need to take the following points into account; training or making use of appropriate information/manual whenever they intend to use protective device and finally build in them the right attitude towards health protection in a hazardous environment.

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