

## Evaluation of cases of burns associated with the use of adulterated kerosene in Aba metropolis Abia State, Nigeria

### ABSTRACT

In Nigeria, numerous uses of kerosene abound. It is the main fuel used for cooking and lighting especially by the 120 million poor that characterise the population as an alternative to the erratic electricity supply. Adulteration of Household kerosene (HHK) may be deliberate or inadvertent. Hospital records from where data were sourced were obtained from randomly selected hospitals within Aba metropolis of Abia state over a three year periods (2019-2021). In 2019 the total number of persons affected by adulterated kerosene related burn was 39 of whom 18 males and females were affected as a consequence of which 5 male and 7 female lost their lives. In 2020, a total number of 28 persons were affected by adulterated kerosene related burn 13 of whom were males and 15 females resulting in the death of 3 males and 4 females. However, in 2021, a total number of 64 cases involving 35 females and 29 males which resulted to the death of 9 females and 7 males were recorded. In conclusion, the study revealed that the incidence of adulterated kerosene related burn was higher in 2021 than 2020 and 2019 with more women than men being affected across the study years.

**Comment [DS1]:** No is requested

**Comment [DS2]:** Additional causes and discussion are required

### Introduction

Kerosene is a combustible hydrocarbon liquid distilled in modern refineries as one of the numerous products of crude petroleum oil [1]. Although referred to as kerosene in Nigeria, in some other countries it is known as paraffin [2]. It is of two categories which include the household kerosene (HHK) and the jet kerosene which is also known as aviation technical kerosene (ATK).

Kerosene is a colourless thin mineral oil with density range of 0.75-0.85 g/cm<sup>3</sup>. It is a mixture of carbon that contains between 6 and 16 carbon atoms and while miscible in water, it is immiscible in water. It has a flash point of 37°C and 65°C and its auto ignition temperature is 220°C. Kerosene has a low volatility hence a lighted match if thrown into a pool of it will quench [1].

**Comment [DS3]:** ?? explain please

Nigeria an OPEC member is one of the largest producers of petrol globally. In Nigeria, numerous uses of kerosene abound. It is the main fuel used for cooking and lighting especially by the 120 million poor that characterise the population as an alternative to the erratic electricity supply. Other uses of kerosene include fire breathing, fire juggling and dancing in the

**Comment [DS4]:** Is crude oil refined in the country?

entertainment industries for fire performance owing to its low flame temperature when burnt in free air.

**Comment [DS5]:** Are these the only uses?

Kerosene is said to be adulterated when mixed with other liquids either miscible or immiscible deliberately evident by existing reports confirming the involvements of major dealers and some transporter in the act in order to maximize profits [3] or inadvertently through unwholesome practice by some transporters to use one colour coded truck for all product which may amount to mixing up a product with a left over in the tank [4]. Kerosene adulteration had been implicated in all the various kerosene explosions in Nigeria. The first major kerosene explosion in Nigeria occurred in March 1984 in Lagos [5]. There have been several other kerosene explosions in Nigeria since then [6].

**Comment [DS6]:** Long sentence revision is required

**Comment [DS7]:** Burns cases should be mentioned and recoded for this matter

Aba is one of the most renowned cities in the South-eastern part of Nigeria the commercial hub of not only the region but for the country. It is surrounded by small villages and towns and thus plays host to both the rich and the poor.

### Methodology

Random sampling technique was employed to select a total of 20 hospitals from where information used in the study over a three year periods (2019-2021) was harnessed. Hospital records were relied upon for information generation. All cases of adulterated kerosene burns were included. Hospitals established after 2019 were excluded from the study.

**Comment [DS8]:** Explain of the causes for choosing only these three years

**Comment [DS9]:** Methodology should be improved with additional illustration

### RESULT

**Comment [DS10]:** Population records are to be added

**Table 1.0: Reported cases of adulterated kerosene related burns in 2019 within Aba metropolis**

SEX	No. of cases	No. of deaths	No. of survival
Male	18	5	33
Female	21	7	14
Total	39	12	27

**Table 2.0: Reported cases of adulterated kerosene related burns in 2020 within Aba metropolis**

SEX	No. of cases	No. of deaths	No. of survival
Male	13	3	10
Female	15	4	11
Total	28	7	21

**Table 3.0: Reported cases of adulterated kerosene related burns in 2021 within Aba metropolis**

**Comment [DS11]:** Plotting for the results must be added

SEX	No. of cases	No. of deaths	No. of survival
Male	29	7	22
Female	35	9	26
Total	64	16	48

## Discussion

In Nigeria, kerosene is used mainly for cooking and lighting especially by the 120 million poor that characterise the population as an alternative to the erratic electricity supply. Adulteration of Household kerosene (HHK) may be deliberate or inadvertent. Table1-3 shows the recorded cases of adulterated kerosene related burns within Aba metropolis in Abia State Nigeria from 2019-2021. In 2019 the total number of persons affected by adulterated kerosene related burn was 39 of which 18 male and female were affected as a consequence of which 5 male and 7 females lost their lives. In 2020, a total number of 28 persons were affected by adulterated kerosene related burn 13 males and 15 females resulting in the death of 3 males and 4 females. However, in 2021, a total number of 64 cases involving 35 females and 29 males which resulted to the death of 9 females and 7 males were recorded. The study revealed that more females than males were affected by burns resulting from adulterated kerosene. This could be attributed to the fact that women are mainly involved in domestic affairs notably cooking. This finding is consistent with the finding of Olugbenga *et al.* [7] which showed that more within the age range of 21-40 were affected by adulterated kerosene related burns than their male counterpart. The record also showed that more female than male lost their lives as a result of the aforementioned incidents. This could be attributed to the fact that male are naturally more resilient and psychologically more stable than their female counterpart. This finding is in tandem with the finding of Olugbenga *et al* [7] which reported that 12 out of a total number of 123 patients of adulterated

**Comment [DS12]:** This sentence is triple mentioned

**Comment [DS13]:** This is not a discussion but only repeating the mentioned data

**Comment [DS14]:** Additional proofs should be considered

**Comment [DS15]:** No ages are recorded Please add

**Comment [DS16]:** An evidence is required

kerosene related burns died, nine of whom were female and three male. The study also revealed that more persons were affected in 2021 than 2020 and 2019. This could be as a result of the extreme of economic down-turn orchestrated by the COVID-19 outbreak which could have caused marketers to explore illicit means of making profits from consumers in an effort to recover from set-backs introduced by the outbreak. This finding is consistent with the report of Ajuonuma [8] who had affirmed that, some unscrupulous kerosene dealers in the country adulterate household kerosene in order to make excess gain from the sale of the product.

**Comment [DS17]:** Then what is new?

**Comment [DS18]:** Long sentence

## CONCLUSION

Through this study it has been shown that the incidence of adulterated kerosene related burn was higher in 2021 than 2020 and 2019 with more female than male are affected across the study years.

**Comment [DS19]:** What are the suggestions and how to deal with?

## REFERENCES

**Comment [DS20]:** Newer references are required

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