



## Adherence to Safety Practices and the Effect of Petroleum Products on Petrol Station Attendants in Abraka, Delta State, Nigeria

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**ABSTRACT:** This research was aimed at evaluating the adherence to safety practices and the effect of petroleum products on petrol station attendants in Abraka, Delta State, Nigeria. The study was a descriptive cross-sectional study carried out at five randomly selected petrol stations in Abraka, with a total of 35 petrol station attendants assessed using a structured questionnaire. Data was analyzed using SPSS statistical software. Majority of the respondents were female 21 (60%), most respondents were single 27 (77.1%), most respondents had tertiary education 29 (82.9%), most respondents had worked for at least 2 years 12 (34.3%), and most respondents work for more than 8 hours daily 18 (51.4%). Most (51.4%) of the respondents use PPE during their working hours, although, only 13 (37.1%) respondents use them regularly. Reported health problems included cough 5 (14.3%), breathing difficulty 4 (11.4%), and headache 3 (5.6%). Adherence to safety practices and use of personal protective equipment (PPE) by petrol station attendants was good, although, efforts should be made to ensure the use of these PPE by the attendant at the petrol stations, and proper care and attention be given to the petrol stations attendants to avoid future health problems.

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Petroleum products are being used for diverse purposes by human beings at homes, in manufacturing companies and petrochemical industries. Petroleum products are used regularly both by industries and the general public. Individuals who works directly in petroleum industries are occupationally exposed, thus making them likely to be more affected than their counterparts who do not work in these industries (Aleemuddin *et al.*, 2015). The individuals most frequently exposed are the petrol station attendants. They are workers who dispense petrochemical products which are commonly sold at filling stations (Johnson and Umoren, 2018). A lot of harmful effects have erupted after being exposure to petroleum products, this is due to the individual chemicals compounds in the mixture, such as benzene, lead and oxygenates (Chabra *et al.*, 2001). Inhaling little amounts of petrol vapors can lead to nose and throat irritation, nausea, vomiting, headaches, dizziness, confusion and breathing difficulties. Gasoline, when exposed to the skin, causes some allergic reactions such as rashes, redness, and swelling. Hypersensitivity have also been reported but these are rare occurrences (Jia *et al.*, 2002; White *et al.*, 2014). Irritability, physical stress and decreased hearing activity in attendants could result following exposure to loud and distracting noise levels from vehicles. Chemical hazards which emanate mainly from contact and

inhalation of fuel are recognized to have profound impact on petrol attendants. Hydrocarbons in fuel and the fumes from the exhaust of vehicles regularly come in contact with these petrol attendants (Rekhadevi *et al.*, 2010). The known pollutants from petrol products include benzene, toluene, ethylbenzene and xylenes which can lead to several health conditions ranging from neurological diseases to cancers. Many diseases conditions affecting the immune, endocrine, cardiovascular, respiratory and reproductive systems have been attributed to benzene which is considered the most hazardous pollutant in gasoline due to its genotoxic and carcinogenic effects (Ekpenyong *et al.*, 2013; El-Mardy *et al.*, 2015). Long term exposure of petrol attendants to petrol vapour have been reported to cause hepatotoxicity, nephrotoxicity and cardiotoxicity (Nwanjo and Ojiako, 2007). Also, a link has been observed between long term exposure to benzene and higher prevalence of hypertension (Wiwanitkit, 2007). Azari *et al.* (2012) reported that attendants at petrol station are more exposed to health risks associated with benzene than with any other compound. Several symptoms are seen with petrol station attendant following the inhalation of these volatile petroleum products. Exposure to higher concentration may produce effects on the central nervous system (Ritchie *et al.*, 2001). There is a high risk of fire outbreak or explosion if any source of

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ignition is present, since the various petroleum products dispensed at filling stations are flammable even at low temperature. The provision of firefighting equipment at such facilities is a dire necessity (Afolabi *et al.*, 2011). Many literatures worldwide have been emphasizing on the health effects of the petroleum products on the fuel attendants. There are no reports written about the health effects of handling or exposure of petroleum products on the fuel attendants in Abraka. Therefore, this research was aimed at evaluating the adherence to the use of personal protective equipment (PPE) and the possible effect of petroleum products on petrol station attendants in Abraka, Delta State, Nigeria.

## MATERIALS AND METHODS

The study was carried out among petrol station attendants in Abraka, Delta State, Nigeria. The population of this study was drawn from petrol station in vicinity of Abraka town which comprised of about 10 (ten) petrol stations. The sample size for the study was randomly selected using the simple random sampling technique.

Five (5) petrol stations were randomly selected; a total of 35 petrol station attendants was selected from the five (5) petrol stations and these were used for the study. Ethical approval was obtained from the ethical board of the Faculty of Basic Medical Sciences. Informal oral consent was obtained from individual attendant as they willingly filled out well-structured questionnaires which were used as the instrument for data collection. Information collected comprised respondents socio-demographic characteristics, use of personal protective equipment (PPE) and safety practices, and identification of health related problems. Data was presented as percentage using descriptive statistics.

## RESULTS AND DISCUSSION

The socio-demographic characteristics of respondents is presented in Table 1. Most respondents were within the age of 21-25 (13; 37.1%). Majority of the respondents were female 21 (60%), most respondents were single 27 (77.1%), most respondents had tertiary education 29 (82.9%), most respondents had worked for at least 2 years 12 (34.3%), and most respondents work for more than 8 hours daily 18 (51.4%).

Table 2 shows the use of personal protective equipment (PPE) and participants adherence to safety practices. It was observed that most 18 (51.4%) of the respondents use PPE during their working hours, although, only 13 (37.1%) respondents use them regularly.

**Table 1:** Socio-Demographic Data of Respondents

Variable	Response	
	Frequency (N=35)	Percentage (%)
<b>Age</b>		
16-20	6	17.1
21-25	13	37.1
26-30	5	14.3
30 above	11	31.4
<b>Gender</b>		
Male	14	40.0
Female	21	60.0
<b>Marital status</b>		
Single	27	77.1
Married	8	22.9
Divorced	0	0
<b>Educational background</b>		
Informal	1	2.9
Primary	2	5.7
Secondary	3	8.6
Tertiary	29	82.9
<b>Religion</b>		
Christianity	32	91.0
Muslim	3	9.0
<b>Work years</b>		
<1 year	6	17.1
1-2 years	12	34.3
3-5 years	8	22.9
5 years above	9	25.7
<b>Daily working hours</b>		
< 4hrs	10	28.6
4-8hrs	7	20.0
>8hrs	18	51.4

**Table 2:** Use of PPE and Adherence to Safety Practices

Statement	Response (%)
<b>Do you use personal protective equipment before handling or refilling of vehicles?</b>	
Yes	18 (51.4%)
No	17 (48.6%)
<b>How often do you put on these protective wears?</b>	
Regularly	13 (37.1%)
Rarely	5 (14.3%)
Never	17 (48.6%)
<b>Do you wear protective hand gloves before handling or refilling of vehicles?</b>	
Yes	20 (57.1%)
No	15 (42.9%)
<b>Do you wear protective goggles before handling or refilling of vehicles?</b>	
Yes	23 (65.7%)
No	12 (34.3%)
<b>Do you wear protective clothing before handling or refilling of vehicles?</b>	
Yes	20 (57.1%)
No	15 (42.9%)
<b>Do you wear protective nose mask before handling or refilling of vehicles?</b>	
Yes	5 (14.3%)
No	30 (85.7%)
<b>When working do you wear safety boots?</b>	
Yes	24 (68.6%)
No	11 (31.4%)
<b>After work do you wash your hands before leaving the petrol station?</b>	
Yes	30 (85.7%)
No	5 (14.3%)

Table 3 indicates the level of health related problems by respondents. Results showed that 17 (48.6%) of the

respondents had no known health related problems. Reported health problems include cough 5 (14.3%), breathing difficulty 4 (11.4%), headache 3 (5.6%), eye redness 2 (5.7%), dizziness 2 (5.7%), nausea 1 (2.9%), and stomach pain 1 (2.9%). The largest percentage of respondents manifested the health problem within a few days 27 (77.1%).

**Table 3: Health related problems by respondents**

Statement	Response (%)
<b>Health challenges faced</b>	
Stomach pain	1 (2.9%)
Breathing difficulty	4 (11.4%)
Eye redness	2 (5.7%)
Headache	3 (5.6%)
Nausea	1 (2.9%)
Dizziness	2 (5.7%)
Cough	5 (14.3%)
None	17 (48.6%)
<b>Duration of time faced with the health challenge</b>	
Days	27 (77.1%)
Weeks	2 (5.7%)
Months	5 (14.3%)
Years	1 (2.9%)

This study's objective was to evaluate the level of adherence to safety practices and the effect of petroleum products on petrol station attendants in Abraka, Delta State, Nigeria. The respondents in this study were majorly young people between the age of 21-25 years, who were mostly single and had completed tertiary education. The results of this study revealed that female attendants were more than the males. This finding is similar to studies carried out by Johnson and Umoren (2018) in Uyo, Nigeria but is in contrast with the findings conducted in Brazil where the male attendants constituted 90.5% of the workforce (Rocha *et al.*, 2014). Majority of the respondents in the present study had worked between 1-2 years with percentage of 34.3%. A possible reason could be the fact that many were young and may just have started working after completing their tertiary education awaiting better job offers. The present study revealed that a good level of adherence to safety practices and the use of personal protective equipment such as hand gloves, goggles, clothing, and safety boots, which was reported to be used regularly. Washing of hands was also practiced. This is a good practice and it should be encouraged. However, it was observed that use of protective nose mask was not a common practice among the petrol station attendants. This may be because of its unavailability, that is, not provided for them, discomfort from its use, or may be the physical appearance of it on them. This non-adherence to the use of protective nose mask could result in the inhalation of toxic petroleum products which could gastrointestinal discomfort, nervous

disorders, lung damage, amongst other effects (Glass *et al.*, 2003; Azari *et al.* 2012; Ekpenyong *et al.*, 2013). Not much health concerns were reported with this study. Cough and breathing difficulty was among the health problems reported. This might be as a result of the non-usage of protective nose mask by the petrol station attendants. Considering the presence of hydrocarbon and other pollutants in gasoline, the poor use of PPE which was reported to be high with usage of protective nose mask in the present study put the workers at risk of several health challenges and diseases which could affect many systems of the body (Ekpenyong *et al.*, 2013; Bahadar *et al.*, 2014; El-Mahdy *et al.*, 2015).

**Conclusion:** Although, adherence to safety practices and use of personal protective equipment by petrol station attendants was good, it is paramount to maintain the regular usage of PPE such as hand gloves, goggle and nose mask as they are important to reducing the level of health associated problems following exposure to petroleum products by petrol station attendant. There is need for stricter enforcement of government policies on the use of these PPE.

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