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Prevalence of Adulteration of Conventional Fuel in the Society (Six Geopolitical Zone of Nigeria as a Case Study)

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Abstract

With increase in Fuel demand and consumption but decrease in supply, an increase in the level of fuel adulteration has also been observed and confirmed in Nigeria. Lower priced adulterants are commonly added to our conventional fuel which contributes towards the increase in damages mostly on cars, generators, Human Health and some other electrical Gadget in the society. This paper ascertains fuel adulteration and discuss the Desirability for Solution in Nigeria. A survey was conducted by administration of a questionnaire given to each Respondent to complete in the 6 geopolitical zone of Nigeria which are North Central(NC), South East(SE), North East(NE), South South(SS), North West(NW), South West(SW) of Nigeria. First part of the questionnaire dealt with the Socio-Demographic Information. The second section was concerned with Adulteration: Most Utilized Fuel, Types and Forms of Adulteration, Frequency of Adulteration, Effect/ Damages caused by Adulteration of Fuel and Appropriate suggestions to Stop or Reduce Adulteration. From the table of data, the most significant items are as follows. 90% major fuel consumers are between the age of 21-60 years. 86% of the respondent have experienced fuel Adulteration at one time or the other, 32% Civil Servant, 28% Professionals, 12%Students, 12% Businessmen. 10% Artisan, 10% Trader all spread across the 6-geopolitical zone of Nigeria. In the second section, 66% of Respondent are frequent users of Petrol, 8% uses Diesel more than Fuel, and 26% uses Kerosene more often. Adulteration of fuel is obvious in the survey, 16% experienced Adulteration on a daily basis,76% every week, 8% monthly.78% has attempted to check for adulteration,46% of the adulterated fuel was bought from Road Vendor,48% from Pump Station, 6% from Pipeline Vandals. In view of this, respondent in the society prefers a new technology effective and simple enough to detect any form of adulteration.

Keywords: Petroleum Products, Adulteration level in Nigeria, New Technology.

Introduction

Fuel adulteration problems have become increasingly rampant in recent times. It is a common knowledge that purity of fuel holds crucial significance mainly for automobile, power generation and engineering industries (Gupta etal 2010). In Nigeria, adulteration during production, through transportation, right up to the point of sale has become an acute problem.

The introduction of a foreign substance into motor spirit / high speed diesel, or kerosene illegally or unauthorized with the result that the product does not conform to the requirements and specifications of the product is called adulteration (Murty, 2014). The foreign substances are called adulterants which when introduced alter and degrade the quality of the base transport fuels. Specific types of adulteration may be broadly classified as follows: Small amount of distillate fuels like diesel or kerosene into Petrol. Variable amount (as much as 30%) of hydrocarbons such as industrial solvents into Petrol.Waste industrial solvent such as used lubricants, which would be costly to dispose of in an environmentally approved manner into Petrol and diesel. A blend of kerosene into diesel, often as much as 20-30 percent. The use of such adulterants is not only affecting the quality of the conventional automobile fuels but also contribute towards environmental and health hazard. (Jude, 2012).

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Materials and Methods

Population and Sampling

A survey was conducted in the 6 geopolitical zone of Nigeria which are North Central(NC), South East(SE), North East(NE), South South(SS), North West(NW), South West(SW) of Nigeria. The purpose of the survey was to analyze and Study the Effect of Adulteration of Conventional Fuel on the environment.

The survey was conducted by means of a questionnaire given to each Respondent to complete. The first part of the questionnaire dealt with the Socio-Demographic Information. The second section was

concerned with Adulteration: Most Utilized Fuel, Types and Forms of Adulteration, Frequency of Adulteration, Effect/ Damages caused by Adulteration of Fuel and Appropriate suggestions to Stop or Reduce Adulteration.

Data Collection

The most significant items are as follows. 90% major fuel consumers are between the age of 21-60 years. 86% of the respondent have experienced fuel Adulteration at one time or the other, 32% Civil Servant, 28% Professionals, 12%Students, 12% Businessmen. 10% Artisan, 10% Trader all spread across the 6-geopolitical zone of Nigeria.

In the second section, not surprisingly, 66% of Respondent are frequent users of Petrol, 8% uses Diesel more than Fuel, and 26% uses Kerosene more often. Adulteration of fuel is obvious in the survey, 16% experienced Adulteration on a daily basis,76% every week, 8% monthly.78% has attempted to check for adulteration,46% of the adulterated fuel was bought from Road Vendor,48% from Pump Station, 6% from Pipeline Vandals. 90% of the respondent use physical examination to detect Adulteration,74% of the 90% complained that the physical examination method is not effective enough, 88% needs a more Technical approach to detect Adulteration,72% preferably wants a new technology with cost ranging between N2000-N10,000.

Data Analysis

The data collected were analyzed using Statistical package for the Social Sciences (SPSS)software, the choice is influenced by a strong desire to achieve a more descriptive statistics, a wider range of charts and a faster access to statistical tests. This is to ensure that the analysis carried out do not go to waste but are adequately translated into a motivation for creating a simple and new technology to solve the problem of adulteration.

A total of Hundred (100) respondentswere administered with Questionnaire and 15were retrieved, this presented questionnaire recovery rate

=(Total Responses to Survey) X 100
(Total Distributed)
= 85/100 X 100/1= 85% Recovery Rate.

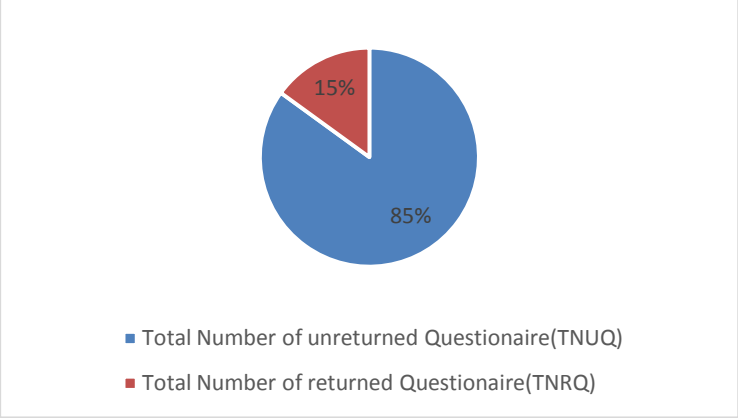

Figure I. Questionnaire Analysis**.**

Result and Discussion

Frequency of Adulteration: The figure 2 below shows the problem of Adulteration has become a global problem and the detail of its frequency is analyzed below that 16% of the respondent has a daily experience of adulteration of any one of the petroleum product sample, also 76% of the respondent has her own experience of adulteration weekly likewise very few about 8% has their own experience monthly.

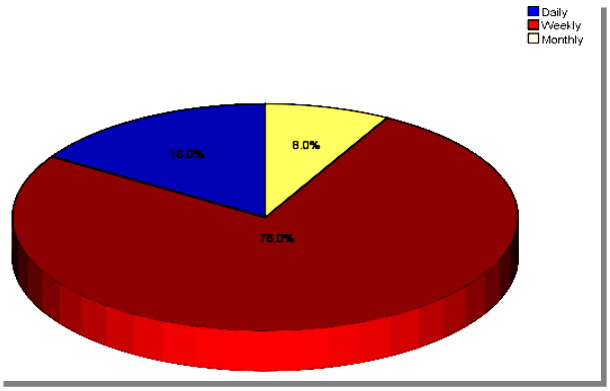

Figure II. Pie charts showing frequency of Adulteration

Adulteration experienced by Profession: Figure 3 below shows that 32% of the respondent are predominantly civil servant working with either the State or Federal Government, 28% are real professionals mostly with their private Practice such as Doctors, Lawyers etc as seen below. This is necessary in order to determine if the questionnaire administration was lopsided tilting towards a particular set of people.

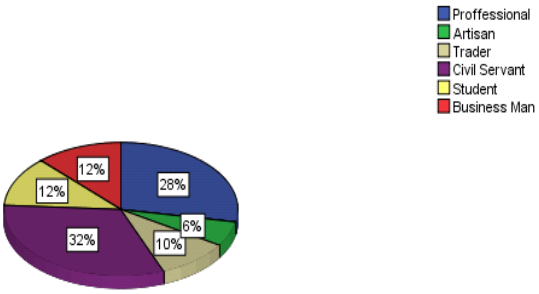

Figure III. Pie chart showing the Occupation distributions of the respondent

Desperation towards Adulteration Solution: The figure 4 shows that most of the respondent about 88% desire a quick intervention on resolving the problem of Adulteration, due to the fact that the available methods are not readily available.

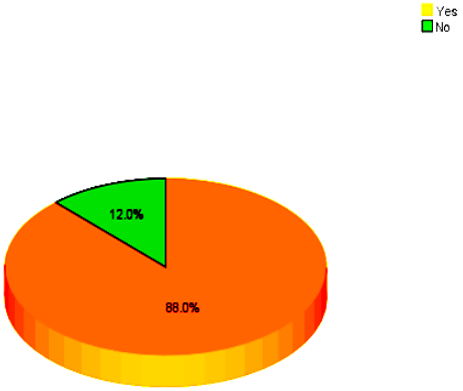

Figure IV. Pie Chart showing respondent is in need of Intervention

Type of Intervention needed: In figure 5 below it was observed that 72 % of the respondent desired a new but simple approach in form of a new technological innovation to tackle the problem of Adulteration.

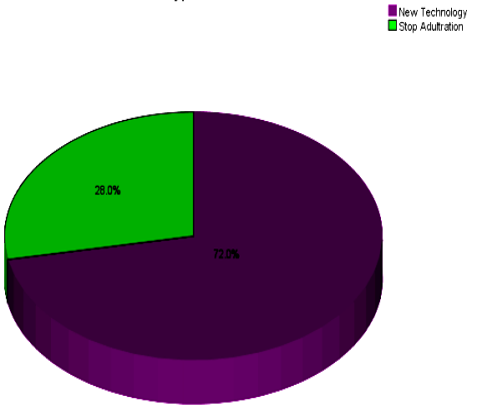

Figure V. Pie Chart showing type of Intervention needed.

Frequency of Fuel Adulteration experience: In figure 6 below it was observed that 16 % of the respondent experience Adulteration daily,8% experience adulteration monthly and 76% experience Adulteration Weekly.

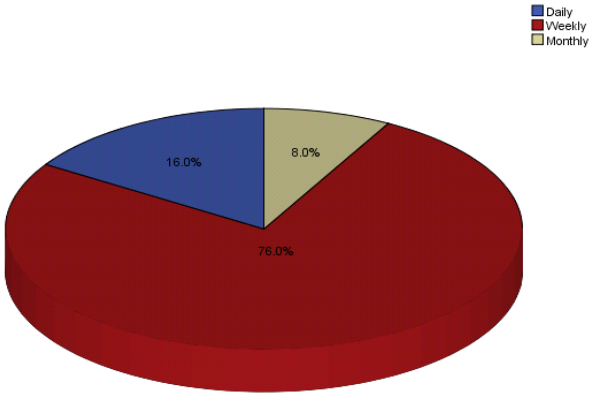

Figure VI. Frequency of how respondents have experienced Fuel Adulteration

Rate of Fuel usage: In Figure 7 below it was observed that 66% of respondent mostly use Petrol, 26% of respondent uses kerosene while 8 % of respondent uses Diesel.

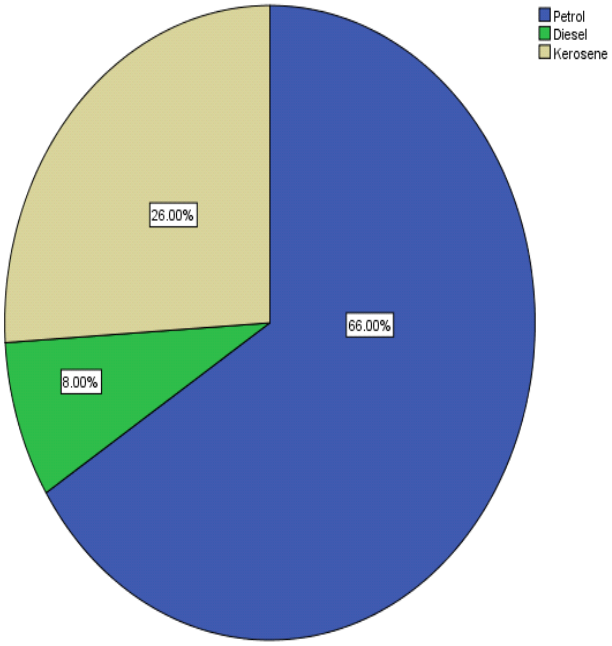

Figure VII. Percentage of fuel mostly consumed by the respondent

Forms of Fuel Adulteration mostly experienced: In Figure 8 below shows the forms of Adulteration mostly experienced.

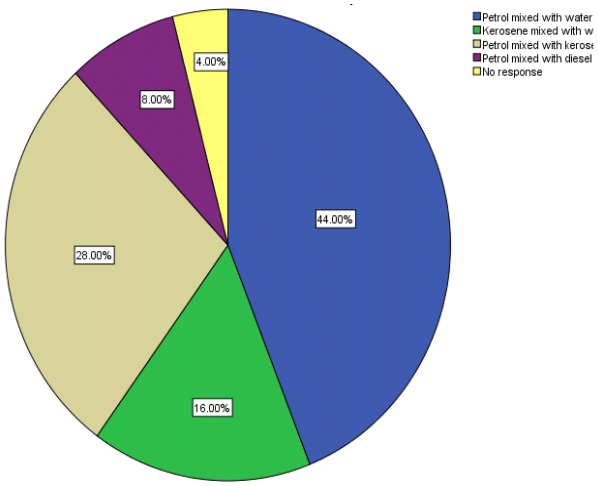

Figure VIII. Shows the form of adulteration experienced by the respondent

Source of Adulterated Fuel: In Figure 9 below it was observed that 46% of respondent got the fuel from the road vendor, 48% of respondent from pump station,2% from Pipeline vandals.

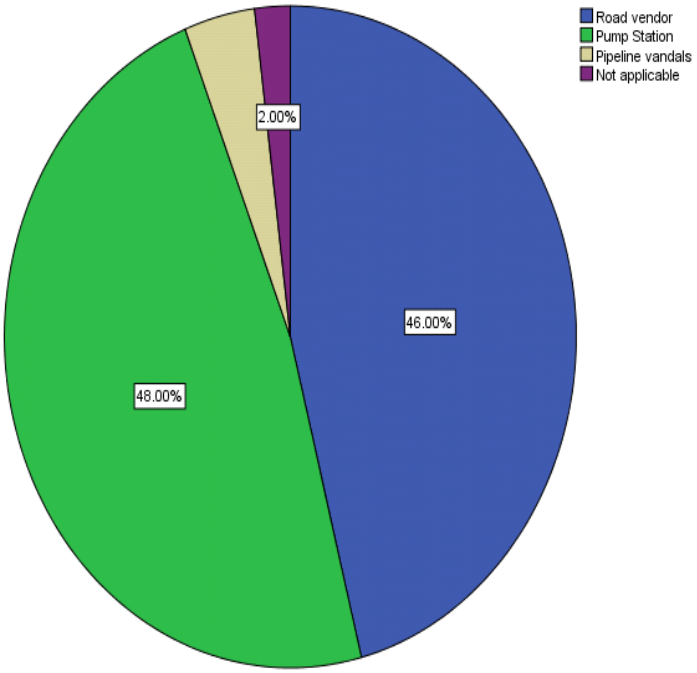

Figure IX. Shows the pie chart of where the Adulterated fuel was bought

How do respondent currently check for fuel adulteration: In Figure 10 below it was observed that 90% of respondent detected Adulteration via physical examination

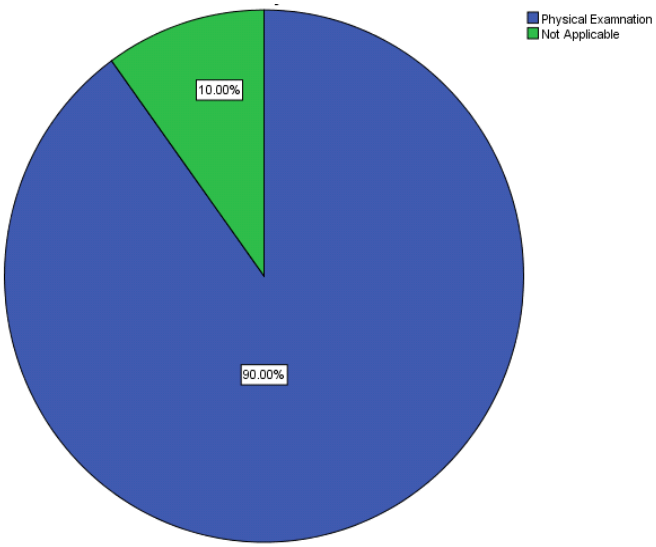

Figure X. This Pie chart shows how respondent has been checking for Adulteration

Conclusion

In View of the foregoing it was observed that thechallenges posed by adulteration has to be dealt with, it has caused a lot of damages mostly on cars, generators, Human Health and some other electrical Gadget in the society, Majority of respondent in the society prefers a new, simple and readily available technology effective enough to detect any form of adulteration.

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