European Journal of Public Health Studies
ISSN: 2668 - 1056
ISSN-L:2668 - 1056
Available on-line at: www.oapub.org/hlt

DOI: 10.46827/ejphs.v4i2.93 Volume 4 | Issue 2 | 2021

INFLUENCE OF DEMOGRAPHIC VARIABLES ON FIRE SAFETY HAZARDS EXPOSURE AND ADHERENCE TO CONTROL MEASURES AMONG WORKERS OF PETROL FILLING STATIONS IN PORT HARCOURT METROPOLIS, NIGERIA

Amanze, Hope Emeka[1],
Ernest I. Achalu[2i]
[1]PhD Candidate,
Department of Health Education & Human Kinetics,
University of Port Harcourt,
Nigeria
[2]Professor,
Department of Health Education & Human Kinetics,
University of Port Harcourt,
Nigeria

Abstract:
The study investigated the influence of demographic variables on fire safety hazards exposure and control among workers of petrol filling stations in Port Harcourt metropolis. Descriptive survey design was adopted for the study. Eight (8) hypotheses were used for the study. Research instrument was a self-structured questionnaire captioned Demographic Variables and Fire Hazards Exposure and Adherence to Control Measures among workers of Petrol filling stations in Port Harcourt Metropolis (DVFHECQ). The reliability of the instrument yielded 0.81. Descriptive statistics were used to answer the research questions while inferential statistics of Z-test and ANOVA were used to test the hypotheses at 0.05 alpha level. The study showed a significant difference based on age, educational status and marital status of the respondents. However, there was no significant difference in exposure to fire safety hazards based on gender, Also, there was a significant difference on adherence to fire safety control measures based on age, educational status and marital status. It is therefore recommended that age, educational status and marital status should be considered as parameters in the employment of petrol filling station workers in Port Harcourt metropolis.

Keywords: fire safety, demographic variables, petrol filling stations

[i] Correspondence: email akasm29@gmail.com

1. Introduction

Petrol filling stations are prone to fire hazards as a result of the highly inflammable nature of the products they dispense which include Premium Motor Spirit (PMS), Automated Gas Oil (AGO) and Dual-Purpose Kerosene (DPK) to the consuming public. According to Mshelia, Abdulahi and Dawha (2015) more than 2.3 million lives and properties worth more than 4.5 billion dollars are lost annually to fire out breaks associated with petroleum products mishandling. Petrol filling stations are found in all nook and cranny in major cities in Nigeria. Despite the importance of petrol filling stations to the economy, their location is expected to be guided by a defined environmental rule. The standards for environmental protection varies from country to country and the level of protection are determined by such factors as legislation and economic priorities of the individual state Mshelia, Abdulahi and Dawha (2015).

In Nigeria, the Department of Petroleum Resources (DPR) is the Federal Government Agency vested with the responsibilities of regulating the citing, operation and construction of petrol filling stations. The Department of Petroleum Resources Petroleum Amendment Decree Number 37 of 1977 Safety Rules and Regulations clearly spelt out the guidelines for the approval, construction and operation of petroleum products filling stations. Despite the regulatory and monitoring activities of the Department of Petroleum Resources, several safety challenges are encountered at these petroleum facilities including fire outbreaks.

Besides safety challenges, there are also health challenges encountered by both workers of the petrol filling stations and their clients. Petroleum products give off flammable vapour which when inhaled in excess may predispose individual to various health problems. Such contact with petroleum products may lead to dermatitis (Ahmed, Abdulrahman & Koro, 2014).

Independent Petroleum Marketers are at the habit of converting any available portion of land to a petrol filling station in almost all the cities in Nigeria with the sole motive of profit making. Many petrol filling stations do not adhere to the provisions of the Regulatory body in their construction and operational activities, including carrying out risk assessment of the facility as required by the law (DPR, 2014).

Port Harcourt metropolis, the area of study is a metropolitan city and the Capital and commercial Centre of the oil rich Niger Delta State (Rivers State). Port Harcourt metropolis covers the Port Harcourt City Local Government Area (PHALGA) and extends to some parts of Obio-Akpor Local Government Area of the State. Several fire outbreaks linked to petrol filling stations have occurred in the metropolitan city of Port Harcourt.

Various categories of workers are engaged in the petrol filling stations. They include pump attendants, managers, generator operators and clerical assistants. These workers are exposed to various kinds of hazards as a result of the nature of the products they handle on daily basis. The identified fire safety hazards include; customers leaving

vehicle engines on while refuelling, poor electrical installations and wirings in the petrol filling stations, hoarding of petroleum products, poor house-keeping, use of unserviceable and faulty generating sets, immediate discharge of petroleum product on arrival from the tank farm among other hazards. However, a study on the influence of demographic variables such as gender, age, educational status, marital status, years of experience and workers status on the exposure and adherence to control measures of fire safety hazards among these workers in petrol filling station in Port Harcourt metropolis has not been reported.

This study is therefore aimed to ascertain the influence of demographic variables on fire safety hazards exposure and adherence to control among workers of petrol filling station in Port Harcourt metropolis.

2. Methodology

The study used the descriptive survey design. Descriptive research includes surveys and fact-finding enquiries and the description of the state of affairs as it exists at present (Kothari & Garg, 2014). Also, Elendu (2010) pointed out that a descriptive study is aimed at describing, explaining and analyzing events and behaviours as they occur at a particular period. The descriptive survey design is considered appropriate to ascertain the influence of selected demographic variables. The study area was Port Harcourt metropolis. It covers the Port Harcourt City Local Government Area (PHALGA) and Obio-Akpor Local Government Area (OBALGA). There are numerous petrol filling stations within Port Harcourt metropolis being the commercial nerve centre of the oil rich state, Rivers. According to the department of petroleum resources, there are more than 270 petrol filling stations as at the time of data collection. It is believed that more will be springing up as a result of the commercial nature of Rivers State. As a metropolitan city, a lot of Petrol Filling Station business thrive in Port Harcourt metropolis both the ones owed by the conglomerates and independent petroleum marketers.

The population of study comprised of all the employees of petrol filling stations (1,600) in Port Harcourt metropolis. However, the study was made up of all the managers and employees of petrol filling stations in Port Harcourt metropolis with an estimated population of 1,600 workers (DPR, 2015) working in a total number 270 petrol filling stations (DPR, 2015). The study made use of 1,000 respondents which was drawn from the petrol filling stations in Port Harcourt metropolis, using the multi stage sampling procedure.

Two hypotheses were tested:

H01: There is no significance difference on exposure to fire safety hazards in petrol filling stations based on gender, age, educational status and marital status.

H02: There is no significant difference in adherence to control measures of fire safety hazards based on gender, age, educational and marital status was tested at 0.05 alpha level.

A 37-item structured and validated questionnaire was used as the instrument for data collection. The instrument, Demographic Variables and Fire Hazards Exposure and Control measures among workers of petrol filling stations in Port Harcourt Metropolis (DVFHECQ). The questionnaire adopted the modified four (4) points Likert scale.

Always (AL)	4 points	Very high
Occasionally (OC)	3 points	High
Rarely (RA)	2 points	Low
Never (NE)	1 point	Very low

Also, the reliability of the instrument which yielded 0.81 was established through test-retest method and correlated with Pearson product moment correlation. While validity was done by three (3) experts in the field of Occupational Health Promotion (Health Education).

Reliability of the instrument was determined through the "test–retest" method. In the process twenty (20) copies of the approved questionnaire was administered to managers and workers of Petrol filling stations in Aba metropolis, Abia State. The same instrument was re-administered after two weeks. Data from the first and second trials were correlated using test-retest reliability which yielded 0.81. Cronbach alpha was adopted to establish inter-scale reliability of the questionnaire. The retrieved copies of the questionnaire were assembled and sorted. This was followed by coding for analysis through the use of Statistical Packages for Social Sciences (SPSS) version 23. Item by item, and for the overall analysis, descriptive statistics of simple percentage, mean, standard deviation, Z-test, and Analysis of Variance (ANOVA) were used for the data analysis. Simple percentage was used to analyze data concerning personal data of the respondents. Tables and percentages were used to analyze data concerning the research questions. While Z-test and ANOVA were used to test the hypothesis at 0.05 level of significance. A criterion mean 2.5 was used in taking decision.

3. Results

H1: There is no significant difference in exposure to fire safety hazards in petrol filling stations based on gender, age, educational and marital status.

Table 1.1: Summary of z-test of no significant difference on exposure to fire safety hazards in petrol stations based on gender

Gender	N	Mean	Std	Df	Z-Cal	Z-Crit.	Alpha Level	Decision
Male Respondent	371	43.00	6.01	765	.679	1.96	0.05	Hypothesis accepted
Female Respondent	396	42.61	6.25					
p>0.05								

Table 1.1 revealed that male respondents have mean and standard deviation scores of 43.00 and 6.01 while female respondents have mean and standard deviation scores of

42.61 and 6.25 respectively. With degree of freedom of 765, the calculated z-test value of 0.679 is less than the critical z-test value of 1.96. Therefore, the null hypothesis is accepted. By implication, there is no significant difference in exposure to fire safety hazards in petrol filling stations based on gender.

Table 1.2: Summary of One-way ANOVA of no significant difference on exposure to fire safety hazards in petrol station and age

	Sum of Squares	Df	Mean Square	F	Sig.	Decision
Between Group	317.048	2	158.524	4.192	0.015	Null hypothesis rejected
Within Groups	28892.798	764	37.818			
Total	**29209.846**	**766**				
P<0.05						

Table 1.2 revealed that the degrees of freedom are 2 and 764. The calculated F ratio value was 4.192 which is significant at when compared to 0.05 alpha level of significance. By implication, the null hypothesis is rejected. By implication, there is a significant difference on exposure to fire safety hazards in petrol filling station based on respondents' Age.

H2: There is no significant difference in exposure to fire safety hazards in petrol filling stations based on educational status, marital status and age.

Table 1.3: Summary of One-way ANOVA of exposure to fire safety hazards in petrol station based on educational status

	Sum of Squares	Df	Mean Square	F	Sig.	Decision
Between Group	263.133	3	87.711	2.312	.075	Accepted
Within Group	28946.714	763	37.938			Not Significant
Total	**2.9209.846**	**766**				
p>0.05						

Table 1.3 revealed that the degrees of freedom are 3 and 763. The calculated F ratio value was 2.312 which is not significant at 0.075 when compared to 0.05 alpha level of significance. By implication, the null hypothesis was accepted. This means that there is no significant difference on exposure to fire safety hazards in petrol filling station based on respondents' educational status.

Table 1.4: Summary of One-way ANOVA of exposure to fire safety hazards in petrol stations and marital Status

	Sum of Squares	Df	Mean Square	F	Sig.	Decision
Between Group	404.057	3	134.686	3.658	0.14	Hypothesis is rejected
Within Group	28805.789	763	37.753			
Total	**29209.846**	**768**				
p>0.05						

Table 1.4 revealed that the degrees of freedom are 3 and 763. The calculated F ratio value was 3.568 which is significant at 0.014 when compared to 0.05 alpha level of significance. By implication, the null hypothesis rejected. This means that, there is a significant difference on the exposure to fire safety hazards in petrol filling station based on Marital Status.

Table 1.5: Summary of z-test of no significant difference on the adherence to control measures of fire safety hazards in petrol filling stations based on gender

Gender	N	Mean	SD	df	z-cal	z-crit.	Decision
Male	371	19.45	1.97	765	1.688	1.96	Hypothesis is accepted
Female	396	19.66	1.43				
p>0.05							

Table 1.5 showed that male respondents have mean and standard deviation scores of 19.45 and 1.97 while the female respondents have mean and standard deviation scores of 19.66 and 1.43. With degree of freedom of 765, the calculated z-test value of 1.688 is less than the critical z-test value of 1.96. Therefore, the null hypothesis is accepted. By implication, there is no significant difference on the control measures of fire safety hazards in petrol station based on gender.

Table 1.6: Summary of One-way ANOVA of no significant difference on the adherence to control measures of fire safety hazards in petrol filling stations based on age

	Sum of Squares	Df	Mean Square	F	Sig.	Decision
Between Groups	72.349	2	36.174	12.686	.000	Hypothesis is rejected
Within Groups	2178.582	764	2.852			
Total	**2250.931**	**766**				
P<0.05						

Table 1.6 revealed that the degrees of freedom are 2 and 764. The calculated F ratio value was 12.00 which is significant at 0.00 when compared to 0.05 alpha level of significance. By implication, the null hypothesis is rejected. By implication, there is a significant difference on adherence to control measures of fire safety hazards in petrol station based on Age.

Table 1.7: Summary of One-way ANOVA of adherence to control measures of fire safety hazards in petrol filling stations and educational status

	Sum of Squares	Df	Mean Square	F	Sig.	Decision
Between Groups	373.596	3	124.532	50.613	.000	Hypothesis is rejected
Within Groups	1877.335	763	2.460			
Total	**2250.931**	**766**				
P<0.05						

Table 1.7 revealed that the degrees of freedom are 3 and 763. The calculated F ratio value was 50.613 which is significant at 0.00 when compared to 0.05 alpha level of significance. By implication, the null hypothesis was rejected. This means that, there is a significant difference on adherence to control measures of fire safety hazards in petrol station based on Educational Status of the Respondents.

Table 1.8: Summary of One-way ANOVA of adherence to control measures of fire safety hazards in petrol filling station based and marital status

	Sum of Squares	**Df**	**Mean Square**	**F**	**Sig.**	**Decision**
Between Groups	83.051	3	27.684	9.743	.000	Hypothesis is rejected
Within Groups	2167.880	763	2.841			
Total	**2250.931**	**766**				
P<0.05						

Table 1.8 revealed that the degrees of freedom are 3 and 763. The calculated F ratio value was 9.743 which is significant at 0.00 when compared to 0.05 alpha level of significance. By implication, the null hypothesis was rejected. By implication, there is a significant difference on adherence to control measures of fire safety hazards in petrol filling stations based on Marital Status.

4. Discussion

The study results show no significant difference in exposure to fire safety hazards based on gender, however there is significant difference based on age, educational status and marital status of the respondents. Also, there is a significant difference on adherence to fire safety control measures based on age, educational status and marital status.

The study revealed that the Z-Calculated value (.679) is less than Z-Critical value of (1.96) at the degree of freedom of (765) and at 0.05 level of significant. Therefore, the null hypothesis which stated that there is no significant difference on the exposure to fire safety hazards in petrol filling stations based on gender was accepted.

Also, at the degrees of freedom of 2 and 764 respectively, the calculated F ratio was 4.197 which is significant at 0.015 when compared to 0.05 alpha level of significance. The null hypothesis which stated that there is no significant difference in exposure to fire safety hazards in petrol filling stations based on age was rejected. By implication, there is a significant difference in exposure to fire safety hazards in petrol filling stations based on age.

There is no significant difference in exposure to fire hazards in petrol filling stations based on educational status was accepted as the calculated F-ratio value of 2.312 is not significant at 0.075 when compared to 0.05 level of significance. By implication, there is no significant difference on exposure to fire safety hazards in petrol filling stations based on educational status.

There is no significant difference on exposure to fire safety hazards in petrol filling stations within Port Harcourt metropolis based on marital status was accepted. At the degree of freedom of 3 and 763 respectively, the calculated F-ratio value was 3.568 which is significant at 0.014 when compared to 0.05 alpha level of significance. Therefore, there is a significant difference on the exposure to fire safety hazards in petrol filling stations based on marital status.

The null hypotheses which stated that there is no significant difference on adherence of to control measures of fire safety hazards at petrol filling stations based on age was rejected. At degrees of freedom of 2 and 764 respectively. The calculated F ratio value was 12.00 which is significant at 0.00 when compared to 0.05 alpha level. This implies that there is a significance difference on adherence to control measures of fire safety hazards at petrol filling stations based on age.

This hypothesis stated that there is no significant difference on adherence to control measures of fire safety hazards at petrol filling stations based on educational status. The hypotheses after analysis indicated that the calculated F ratio value was 50.613 is significant at 0.00 when compared to 0.05 level of significant at 3 and 763 degrees of freedom respectively. This then means that there is significant difference on adherence to control measures of fire safety hazards at petrol filling stations based on educational status.

There is no significant difference on adherence to control measures of fire safety hazards at petrol filling stations based on marital status. This hypothesis was rejected after analysis. The calculated F ratio value 9.743 is significant at 0.00 when compared to 0.05 level of significance at 3 and 763 degrees of freedom. Therefore, there is a significant difference on adherence to control measures of fire safety hazards at petrol filling stations based on marital status.

5. Conclusion

Based on the findings it is therefore concluded that; there is no significant difference in exposure to fire safety hazards in petrol filling stations in Port Harcourt metropolis based on gender. There is a significant difference in exposure to fire safety hazards in petrol filling stations in Port Harcourt metropolis based on age. There is no significant difference in exposure to fire safety hazards in petrol filling stations in Port Harcourt metropolis based on educational status. There is significant difference in exposure to fire safety hazards in petrol filling stations in Port Harcourt metropolis based on marital status. There is no significant difference on adherence to control measures of fire safety hazards in petrol filling stations in Port Harcourt metropolis based on gender. There is a significant difference on adherence to control measures of fire safety hazards in petrol filling stations in Port Harcourt metropolis based on age. There is a significant difference on adherence to control measures of fire safety hazards in petrol filling stations in Port Harcourt metropolis based on educational status. There is a significant difference on

adherence to control measures of fire safety hazards in petrol filling stations in Port Harcourt metropolis based on marital status.

5.1 Recommendations

Based on the findings of the study it is hereby recommended that age, marital and educational status should be considered as parameters in the employment process of petrol filling station workers in Port Harcourt metropolis.

Conflict of Interest Statement

The authors declare no conflicts of interests.

About the Authors

Amanze, Hope Emeka is a PhD candidate of Occupational Health and Safety Education in the Department of Human Kinetics and Health Education, Faculty of Education, University of Port Harcourt, Rivers State, Nigeria.
Ernest I. Achalu is a Professor of Health Education and Health Promotion, lecturing in the Department of Human Kinetics and Health, University of Port Harcourt, Nigeria. Additionally, Achalu is a Fellow, Institute of Safety Professionals of Nigeria (FISPoN).

References

Afolabi, O. T. (2011). Assessment of Safety Practices in Filling Stations in Ile-Ife, South Western Nigeria, Journal of Community Medicine and Primary Health Care 23, Nos. (1) and 2.

Ahmed, S., Abdulraham, A. S., Ibrahim E. O. & Agbo, A. A. (2004). Health, Risk and Safety of Petrol Stations in Minna Town. An overview. World Applied Services Journal, 32, 1.

Amanze, H. E. and Agu, B. N. (2014). Concepts in Occupational Health and Safety Technology, Port Harcourt, Harvey Publications Company.

Cotterell, C. A. (2002). Fire Fighting and Prevention on River Crafts and Boats in B.A. Fubara (Ed). Safety Management (pp 106-110) Port Harcourt, Pearl Publishers.

Department of Petroleum Resources (2018). DPR Guidelines for Approval to Construct and Operate Petroleum Products Filling Station. Retrieved from http://www.dpr.gov.ng/wp-content/uploads/2018/ fillingstationg ui delines.

Elendu, I. C. (2010). Fundamentals of Research and Statistics for students in Human Kinetics and other Educational Disciplines. Port Harcourt, The Glory of the later Publishing Company

Gupta, A. K. (2010). Industrial Safety and Environment, New Delhi, University Science publishers.

Kothari, C. R. and Garg, G. (2014). Research Methodology. Methods and Techniques (3rd Ed) New Delhi New Age International Publishers.

Monney, Isaac, Daramani, John, Aruna, Abigail, Tenkong, Asantewa, and Osei-Poku (2015). Health and Safety in High-Risk Work Environments: Journal of Environment and Occupational Science. Vol. 4.1,10.5455

Mshelia, A. M, Abdulahi, J. and Dawha E. D. (2015). Environmental effects of Petrol Stations at close proximities to Residential Buildings in Maiduguri and Jere, Borno State, Nigeria. IOSR Journal of Humanities and Social Sciences, 20, 1-2

National Examination Board for Occupational Safety and Health (2010). Unit IGCI Management of International Health and Safety.

Ogbonna, C. I. and Nwaogazie, I. L. (2015). Fire Safety Preparedness in Workplaces in Port Harcourt, Nigeria. International Journal of Public and Environmental Health. 2.1

Okafoagu Nneka C., Oche Mansur O., Gana Godwin J., Ango Jessica T., Yunusa Edzu U. (2017). Knowledge of Occupational Hazards and Safety Practices Among Petrol Station Attendants in Sokoto metropolis, Sokoto State, Nigeria. Journal of Occupational Health and Epidemiology.; 6 (3) :122-127.

Ugbebor, J. N. (2014). Modern Safety: Principles and Practice. Ibadan, Vertex Media Limited.