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Health, Risk and Safety of Petrol Stations in Minna Town: An over View

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Abstract: The aim of this study was to determine the level of awareness of hazards and safety measures among Petrol Filling Stations and assess the prevailing safety Practices in Petrol Filling Stations in Minna metropolis of Niger State Nigeria. Urban growth has outpaced the ability of government to build essential infrastructures, enact and enforce the legislation for safety and rewarding environment. This growth has translated into a commensurate in the use of automobiles and consequently need for fuelling services. A descriptive cross-section study was conducted on the Petrol Filling Stations in Minna metropolis. Data was collected using an interview administered, questionnaire and an observation check list which cut across risk, health and hazard sub considerations. The analysis of the data shows that 65% of the Station Attendants are not properly trained on safety. 45 of Minna Petrol Filling stations do not conform to Department of Petroleum Resources (DPR) siting rules as set backs from the road and residential areas were less than 30 meters. Independent Petroleum Marketers shows no concern on people selling Petroleum products in gallon, right in front of their Stations. Conglomerate owned Stations like the Nigeria National Petroleum Cooperation (NNPC) Retail Outlets- (State owned), have better safety measures and orientations compared to those owned by independent marketers.

Key words: Health · Risk · Fire · Equipments · Safety · Operation · Hazard

INTRODUCTION

The rise in the global population has outpaced and posed a serious challenge on government to provide the masses with the essential infrastructure, enact and enforce the legislation on the people [1]. As the population increases, the number of automobile in use also increases, thereby, creating the need to fueling services and consequently the building of Petrol Filling stations around Minna metropolis. Majority of these Petrol Filling Stations both new and renovated lack the basic standard in safety, health and risk control approved by the regulatory agencies like Niger State Environmental Protection Agency (NISEPA), Department of Petroleum Resources (DPR), Ministry of Land and Housing and Niger State Urban Development Board(NUDB).

Negligence to the standard requirements for Petrol Filling Stations building has posed serious threat on health of the workers and masses residing close to the Petrol Filling Stations. By definition, one can see Petrol Filling Station as a facility where fuels and lubricants for automobiles which includes Premium Motor Spirit (PMS), Liquidified Natural oil, Kerosene, Dual Purpose Kerosene (DPK), Aviation Turbine Kerosene are sold) [2].

All these finished white Petroleum products can give off flammable vapour at a very low temperature and thus suggest that there are high risks of explosion or fire if an ignition point is close. Additionally, these flammable liquids float on the water surface that can drain a distance, thereby posing danger away from source [3].

Healthwise, these fuels could cause dermatitis on contact with the skin of the handlers as a result their hydrocarbon contact [4]. Heamatogical disorders could be attributed to exposure of person to benzene which is more prevalent in less developed Countries [5]. The risk, health and safety of people and protection of Minna environment are the major challenges and concern of Petrol Filling Stations in Minna metropolis.

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Generally, finished white Petroleum products are potentially hazardous at ambient temperature. Petrol gives off vapour which when mixed with air in appropriate proportion can explosively burn if ignited. Petroleum products are potential pollutants which if released can cause damage to the environment there are harmful health related effect on human if wrongfully handled [4].

This study therefore aimed at assessing the prevailing safety, risk and health practices in Petrol Filling Stations in Minna metropolis of Niger State Nigeria, by assessing the awareness of safety measures among the attendants, identifying hazards present in the Petrol Filling Stations, determining the proportion of existing Petrol Filling Stations, that meet the minimum standard and comparing these Petrol Filling Station by ownership status. This work will also highlight the measures needed to avoid these hazards and serve as a basis for policy decisions.

MATERIALS AND METHODS

The study which was a descriptive cross sectional type was carried out in Petrol Filling stations located in Minna Local Metropolis of Niger State, Nigeria between the month of February,1st and April, 30th 2014. It is the state capital and one of the most populous city in the state, it is densely populated and one of the most busiest town in Niger State. There are approximately 70 Petrol Filling Stations. These includes conglomerate which are owned by multi -national such as (Mobil, Total, Nigeria National Petroleum Cooperation (NNPC),Oando and independent Petroleum Marketers (IPMs) run by private individuals, the average distance between these Petrol Filling Stations is at most 200m away.

Fifty (50) Petrol Filling Stations was chosen for the study across the city. A list of the Attendants in each of the Petrol Filling Station was obtained to form the Sampling frame and two was selected based on their responsibility in the fuel Station. Permission was obtained from the owners of the Petrol Filling Station and informed consent obtained from the Attendants before the data collection was applied. Data was collected with the use of an interviewer - administered questionnaire which was based on questions on health, risk and safety issues in the Petrol Filling Station. A survey was also done on the number of dispensers, fire extinguisher and their functionality and practices of Attendant during fuel dispensing, Fire extinguisher ratio was defined as at least one fire extinguisher per dispenser.

RESULTS

All the questionnaires administered to the Fifty (50) selected Petrol Filling Stations and its Attendants were retrieved and analyzed. The average age of these Attendants were 25 years with a majority been male (3:1). Most of the Attendants had educational attainment of at least Secondary School. Based on the hazards in Petrol Filling Station; the most understood hazard is fire hazards. Other include car accidents, fuel spillage and health hazards such as fume inhalation.

Majority of the respondents were aware of safety measures in the Petrol Filling stations. Safety measures such as the use of fire extinguisher, switching off of ignition before fueling, non-use of mobile phone and displaying of no smoking label on each pump.

Out of the Fifty (50) Petrol filling Stations administered, Forty Five (45) were owned by Independent Petroleum Marketer (IPMs). All the Petrol Station except Fifteen (15) had a minimum required distance of 30m between the edges of the road. All the Petrol Filling stations had “No Smoking” signs. Of all the Petrol Filling Stations, only Seventeen (17) was well above 30m from residential areas.

All the Petrol Filling Stations had the “IN and EXIT” signs. All the petrol Filling Stations had equal amount of fire extinguishers for all the pumps. However, all the fire extinguisher, Two-third ($^2/_3$) was functional. None of the Petrol Filling Stations has ever had any experience of fire outbreak in the past. Only Five (5) of all the Petrol Filling Station have never had a form of training or re- training. Twenty (20) have training bi - annually and Ten (10) yearly. The remaining Fifteen (15) had quarterly.

Fig. 1 - 6: interpretation of Table 1 into graphical forms.

Fig. 7 -12 Physical Assessment of Petrol Filling Station in Minna, Nigeria.

Graphical representation.

RESULTS AND DISCUSSION

Due to the non availability of other means of transportation except by road, increase in number of vehicle plying Nigerian roads has translated to higher consumption of Premium Motor Spirit (PMS). This increased demand has to be met by increasing the amount of Petrol Filling Stations without properly controlling the impact of these Petrol Filling Stations sites on the environment and the health of man. The hazard level of

Table 1: Socio - demographic characteristics and selected safety attributes

Variable	Characteristics	Frequency	Percentage (%)
Age of	18 - 24	37	74.00
Respondents	25 - 31	13	26.00
Sex of	Male	41	82.00
Respondents	Female	9	18.00
Educational	Primary	9	18.00
Attainment	Secondary	28	56.00
	Tertiary	13	26.00
Hazards encountered	Fire Hazards	-	0.00
In the Station	Robbery	7	14.00
	Fuel spillage	45	90.00
	Health Hazard	27	54.00
Awareness of safety	Yes	45	90.00
Measures	No	5	10.00
Types of Safety	Fire extinguisher	45	90.00
Measures known	No Smoking	50	100.00
	Switch off engine	30	60.00
	Sand box	12	24.00
	No use of phones	12	24.00

Table 2: Physical Assessment of Petrol Filling Station in Minna, Niger State Nigeria

Variable	Frequency	Percentage (%)
Ownership of facility0		
Conglomerate	5	10.00
Independent Petroleum \Marketers (IPMs)	45	90.00
Setback from Road		
Less than 30m (<30m)	15	30.00
More than 30m (>30m)	35	70.00
Distance from		
Residential Area		
Less than 30m (<30m)	33	66.00
More than 30m (>30m)	17	34.00
Display of 'No Smoking' sign		
Yes	50	100.0
No	0	0.00
Maintenance of Fire extinguisher		
Less than 6 months ago (< 6 month ago)	5	10.00
More than 6 months ago (>6 month ago)	45	90.00
Experience of Fire accident		
Yes	0	0.00
No	50	100.0

Fig. 1: Percentages of ages of respondents (age of respondents)

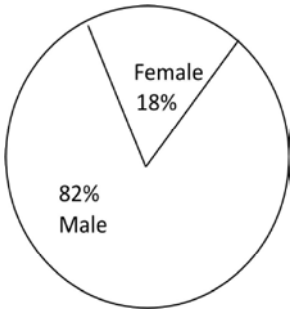

Fig. 2: Percentages of male and female attendants (sex of respondents)

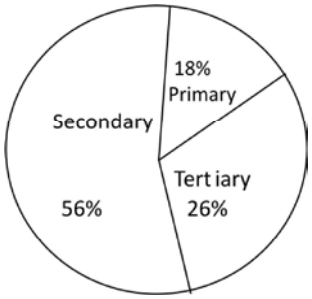

Fig. 3: Percentages of educational attainment of the respondents (Educational attainment)

Fig. 4 a: Fire Incidence

Fig. 4b: Robbery Incidence

indiscriminately siting of Petrol Filling Station around residential area may lead to disaster at some point. To mitigate this, this study assessed the safety

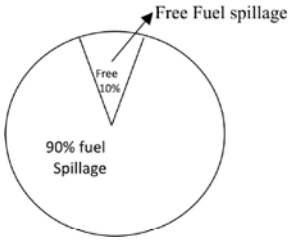

Fig. 4c: Fuel Spillage

Fig. 4d: Health Hazard

Fig. 4 a-4 d: Percentage of various types of hazards in Petrol Filling Stations

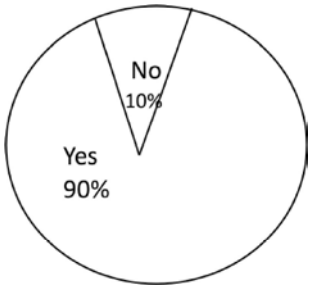

Fig. 5: Awareness of safety measures by Petrol Filling Stations

practices in Petrol Filling Stations in order to have information that can guide policy formulation and intervention.

The median age of the respondents in this study was 22 years with 56 percent having Secondary School Education, the level of safety awareness was 90 percent. Also, 91 percent respondents in this study know about importance of safety measures.

Although 50 percent of the respondents have had a form of training in the past. The most known safety measures in this study was availability of functional fire extinguisher which stands to reason as the most frequent hazard reported in the study was fire hazard.

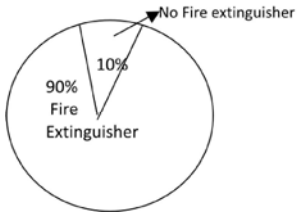

Fig. 6a: fire extinguisher measures

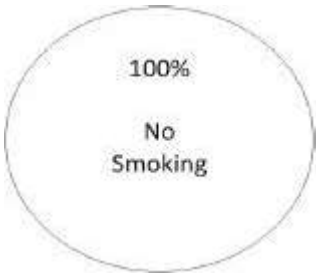

Fig. 6b: No Smoking measures

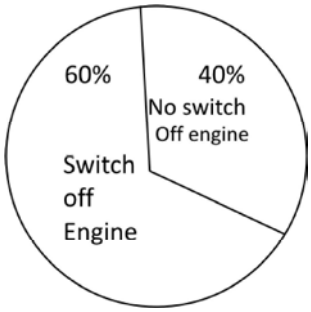

Fig. 6c: switch off Engine measures

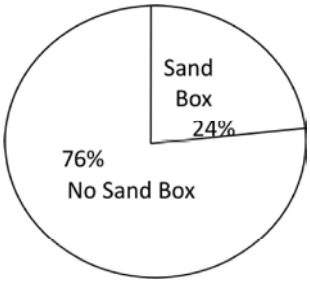

Fig. 6d: Sand Box measures

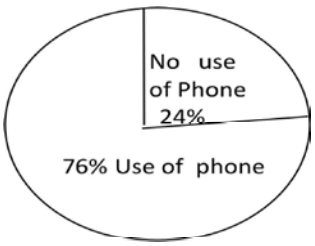

Fig. 6e: No use Phone measures

Fig. 6 a -6e: Types of Safety measures known

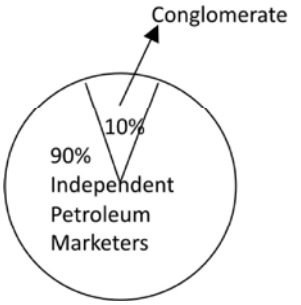

Fig. 7: Ownership of Facility

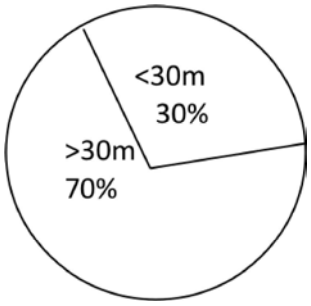

Fig. 8: Set Back from Road

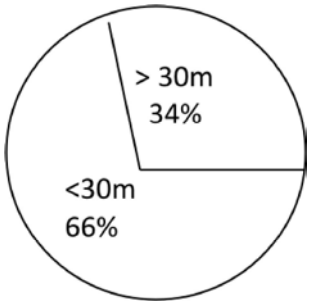

Fig. 9: Distance from Residential Area

Fig. 10: Display of "No Smoking Sign"

The study showed that most of the Petrol Filling Stations did not comply with the laid down regulation regarding siting of Petrol Filling Stations. Only 34 percent comply with the agreed 30m away from residential site. 66 percent did not comply with 30m distance from the road.

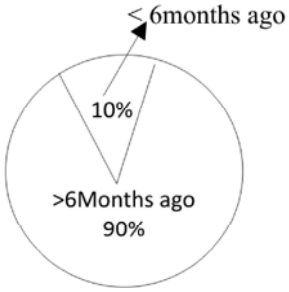

Fig. 11: Maintenance of fire extinguisher in the last six (6) Months

Fig. 12: Experience of fire accident in the past.

In view of possibility of fire accidents, there was 100 percent compliance by all Petrol Filling Stations, on display of "No SMOKING" sign within their premises

CONCLUSION AND RECOMMENDATIONS

Petrol Filling Stations owned/run by conglomerates had better standards than those owned by Independent petroleum Marketers (IPMs). Most Petrol Filling Stations own by Independent Petroleum Markers (IPMs) do not ensure adequate training of staff, maintenance of fire, accident and safety equipment. Therefore, the regulatory body saddled with environmental protection should periodically inspect and fine erring operators. More effort should be put in training staff especially the Independent Petroleum Marketers (IPMs) and a regular assessment of facilities should be conducted. Also, policies on siting of Petrol Filling Stations should be observed and followed up from beginning to the end.

However, a larger proportion of Petrol Filling Stations do not meet the minimum required standard for safety in a Petrol Filling Stations - Awareness among Petrol Filling Stations Attendants on safety measures were good but too narrow. Therefore, the need for training and re - training.

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