



IMPACT OF OCCUPATIONAL-RISK INTERVENTION PROGRAM ON KNOWLEDGE AND PERCEPTION OF SAFETY PRACTICES AMONG ARTISANS IN SOUTHWEST NIGERIA

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ABSTRACT: *Background:* Hazards in the workplace pose a major, yet often overlooked, problem globally, particularly in developing countries. Although research on work-related injuries and illnesses among artisans in low- and middle-income countries (lmics) like Nigeria are limited and of varying qualities, available reports suggest that work-related mortality rates in lmics are higher than those in high-income countries. Therefore, this study assessed the effect of Occupational Risk Intervention Program on knowledge and perception towards safety practices among artisans in South West Nigeria. *Methodology:* The study employed a quasi-experimental design. A sample size of 30 artisan's workers for each group was derived using the Power formula. Two states were selected purposively from six states in southwest Nigeria. Two Local Government Areas were randomly selected in Lagos States as the Experimental group (EG) and two LGAs were selected in Ekiti state as the Control group (CG). A structured validated questionnaire with Cronbach's alpha reliability index ranging from 0.703 to 0.812 was used to collect data. Data was collected at baseline, immediate post-intervention and six weeks follow-up. Data was analysed using descriptive, and inferential statistics at 5% level of significance. *Results:* Findings showed that at baseline, there was no significant difference ($p > 0.05$) in the mean scores of knowledge of safety practices for EG (5.62 ± 0.38) and CG (8.07 ± 0.23). There was no significant difference ($p > 0.05$) in the mean scores of perception towards safety practices for EG (29.50 ± 2.00) and CG (28.15 ± 1.44). Furthermore, there was a significant difference ($p < 0.05$) in the mean scores of knowledge between baseline for EG (8.65 ± 1.01) and 12th week follow-up (18.56 ± 1.02); there was also a significant difference ($p > 0.05$) in the knowledge and perception of safety practices among artisans in the control group and artisans in the experimental group at 12th follow up, greatly due to the occupational-risk intervention program. *Conclusion:* The implementation of an educational intervention program has the potential to increase the knowledge, attitude, and self-efficacy of artisans towards safety practices and the use of personal protective equipment (PPE), ultimately leading to a reduction in occupational risks and hazards. As a consequence, the educational intervention program had a significant impact on the level of knowledge and perception towards safety practices with a very large margin between the 12th week follow-up safety practices score and the baseline safety score. The educational intervention program had a significant impact on the level of knowledge and perception towards safety practices among artisans in southwest Nigeria.

KEYWORDS: Artisans, Intervention program, Occupational risk, Safety practices.



INTRODUCTION

Hazards in the workplace pose a major, yet often overlooked, problem globally, particularly in developing countries. According to the International Labour Organization (ILO), work-related accidents or illnesses result in the death of 2.78 million workers each year, with an additional 374 million workers experiencing non-fatal work-related accidents (ILO, 2019).

According to an article published by the National Bureau of Statistics in Nigeria (2013), the percentage breakdown of artisans in Nigeria's informal sector is as follows: carpenters and joiners makeup 8.3%, plumbers and pipefitters make up 2.8%, welders and metal fabricators make up 6.7%, and motor vehicle mechanics make up the largest portion at 12.6%. Together, these four categories of artisans account for nearly 30% of the total Micro, small and medium enterprises (MSME) in Nigeria's informal sector.

Several studies have documented that work-related accidents and diseases among artisans can be prevented through effective interventions on increase of knowledge in safety practices. Nonetheless, in the absence of legislations that mandate adherence to occupational safety and health guidelines by informal businesses, artisans in the automobile repair industry are at a greater risk of experiencing health and safety problems. This is because these workers often lack the necessary technical knowledge, resources, and funding to implement OSH measures in their workplaces (Gautam & Yadav, 2018).

The situation is particularly concerning for Nigeria, where previous studies have reported numerous OSH problems among artisans, including injuries to hands, fingers, or eyes; burns; bruises; fractures; hand dermatitis; headaches; dizziness; tiredness; back, waist and joint pains; and hearing impairment (Adu-gyamfi, 2019). Despite this, according to Adejumo et al. (2017), the utilization of personal protective equipment (PPE) is not prevalent among informal artisans in Nigeria, with 91.9% of automobile mechanics in a Lagos metropolis not using PPE while conducting repairs. Similarly, a study by Ojo et al. (2017) found that only 3% of car painting workshops in Ile-Ife had respirators with filters. This is in contrast with car repair artisans who utilize PPEs, as those who do not have been found to experience more health issues, including headaches and tiredness (Adejumo et al., 2017), as well as burns, dizziness, hearing impairment, eye injuries, and cuts (Elewon, 2018). The low rate of PPE utilization highlights the need for interventions aimed at improving the knowledge and perception among informal artisans in Nigeria.

Overall, the study will make a significant contribution to the field of occupational safety and health by providing evidence-based recommendations for promoting safer working conditions for informal sector workers, which can ultimately lead to better health outcomes. A similar quasi-experimental study that followed the same pattern but adopted only farmers supported that the participants in the experimental group had statistically significant higher mean scores of safety practices that included safe pesticide use, personal protective equipment (PPE) use, and compliance with safety rules and regulations, than those in the control group across all time points of measurement at weeks 8 and 12 after during follow-up (Wisutthananon et al., 2019).



METHODOLOGY

Study Design

The study employed a quasi-experimental design. The study consisted of two groups: one experimental group and one control group. The experimental group comprises artisans in Lagos State who participated in an occupational-risk intervention program, while the control group consists of artisans in Ekiti State who did not receive the intervention program but an equivalent beneficial health education unrelated to occupational-risk practice in the workplace. The inclusion criteria include artisans who work as carpenters, welders, or mechanics, artisans between the ages of 18 and 60 able to read and understand English, and artisans who are currently working in the selected local government areas of Lagos and Ekiti States. Two out of the six states in the southwest were purposively selected; the experimental group was selected based on the state with the highest cases of occupational accidents among artisans in Lagos State, and the control group was selected from southwest states with the lowest number of occupational accident cases among artisans. It was essential to select states that have over 150 km between them to avoid communication and biased responses between the groups.

Two local government areas were randomly selected in Lagos State for the experimental group, of which one was selected from the semi-urban area of Lagos State and the other was selected from the rural area of Lagos State. For the control group, two local government areas were also randomly selected: one from the semi-urban area of Ekiti State and the other from the rural area of Ekiti State. The artisans in the selected local government areas were stratified according to their trade types (e.g., welders, carpenters, mechanics) and a random sample of artisans was used to select 5 artisans from each stratum per local government.

Research Instrument and Data Collection

The research method chosen for this study was quantitative in nature. To create a reliable and valid instrument for data collection, the researcher gathered information from various sources including a review of relevant literature, as well as examining instruments used in similar studies. With this information, an appropriate instrument was developed for use in collecting data from the participants. The instrument was designed to ensure that it aligns with the research objectives and the research questions. The instrument was a semi-structured, participant-administered questionnaire, which solicited information on demographic characteristics, knowledge and perception towards occupational safety practices. The same instrument was administered at baseline, immediate post intervention and 12-weeks follow up. Cronbach Alpha scores were generated for the individual constructs (predisposing = knowledge = 0.703, overall perception = 0.893).

Table 1: Description of the Data Collection

Groups	Baseline Data	Interventions	Outcome Evaluation (end of intervention program)	Impact Evaluation(at 12 th weeks)
Control Group	O	-	O	O
Experimental Group	O	X	O	O

Key: X = Intervention; O = Outcome



Study Variables

The independent/treatment variable of the study is occupational risk while the dependent variable is safety practices among artisans.

Data Analyses

The data collected for the study was collated, entered and coded using the Statistical Product for Service Solutions (SPSS) version 23. The data was cleaned by running a frequency analysis on each item and checking responses to ensure that the values were accurately coded. Data was analysed using descriptive, and inferential statistics at 5% level of significance. Effect size (ES) was used to measure the magnitude of the intervention in the Experimental group.

Ethical Clearance

An application for ethical approval for this study was submitted to the Babcock University Research Ethics Committee. The purpose of the study was explained to all participants, after which verbal consent was given by each participant, while they also signed the consent forms. All participants were assured of anonymity and the confidentiality of the information received from them.

RESULTS

Demographic Information of Participants

The results in Table 2 show that there are male, 59 (98.3%) and female, 1 (1.7%) participants in the control group while the experimental group consists of 100% males. The mean age of respondents was $M = 34.5 \pm 11.48$ years for the control group and $M = 33.5 \pm 11.24$ years for the experimental group, coupled with an age range of 18 to 66 years. According to Figure 4.2, the majority of the participants fall within the categories of 18-29 years of age (~12%), 27-30 years of age (~20%) and 32-33 years of age (~11%). This implies that the majority of the respondents are less than 35 years old. The results also indicate that the majority, 13 (43.3%) and 15 (51.7%) of the participants in the control and experimental groups respectively are married. On the educational attainment, non-formal education was 11 (36.7%) for the control group and 6 (20%) for the experimental group; primary education was 7 (23.3%) for the control group and 9 (30%) for the experimental groups; secondary education was 7 (23.3%) for the control group and 9 (30%) for the experimental group; and the post-secondary education of respondents for the control group was 5 (16.7%) and 6 (20%) for the experimental group.

On ethnicity, respondents of Yoruba origin were the majority, 27 (90%) for the control group and 23 (76.7%) for the experimental group, respondents of Igbo origin were 2 (6.70%) for the control group and 4 (13.3%) for the experimental group, while respondents of Hausa origin were 1 (3.30%) for the control group and 2 (6.7%) for the experimental group at baseline. For religious beliefs, Christianity accounted for 12 (40%) for the control and experimental groups respectively, Islam was the second most religious group among the respondents in the control group, 10 (33.3%) and the major religion for the experimental group, 13 (43.3%), while African traditional religion accounted for 8 (26.7%) and 5 (16.7%) for the control and experimental groups respectively.



The occupation reported for the control and experimental groups was 10 (33.3%) for all three occupations used for the study (mechanic, carpenter and welder). The results show that respondents with apprentice position were 24 (80%) for the control group and 22 (73.3%) for the experimental group, while only few respondents, 6 (20%) and 8 (26.7%) indicated the position of “Master” in the control and experimental groups respectively (see Table 4.1). Those with 5-15 years of experience were more based on the result, with 40% and 37% of participants from the control and experimental group respectively.

Table 2: Demographic Characteristics of the Participants in the Study for Each Arm of the Intervention at Baseline

Variable	Control N=30		Experimental N=30		Total N (%)	P-value
	Frequency N	%	Frequency N	%		
Age Range:18-60 years old	34.5 ± 11.48		33.50 ± 11.24		34.02 ±1.46	0.726
Gender:						0.339
Male	29	96.7	30	100.0	59 (98.2)	
Female	1	3.3	0	0.0	1 (1.8)	
Educational attainment:						0.560
Non-formal	11	36.7	6	20.0	17 (28.3)	
Primary	7	23.3	9	30.0	16 (26.7)	
Secondary	7	23.3	9	30.0	16 (26.7)	
Tertiary	5	16.7	6	20.0	11 (18.3)	
Ethnicity						0.509
Yoruba	27	90.0	23	76.7	50(83.3)	
Igbo	2	6.70	4	13.3	6(10)	
Hausa	1	3.30	2	6.7	3(5.0)	
Others	0	0.00	1	3.3	1(1.7)	
Religion						0.582
Christianity	12	40.0	12	40.0	24(40)	
Islam	10	33.3	13	43.3	23(38.3)	
ATR	8	26.7	5	16.7	13(21.7)	
Occupation						0.150
Carpenter	10	33.3	10	33.3	20 (33.3)	
Mechanic	10	33.3	10	33.3	20(33.3)	
Welder	10	33.3	10	33.3	20(33.3)	
Marital Status						0.715
Single	12	40.0	11	37.9	23 (39.0)	
Married	13	43.3	15	51.7	28 (47.5)	
Separated	5	16.7	3	10.3	8 (13.6)	
Position						
Apprentice	24	80.0	22	73.3	46(76.7)	0.542
Master	6	20.0	8	26.7	14(23.3)	

***Comparing certain demographic characteristics to demonstrate matched groups at baseline**



Predisposing Factors Related to Knowledge and Perception on Occupational-risk Exposure to Hazards in the Workplace and Safety Practices at Baseline

The results in Table 3 show that the computed mean and standard deviation knowledge score was 8.07 ± 1.22 and 5.62 ± 1.92 for the control and experimental groups respectively, which was significant at 0.001 *p*-value. The level of knowledge for the control group was high while the level of knowledge of the experimental group participants was moderate towards occupational-risk exposure to hazards in the workplace and safety practices measured on an 11-point scale.

Comparing the overall perception score measured on a 60-point scale, we have the control group mean score of 42.15 ± 7.35 and experimental group mean score of 29.50 ± 7.98 on occupational-risk exposure to hazards in the workplace and safety practices at baseline. This indicates that there is a significant difference ($p < 0.05$) between the control and experimental groups due to lower mean score for the experimental group before the intervention. The perceived benefits (0.019), perceived threat (0.007), perceived barrier (0.000), perceived self-efficacy (0.000) were also significant across the study groups, that is, the control and experimental groups (see Table 3).

Table 3: Comparison of Measures of Predisposing Factors Related to Knowledge and Perception Involved in Occupational-risk Exposure to Hazards in the Workplace and Safety Practices at Baseline

Variables	Maximum Points Scale Measure	on of	Control Group N=30		Experimental Group N=30		P-value
			$\bar{X}$ (SE)	$\pm$ SD	X(SE)	$\pm$ SD	
Knowledge	11		8.07(0.23)	1.22	5.62(0.36)	1.92	0.000
Overall perception	60		42.15(1.44)	7.35	29.50(2.00)	7.98	0.000
Benefits	15		10.40(0.46)	2.51	8.81(0.46)	2.4	0.019
Threat	15		10.10(0.51)	2.78	7.74(0.69)	3.58	0.007
Barrier	15		10.32(0.53)	2.8	7.33(0.60)	2.96	0.000
Self-efficacy	15		10.53(0.49)	2.59	7.50(0.51)	2.7	0.000

* Test of significance for an independent sample t-test



Control Group Evaluation of Baseline and 12th Week Follow-up for Knowledge and Perception

On the account of the post-test intervention evaluation for the control group, knowledge of respondents at baseline and 12th week follow-up indicates difference does exist [ES 1.09 (0.52 to 1.69)] with a significant *p*-value (0.001); meanwhile, the overall perception of respondents shows that no significant difference [ES 0.26 (-2.77 to 3.81)], (*p*-value 0.751) exists between baseline and 12th week post intervention evaluation. Among the sub-groups in participants' perceptions, the results for perceived benefit [ES 0.01 (-0.95 to 1.08)] (*p*-value, 0.869), perceived threat [ES -0.64 (-1.70 to 0.76)] (*p*-value, 0.451), perceived barrier [ES -0.64 (-1.70 to 0.76)] (*p*-value, 0.843) and perceived self-efficacy [ES 0.59 (-1.16 to 1.63)] (*p* = 0.997) were not significantly different between baseline and 12th week follow-up.

Table 4: Evaluation of the Effect of the Intervention on Knowledge and Perception Involved in Occupational-risk Exposure to Hazards in the Workplace and Safety Practices for Control Group - Comparing with Baseline with 12th Week Follow-up Mean Scores

Variables	Maximum Points on Scale of Measure	Baseline (N=30)		12th Week follow - up (N=30)		*ES (95%CI)	P-value
		X(SE)	±SD	X (SE)	±SD		
Knowledge	11	8.07(0.22)	1.21	6.97(0.18)	.981	1.09(0.52 to 1.69)	.000*
Overall perception	60	42.15(1.44)	7.35	41.63(0.75)	4.12	0.26(-2.77 to 3.81)	.751
Benefits	15	10.40(0.46)	2.51	10.33(0.22)	1.18	0.01(-0.95 to 1.08)	.869
Threat	15	10.10(0.51)	2.78	10.57(0.34)	1.89	-0.64(-1.70 to 0.76)	.451
Barrier	15	10.32(0.53)	2.803	10.20(0.32)	1.75	0.87(-1.10 to 0.34)	.843
Self-efficacy	15	10.54(0.50)	2.589	10.53(0.32)	1.78	0.59(-1.16 to 1.63)	.997

*ES; effect size of the control group comparing baseline and 12th week follow-up

Evaluation of Control and Experimental Groups at 12th Week Follow-up

The result of the analysis reveals that there were significant differences at 12th week follow-up between the control and experimental groups in all the variables measured. The *p*-value (0.001) for knowledge level is significant, giving a high effect size [3.24: (-3.86 to -2.50)] that the educational intervention did impact on the safety practices level of the participants with similar significant difference (*p*=0.001) with effect size of 4.09 (-15.63 to -11.29) when compared across the groups at 12th week follow-up. However, at the baseline mean score for knowledge (8.07±1.22) revealed that the control group has a higher knowledge level compared to the experimental group (5.62±1.92) but this did not improve and was not consistent (control group 12th week follow-up knowledge level of 6.97±0.18); the experimental group improved



significantly (from 5.62 ± 1.92 to 10.14 ± 1.53), consistently and this does not give the impression of any coincidence playing out at all. A similar trend was observed with all perception variables, reinforcing and enabling factors. Further critical analysis showed that the intervention's effect size is obvious with knowledge, benefits perceptions, and safety practice compared to threat perception, self-efficacy perception, reinforcing and enabling factors of which effect size is significant but not very high at 12th week follow-up.

Table 5: Effect Size Estimates Based on the Intervention on the Control and Experimental Group Variables Involved in Occupational-risk Exposure to Hazards in the Workplace and Safety Practices at 12th Week Follow-up

Variables	*ES (95%CI)	P-value
Knowledge	3.24 (-3.86 to -2.50)	0.001*
Overall perception	2.46(-11.42 to -4.99)	0.001*
Benefits	2.40(-2.79 to-1.05)	0.001*
Threat	1.39(-3.46 to-1.56)	0.001*
Barrier	1.05(-3.29 to -0.99)	0.001*
Self-efficacy	0.82(-3.26 to-.82)	0.002*

Table 6: Effect Size Estimates Based on the Intervention on Experimental Group across Baseline and 12th Week Follow-up

Variables	*ES (95%CI)	P-value
Knowledge	2.43(-5.44 to -3.60)	0.001
Overall perception	2.64(-25.34 to -15.34)	0.001
Benefits	1.61(-4.62 to -2.25)	0.001
Threat	2.75(-6.88 to -3.80)	0.001
Barrier	2.11(-6.54 to -3.48)	0.001
Self-efficacy	2.09(-6.58 to -3.57)	0.001

Figure 1: Mean plot of impact of intervention across baseline, immediate post-intervention and 12th week follow-up for knowledge values for the experimental group, to show the level of increase of knowledge due to the occupational-risk intervention

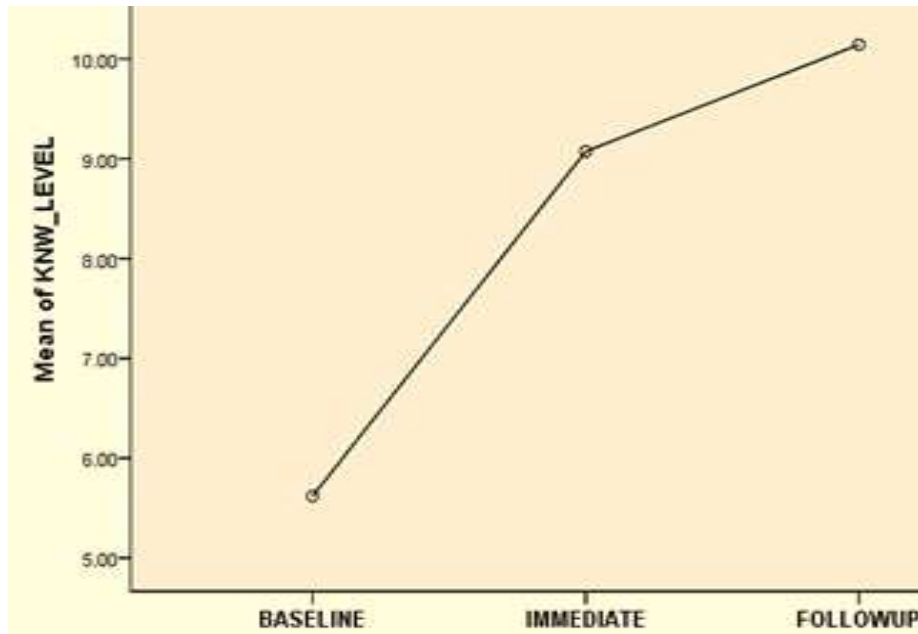
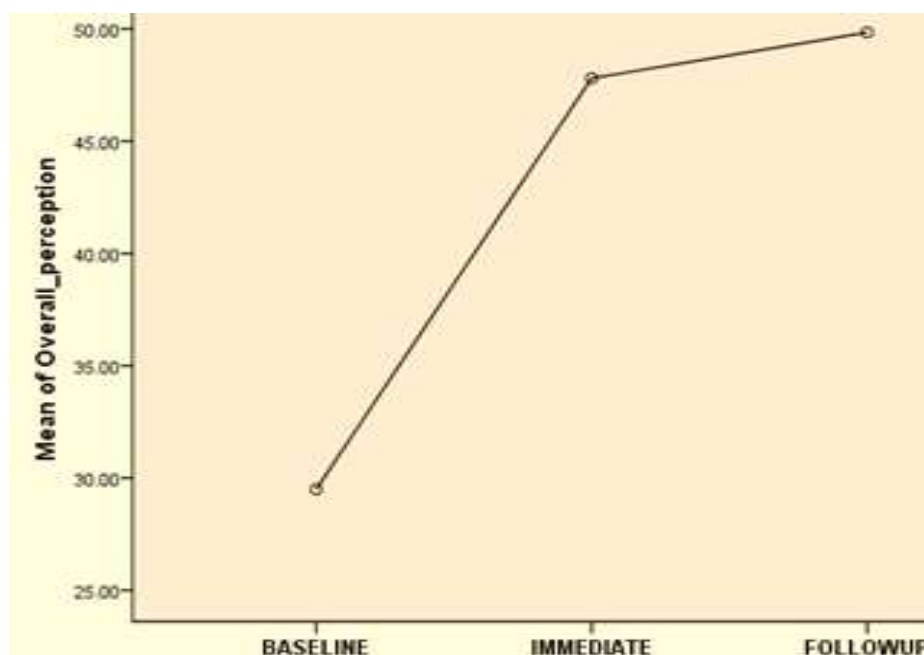


Figure 2: Mean plot of impact of intervention across baseline, immediate post-intervention and 12th week follow-up for perception values for the experimental group, to show the level of increase of knowledge due to the occupational-risk intervention





DISCUSSION

The baseline knowledge suggests that respondents had low levels of occupational safety practices especially in the experimental group, and it was also observed that this group has a lower number of welders compared to the control group. According to Kumar et al. (2013), artisans, particularly welders, tend to be more knowledgeable about occupational hazards than safety measures and practices. Similarly, Diwe et al. (2016) conducted a study in southeastern Nigeria which found a high level of knowledge about occupational hazards among timber workers. They attributed this to the level of education and work experience of the respondents. In a similar study, Tadesse et al. (2016) reported an 86.5% level of knowledge about occupational hazards among welders. The study further found that knowledge was significantly associated with work experience, the existence of well-defined work regulations, job satisfaction, marital status, and higher education attainment. Such safety consciousness was increased by the educational intervention in other occupational categories in the experimental group.

According to the baseline data, the perception of artisans towards safety practices on group average is moderate and was statistically significant. The control group was assumed to have a better perception than the experimental group possibly due to different demographic backgrounds. However, the educational intervention on occupational risk intervention program on safety practices among artisans revealed a consistent boost to the level of positive perception and also on safety practices. In the experimental group, perceived barrier to PPE utilisation, perceived self-efficacy to use of PPE, reinforcing factors and enabling factors showed significant differences ($p < 0.05$) when compared with the baseline and 12th week evaluation. The increase in barrier after interventions may be attributed to the consciousness of need for PPE which was not there before.

According to Ademola and Oke (2021), the majority of the artisans had a positive perception of safety practices in their workplace, with 70.6% of the respondents agreeing that safety practices were important in their workplace. However, despite this positive perception, the study also found that there were gaps in safety practices among the artisans, with a significant number of them not using personal protective equipment (PPE) and not undergoing safety training. Another study by Eze et al. (2021) affirmed that there were gaps in safety practices among the artisans, with a significant number of them not using PPE, which reveals safety practices among artisans in a Nigerian community. The study by Akintoye, Oyesomi, and Oyewole (2020) also supported that the perception of construction artisans towards safety practices was poor and recommended that adequate safety training should be provided to enhance their perception and adherence to safety practices. This according to Afolabi, de Beer, and Haafkens (2021) indicates that the artisans' perception of the degree to which they are vulnerable to occupational health problems is associated with their regular use of PPE.

CONCLUSION

The general objective/aim of the study was to determine the impact of the Occupational Risk Intervention Program on knowledge and perception of safety practices among artisans in southwest Nigeria. The significance of this study lies in its potential to contribute to the improvement of occupational safety knowledge and perception towards safety practices among artisans in southwest Nigeria. The implementation of an educational intervention program has



the potential to increase the knowledge, attitude, and self-efficacy of artisans towards safety practices and the use of personal protective equipment (PPE), ultimately leading to a reduction in occupational risks and hazards. As a consequence, the educational intervention program had a significant impact on the level of knowledge and perception towards safety practices with a very large margin between the 12th week follow-up safety practices score and the baseline safety score. The educational intervention program had a significant impact on the level of knowledge and perception towards safety practices among artisans in southwest Nigeria.

FUTURE RESEARCH

Recommendations for future research include:

1. Further studies may adopt a longer follow up period to assess the compliance to safety practices in Nigeria.
2. Researchers should conduct more interventions to address the unmet needs of PPE among artisans.
3. Concerning occupational health and safety, the local government ought to take a proactive role in mentoring and advising artisans.
4. It is advised to carry out a qualitative investigation to fully comprehend a few peculiar difficulties related to careers for artisans.

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