Research Article
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Health and safety study amongst painters in Nigeria

Abstract

Health is a fundamental human need that falls under the umbrella of psychological and safety needs, making it eligible for government attention through the creation of policies as well as industrial and occupational monitoring. The prevalence and contributing factors of occupational exposure to paints and their components was accessed using n=512 randomly selected painters from major cities in the study. A structured World Health Organization questionnaire was used for data collection. The findings indicated that majority of respondents (48.8%) were aged between 22 and 36 and mostly had secondary education. All respondents were aware of the occupational risks but took to negligence, as 96% of respondents do not wear any personal protective kits during painting, and demonstrated a negative attitude towards them. Three-quarter of the study group had respiratory disorder such as coughing (78%), alongside high reported complaints such as irritation to eyes (56%), skin (59%), nose (31%) health issues associated with painting. Despite the risks associated with painting it remained a source of income for the majority of respondents, which inhibits their propensity to abandon it. Negative health symptoms observed in painters includes neuropsychological symptoms**.** Development of effective frameworks for a better integration, implementation and adherence to occupational safety using consumer products such as paints is very salient. Stringent regulations must be in place to curb indiscriminate usage of hazardous materials beyond the international set standard in products.

Keywords: occupational health safety, paints, painting, safety practices, health risk

Volume 13 Issue 3 - 2024

Ajoke FI Akindele[1,2,3]
[1]BC3 Basque Centre for climate change-Kilma Aldaketa Ikergai, Leioa, Spain
[2]The Council of Scientific and Industrial Research-National Environmental Engineering Research Institute Laboratory, Nagpur – Maharashtra, India
[3]Department of Biosciences and Biotechnology, University of Medical Sciences, Ondo city, Ondo State, Nigeria

Correspondence: Ajoke FI Akindele, University of Medical Sciences, Department of Biosciences and Biotechnology, environmental management and toxicology unit, Nigeria, Tel +2348153837105, Email fakindele@unimed.edu.ng

Received: August 02, 2024 | **Published:** September 04, 2024

Introduction

Health is a fundamental human need that falls under the umbrella of psychological and safety needs, making it eligible for government attention through the creation of policies as well as industrial and occupational monitoring.[1] The economy has been impacted by occupational hazards, which also have a number of negative effects on people's health.[2] An occupational hazard is a risk, injury, or danger that an individual encounters at work, whereby this exposure results in an occupational disease.[3]

Industrialization and construction have made a remarkable improvement in the last decade. This, has led to the release of chemicals indiscriminately into the environment, homes and workplace.[4–6] A sizeable population is afflicted by occupational ailments at workplace or as workers.[7] They are confronted with a variety of risks such as exposure to chemicals, biological agents, physical factors and unfavourable working circumstances.[8–15] Risks to individuals and the environment can be via manufacturing, packing and storage of products, distribution of consumer products.[14,15]

Heavy metals which are essentially used as pigments and as corrosion- and sacid-resistant materials are well known for neurotoxicological effects due to their properties. Their occupational exposure routes are majorly inhalation and ingestion of fumes while and after painting and dusts during and after finishing.[8,9]

Paint is a mixture of different components comprising of pigments, additives, volatile organic compounds, solvent etc.[8] The study seeks to investigate the level of awareness of painters to occupational hazards, safety practices and examine source of income that may influence the procurement of necessary protective kits for use. A large sample size was used for the study for better interpretation. Means of communication and level of education may be limitations to the study.

Materials and methods

Research design and sample

A structured and modified W.H.O questionnaire was used as a tool for data collection for the study (Appendix). The study was designed to assess the occupational safety (dependent variable) obtained from painters (independent variable) on-site in four major state capital namely, Lagos, Ibadan, Akure and Ado-Ekiti in Nigeria. The sample set studied were painters who are usually involved in the process of mixing paint materials and additives, mixing paint colours for the desired expectation. In compliance with research ethics, painters' consent was seeked and they were assisted in the administration of the questionnaire. Respondents were conveniently sampled at their workplace, only willing painters participated in the study at the time of visit. Respondents sought for were those who work independent and or contacted by contractors.

Sample size determination and participant selection

Actual sample size for this study was determined using the formula for single population proportion and to determine the initial sample size the following assumption was made: 5% marginal error (d), 95% confidence level (alpha = 0.05), and the proportion or prevalence of occupational exposure to paints to be 50%. The total sample size was calculated by using the following:

$$n_i = (Z_2^{\alpha})^2 \frac{(P(1-P))}{d^2} \quad (1)$$

Where,

n_i = initial sample size from finite population,

Z = the standard score (critical value) corresponding to a 95% confidence level,

P = the proportion of paint users experiencing occupational exposure which is taken 50%,

1 −P = is the proportion of negative characters,

d = marginal error which is taken to be 5%.

Data analysis and quality control for questionnaire administration

The data obtained from the questionnaires used in this study were analyzed using SPSS, 2018 (Statistical Package for Social Science).

The following quality control steps were ensured during the questionnaire administration:

I. To ensure the quality of the data, a properly designed questionnaire was prepared and pretested with the training of the administrator and few respondents by a health officer.

II. The collected data were reviewed and checked for responses completeness

III. The questionnaire used was prepared in English, and translated into the local language; Yoruba if necessary for easy understanding

IV. Data collection was carried out using face-to-face interviews with the respondents and the administrator. Questionnaires were properly kept in a file.

V. Using the inclusion (those who are painters or whose source of income is painting, > 2 years work experience) and exclusion criteria (those who are casual workers and are not painters, no work experience relating to painting), a post test was conducted and questionnaires were sorted accordingly.

Results

Table 1 shows the demographical characteristics of the study population. It was observed that the majority of the respondents were within the age range of 22-36 years (49%). The collected data revealed that the majority of the painters had secondary education (43%), and 25% had more than primary education. Upto half of the respondents have painting as their primary source of earning. Most of the respondents (~ 59%) had been working as painters for 2-17 years as a primary occupation and (~ 78%) had painting as a secondary occupation.

Table 1 Distribution of respondents' demographic characteristics

Characteristics	Frequency	percentage
Age (years)	N	%
22-36	250	49
37-51	137	27
52-66	125	24
Marital status		
Single	150	29
Married	350	68.5
Divorced	12	2.5
Educational level		
None	150	29
Primary	130	25
Secondary	220	43
Tertiary	12	3
Main/Primary source of income		
Painting	300	58.5
Artist	50	9.7
civil servant	40	7.8
Student	60	12
contractor	50	10
business man	12	2
Most Preferred source of income		
Painting	400	78
Artist	50	10
civil servant	22	4
cloth seller	20	4
house materials seller	20	4
Years of experience in painting		
2-17	300	58.5
18-33	100	19.5
34-49	112	22
Average income as a painter per day		
₦3000-₦9000	480	83
₦10000-₦16000	32	17

Table 2 shows the perceptions of the painters to the hazards and an assessment of their adherence to prescribed safety measures. The results shows that among these respondents, the level of occupational hazard awareness is low (100%) with no formal training on occupational hazards and safety. Some of the respondents (96.0%) use protective kits while working. In detail, 96% do not use hand gloves, goggles, safety boots, dust masks and overall wear.

Table 2 Are you aware of any hazard with painting

a). Are you aware of the hazards with this job?		
Variable	Frequency	percentage
Yes	-	-
No	512	100
No response	-	-
b). Have you had any formal training on occupational hazards associated paint products, their components and safety measures to be taken?		
Responses	**Frequency**	**Percentage**
Yes	-	-
No	512	100
No response	-	-
c). Frequency in the usage of protective kits		

Table 2 Continued..

Protective kits	I do wear	I don't wear
Overall wear/ paint coat	20 (4.0%)	492 (96.0%)
Gloves	20 (4.0%)	492 (96.0%)
Goggles	20 (4.0%)	492 (96.0%)
Boots	20 (4.0%)	492 (96.0%)
Protective face covering or mask	20 (4.0%)	492 (96.0%)

Figure 1 shows the commonly reported negative health symptoms among the respondents. Overall, 94 % of the respondents had multiple symptoms. Headache was the most frequently reported health effect (39%). Others include dizziness (32%), skin irritation (59%), eye irritation (56%), after taste (31%), running nose (31%) and coughing (78%). The practice of negligence in workers was clearly reported. Most of them expected their clients or workplace to provide protective kits for their use despite the health effects they noticed while painting.

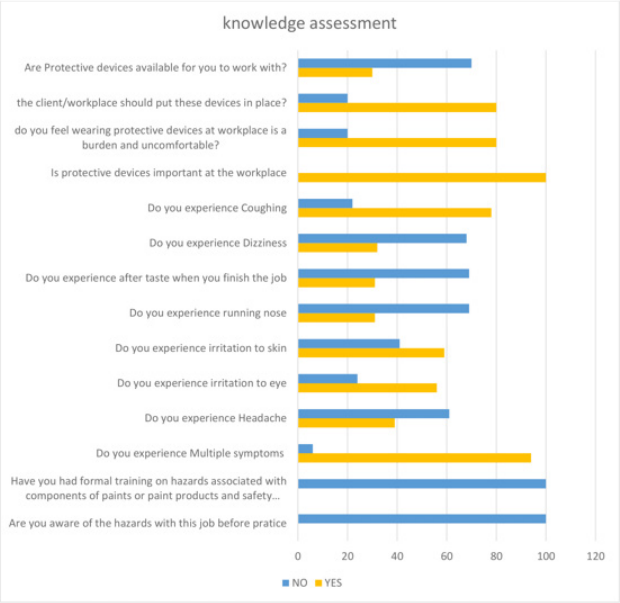

Figure 1 Knowledge assessment (as a percentage) of health effects associated with painting (causes, symptoms and awareness) in 512 painters.

In Table 3, the results showed that painting in spite of its associated hazards as being an income generation to most respondents and limits the tendency to jettison it. Also, painters' passion for beautification (99%) and decoration (100%) were implicated. A 95% of the respondents would prefer it as a career pursuit. This shows that the economic situation of the country has contributed greatly to poverty rate and left citizens no choice to do jobs with great risk.

Table 3 Reasons for choosing painting as a career

Reasons for choosing painting as a career	To a large extent (%)	To a lesser extent (%)
Income generation	99	1
Passion for beautification	99	1
Career pursuit	95	5
Decoration	100	0

Discussion

From investigation, we can report that there is a direct link of these health effects to the chemicals (solvents and heavy metals containing raw materials) used in the production of paints. Previous investigations have equally shown a linkage. Reported negative health symptoms observed in painters include neuropsychological symptoms.[17–21]

There is paucity of information on exposure of occupational hazards to painters in Nigeria that could allow a better comparative study with this work. Results from this study show that most painters involved in painting as a primary occupation with an average income of #3000-#9000 per day. This means that the job is lucrative and quite sustainable. Largely, most respondents are actively within the labour force of the country and are married. Overall, very few workers had tertiary education. All the workers were aware of the occupational hazards, but had no formal training either voluntarily or via the workplace on hazards associated with components of paints or paint products and safety measures to be taken. This is likely why they are experiencing various health hazards. This is contrary to the reports where 72.5% are aware of the hazards associated with their jobs and one-third had formal training on hazards and safety measures necessary as painters.[22]

Consequently, only 4 % make use of protective kits. It was discovered that they had not received any formal training to this regard. Though, a majority said they would not like to put it on because they prefer their designated casual wear. Previous study shows that 40% do not use protective kits low has been reported.[22] Study also anticipated that participants (with ≤12 h/week) who uses personal protective devices(respirators) could be less likely exposed when they are aware of solvents as hazardous.[23]

In addition, a considerable number of them reported non-availability of these devices at their workplaces. However, majority were found to have a positive attitude to the importance of overall wear, gloves, goggles, boots and protective face mask yet they mostly don't wear them. This study clearly indicated that they prefer to have their employers or clients to give them protective devices. Attitude is a very important aspect of occupational health.[24] Only 30% reviewed there were protective devices available for use at workplaces where their services are needed. Upto 80 % of the respondents had negative attitude towards wearing protective devices. They saw it as a disturbance and can enable sweating. This attitudinal report is similar to the study by Onowhakpor AO, et al.,[24] A study involving car painters who were not using protective gloves and masks during working hours were 43 out of 50 participants[25] was also reported.

It is very important to encourage the use of protective kits alongside other safety measures[26,27] especially for exposures from heavy metals,[8,9] volatile organic compounds[10–12] This practice will help reduce risks to painters.

Three-quarter of the study group had respiratory disorder such as coughing (78%) alongside high reported complaints such as irritation to eyes (56%), skin (59%), nose (31%). Contrastingly, a study in Sweden clearly pointed out how workers have good level of knowledge of health hazards and less record of respiratory symptoms from water-based paints compared to solvent.[28] In 10 years, study analysis involving 1,082 cases of occupational skin disease were diagnosed. Allergic (50.1%) and toxic eczema (47.1%) comprised

the majority of occupational cases of dermatoses. The most frequent causes of allergic occupational eczemas were rubber chemicals (19.9%) chromates (19.8%) and epoxy resins (13.1%).[29] A study revealed a 63.04% of solvents exposed paint manufacturing workers had neuropsychological symptoms, compared to the control group.[30] Out of 103 painters, 30 was reported to have respiratory problems and 65 had skin related problems.[31] Health education and enforcement must be put in place. Reports over the years on occupational hazard has not been impressive and this has contributed to their health challenges.[32,33]

In future studies, biological samples should be investigated for chemicals of health concerns in paints, the evaluation of attitudes, opinion, use of protective kits by painters in relation to their demographic details.

Conclusion

In conclusion, this research work clearly highlights an unsafe practice by painters in the selected areas. This assessment shows that painters are not aware of the components or the hazardous nature of paints, non-adherence to the use of protective kits and yet for years they have remained in this profession. Even though most of the painters were familiar to one symptoms or the other in the cause of work, this study revealed that majority (> 80%) of painters had experienced the risky occupational exposure during the course of this practice. A number of determinant factors which were potential acquisition of occupational hazards were identified. The significant determinant factors were professional status, economy, and cost and quality of personal protective equipment usage and materials been used for sewing. Protective devices protects the workers from various forms of occupational hazards which results into the prevention of diseases and or accidents thereby reducing the burden of diseases or illnesses.

Consequently, the majority of the workers report adverse health symptoms while carrying out their jobs. This ultimately means there is negligence on the part of the painters, clients/workplace since there are no stringent sanctions put in place by the government. This will however affect the few health facilities in place in the country and negative economic consequences. Financial resources are thereby extended on healthcare when illnesses results.

Acknowledgments

None.

Conflicts of interest

The author declares no conflict of interest.

Funding

None.

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