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PERCEPTION OF WOMEN ON THE CAUSES AND EFFECTS OF INDOOR AIR POLLUTION IN KANO METROPOLIS

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ABSTRACT
This paper assessed the perception of women on the causes and effects of indoor air pollution in Kano metropolis, Nigeria. Two local government areas within the metropolis were used for the study. Questionnaires were used to generate responses which were then analyzed. The result of the research showed that 82% of respondents have basic education that will furnish them with basic knowledge on issues about environmental pollution. Inadequate ventilation and overcrowdings are the most predisposing factors to increasing air pollution in the home. Smoke generated from burning fuel, dust and pesticides (52%, 18% and 13% respectively) top the list of indoor air pollutants. Many women even though aware of the occurrence of indoor air pollutants, the health effects of indoor air pollution are poorly understood. It is therefore recommended that women should be continuously enlighten and educated on the causes and effects of indoor air pollution so that they realize the dangers and health hazards of living in polluted environment and take charge of their own health and that of the family.

Keywords: *Indoor Air Pollution, Perception, Health, Women.*

INTRODUCTION

It is widely accepted that the indoor environment is important for public health. Indoor air pollution (IAP) is a greater public health hazard in developing countries than malaria or lack of access to clean water and sanitation, resulting in a fatality every 20 seconds (Smith *et al*., 2005). According to WHO (2010) indoor air pollution is not only limited to rural households but also prominent in the urban households as well in developing countries. Many millions of people, predominantly women and children in the poorest developing countries, are obliged to breathe air that is heavily polluted with biomass emission products. Exposure to indoor pollution may be responsible for nearly 2 million deaths in developing countries and 4% of the global burden of disease exceeding the burden from outdoor air pollution fivefold (Bruce *et al*., 2000).

In developing countries, indoor smoke is responsible for an estimated 3.7% of the overall disease burden (WHO FACT SHEET, 2018). IAP may also have long lasting effects on general health and well-being. Thus early exposure to IAP during childhood may result in health challenges which may continue later in life (Almond 2006).

Indoor air pollutants are mainly released during combustion of solid fuel used for cooking and heating. According to WHO (2010) about 90% of rural households in developing countries still rely on unprocessed biomass fuels in the form of wood, dung and crop residues. These are typically burnt indoors in open fires or poorly functioning stoves. Tobacco smoke can also be a major source of indoor exposure to carbon monoxide, benzene and Formaldehyde (WHO, 2010).

Exposure to smoke from the burning of wood is a significant cause of health problems such as acute respiratory infections (ARI) in children, chronic obstructive lung diseases (such as chronic bronchitis and asthma), lung cancer and pregnancy-related outcomes (Bruce *et al.*, 2000; WHO FACT SHEET, 2018). Enongi *et al.*, (2013) reported a pattern of high mortality rate among the under five children during cold season. The possible explanation given for that was the increase in IAP as a result of people trying to keep warm using solid fuels indoor.

Various studies have shown a high level of exposure to indoor air pollution in Nigeria (Ezezue and Diogu, 2017; Oguntoke *et al.*, 2010). The study conducted by Ezezue and Diogu (2017) found gases, steam, particles of dust and fibers, most of which are from indoor combustions as major indoor pollutants in homes. Isara and Aigbokhaode (2014) also found that the use of unclean cooking fuel such as kerosene, firewood and vegetables contributed to a high level of indoor pollution. Omole *et al.*

(2016) on the hand found alternative lighting sources as a major source of IAP.

Women and children are especially more at risk of exposure to indoor air pollutants (WHO, 2010). Understanding women perception to IAP is critical in informing the design of appropriate intervention since perception is an important component of behavioral change and it plays a major role in public response to environmental exposures (Enongi *et al.,* 2013). Information on the perception of women who are the most at risk of indoor air pollution is scanty. This paper is therefore aimed at assessing the perception and awareness level of indoor air pollution among women in Kano metropolis in order to provide baseline information that can help in developing control strategies to minimize the effect of IAP.

MATERIAL AND METHODS

Description of Study Area

Kano is a city in Nigeria and the capital of Kano State in North West Nigeria, It is the second largest city in Nigeria (NPC, 2006). Two local government areas from Kano metropolis namely, Fagge and Nassarawa formed the population of the study as shown in figure 1.

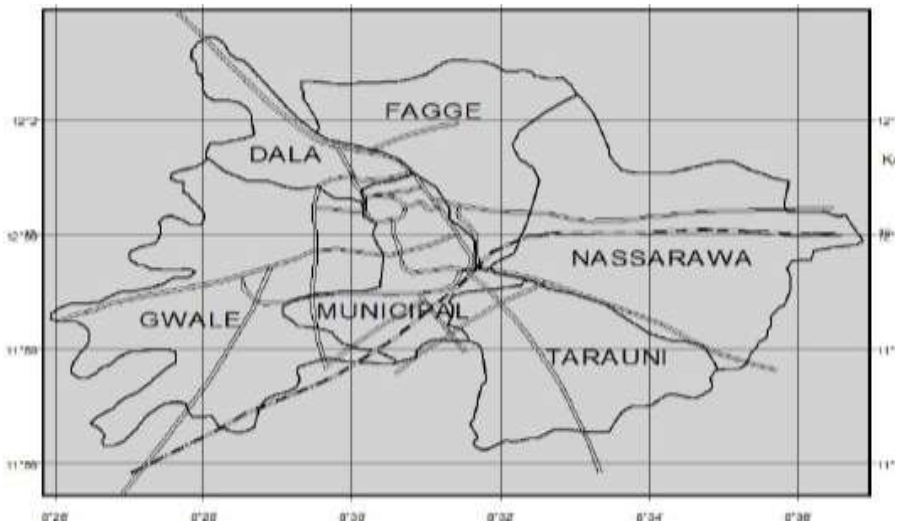

Fig. 1: Map showing the sampling locations in Kano Metropolis, Nigeria

Sampling and Sampling Procedure

One hundred structured questionnaires were administered to fifty (50) women each selected using stratified sampling method from Nassarawa and Fagge local government areas within Kano metropolis. The questionnaires were administered by trained interviewers. The study was cross sectional and descriptive in nature and was carried out between May and June, 2014. Some of the issues the questionnaire seek to know included awareness of associated pollutants, and health effect of such pollutants and factors that contributes to IAP. Data obtained from the survey were analyzed using simple percentage. One hundred (100) questionnaires were administered by trained interviewers to women in two local government areas within Kano metropolis and all were retrieved giving a response rate of 100%. The tables and figures below show the result of the survey.

RESULTS AND DISCUSSION

Socio-economic characteristics of the respondents

Data on socio-economic characteristics of the respondents are presented in Table 1. The table revealed that the age bracket of 31 – 40 had the highest frequency of respondents while a good percentage of respondents had at least secondary school education. Dasgupta *et al*., (2004) indicated that the poorest, least educated households have twice the pollution level as compared with high-income households with highly educated adults. The result showed that 82% of respondents have basic education that will furnish them with basic knowledge on issues about environmental pollution.

Table 1: Demographic characteristics of respondents

Age (years)	Frequency	Percentage
20 - 30	44	44
31 - 40	39	39
41 - 50	14	14
51 Above	3	3
	100	100
Educational background		
No formal education	7	7
Primary school	11	11
Secondary school	38	38
Tertiary education	44	44
	100	100

Distribution of respondents by perceived sources of IAP

Smoke, dust and pesticides (52%, 18% and 13% respectively) formed the major sources of pollution. The choice of smoke could be as a result of the fact that women are mostly responsible for the preparation of food in the home and as such exposed to high level of smoke during the period of cooking. This agrees with the report by Durdana *et al*. (2012) that women are primary cooks and caregivers for children in nearly all cultures, are prone to receive the greatest exposure to the smoke from solid fuel combustion.

Table 2: Distribution of respondents by perceived sources of IAP

Sources of indoor air pollution	Frequency	Percentage
Smoke	52	52
Pesticides	13	13
Cigarette smoke	1	1
Dust	18	18
Heat	9	9
Smelly sewage Chemicals from household materials	3	3
	4	4
Total	**100**	**100**

Perceived health problems associated with IAP

Table 3 showed the perceived health effect of IAP. Difficulty in breathing and coughing were the most common perceived health effect of IAP reported in this study. This is similar to the reports in previous studies by Afolabi *et al. (*2016) and Omole *et al.* (2016). According to WHO (2010), the occurrence of respiratory and pulmonary diseases is the most common outcome of the indoor air pollutants. The failure of the women to associate indoor air pollution to more serious health hazards such as cancer shows the poor perception of the women in relation to health effect of IAP. This explains the reason why little or no attention is paid to alarming issue of indoor air pollution.

Table 3: Distribution of respondents by perceived health problems associated with IAP

Effect of indoor air pollution	Frequency	Percentage
Cough	28	28
Cold	8	8
Difficulty in breathing	36	36
Stuffiness	9	9
Cancer		
Eye problem	0	0
Heart problem	9	9
Asthma	1	1
Headache	5	5
Others	4	4
	0	0
Total	**100**	**100**

Perceived level of health hazard caused by IAP

The perceived health risks to the respondent and their family for the six hazards considered in this survey are shown in table 4, with the hazards ranked according to the percentage of respondents rating it as a 'very high', 'high' or 'no risk'. Chemicals from household products such as textiles, paints, furniture etc. and cigarette smoke were perceived to have no health risk by 72% and 49% of respondents respectively. Smoke was perceived by the largest percentage of respondents to have the most health risk. Table 4 therefore revealed that there is poor perception of the level of health risk posed by different pollutants and as such women may not be able to appreciate the importance of limiting such risks. This agrees with Donna and Harding (2005) who perceived that it is more likely that majority of the women are unaware of these threats in their homes.

Table 4: Distribution of respondents by perceived level of health hazard caused by Indoor Air Pollutants

Pollutant	None (%)	Low (%)	High (%)
Smoke	30	27	43
Pesticides	27	51	22
Cigarette smoke	49	33	18
Dust	23	56	21
Smelly sewage	33	38	29
Chemicals from household materials	72	21	7
Total	**234**	**226**	**140**

Sources of information on IAP

As shown in Figure 2, majority (76%) of the respondents are aware of indoor air pollution and its effect on health while 24% claimed not to have knowledge of it. This finding was consistent with findings from Ilorin in which most of the respondents interviewed were aware of indoor air pollution and its health implication (Desalu *et al*., 2010) but inconsistent with the study by Isara and Aigbokhaode (2014) who found out that women lacked knowledge of the health effects of using unclean cooking fuel.

The major source of information on IAP was friends and neighbours (45%). Bush *et al*. (2001) observed that local knowledge obtained through social interactions play important role in the shaping of perception. This finding did not however agree with the findings of Omole *et al.* (2016) who found that the major source of information on IAP was radio.

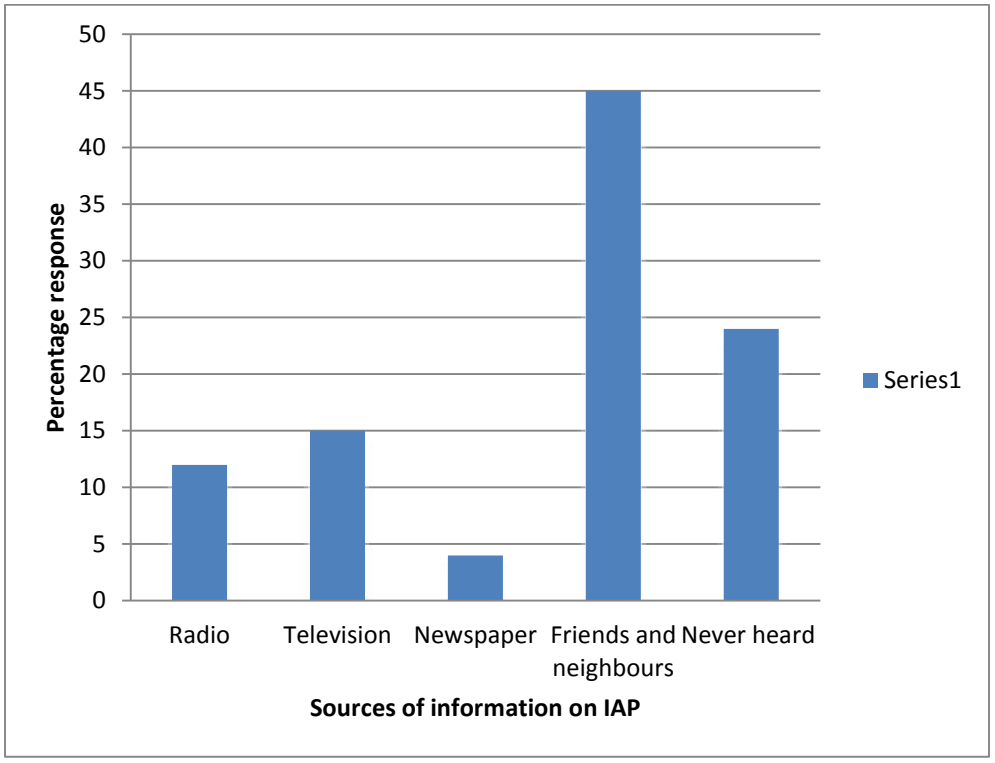

Fig. 2: Distribution of respondents by source of information on IAP

Factors that contribute to IAP

The factors that contribute to IAP were assessed in Figure 3. It was observed that 30% perceived that poor ventilation contributes to IAP. Overcrowding and type of stove used at home for cooking ranked next to poor ventilation (22% and 21% respectively) while only 13% perceived that season could be a contributory factor. This could be due to the fact that housing condition in the town is poor, occupancy ratio within individual household is high with an average of about 4-6 persons per room. Enongi *et al.*, (2013) agreed that due to poor ventilation, outdoor air pollutants infiltrate into households thereby raising the levels of IAP in deprived urban areas. Poor ventilation could also lead to the buildup of pollutants such as smoke within the enclosed place (WHO Fact sheet, 2018).

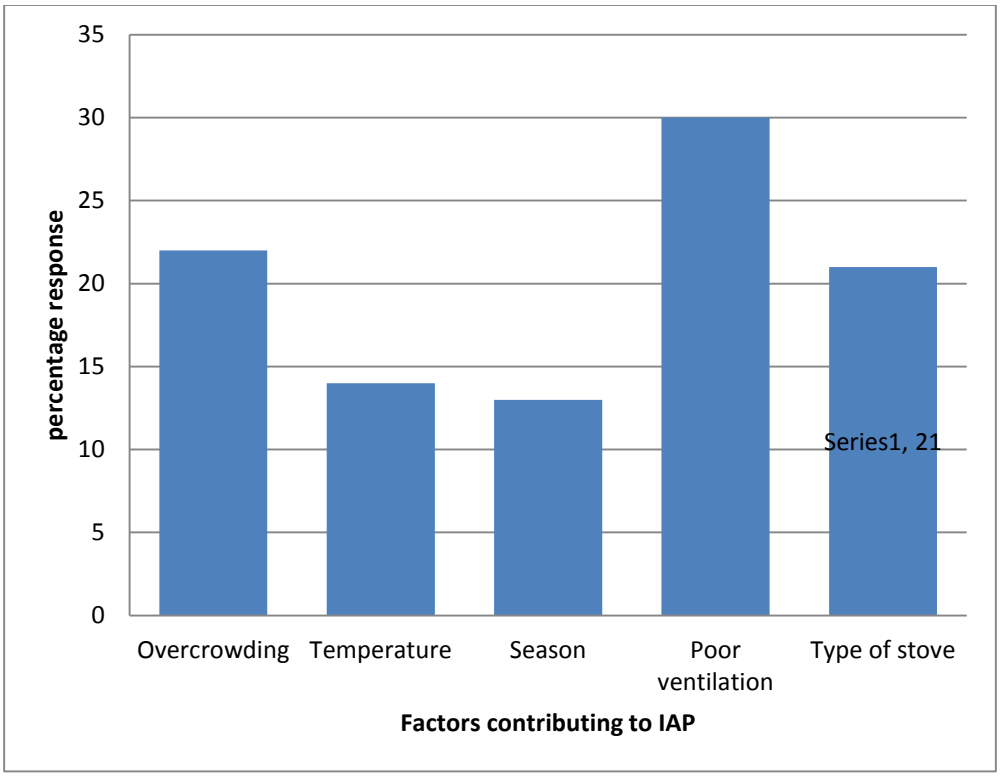

Fig. 3: Perceived factors that contribute to IAP.

CONCLUSION

The results showed that majority of respondents have basic education that will furnish them with basic knowledge on issues about environmental pollution. Thus respondents have good knowledge of causes of IAP and viewed smoke, dust and pesticides as the major sources of indoor pollution. Difficulty in breathing and coughing were the most common perceived health effect of IAP reported in this study. More serious health implications of IAP such as cancer were viewed as of less concern by the respondents. Chemicals from household products such as textiles, paints, furniture etc. and cigarette smoke were perceived to pose no health risk by majority of respondents. This indicate that there is poor perception of the level of health risk posed by different pollutants and as such women may not be able to appreciate the importance of limiting risks associated with the pollutants. There is therefore need to continuously enlighten and educate the women and the general public about the causes and effects of air pollution so that they realize the dangers and health hazards of living in polluted environment and take charge of their own health and that of the family.

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