

# Awareness of health effects of exposure to secondhand smoke from cigarettes: A cross-sectional study of never-smoked adult primary care patients in Eastern Nigeria

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## ABSTRACT

**Background:** Cigarette smoking whether actively or passively is a growing public health problem. Despite the wealth of information on the hazards of active cigarette smoking, awareness of the health effects of passive smoking on human population is often neglected in Nigeria. **Aim:** The study was aimed at describing the awareness of health effects of exposure to secondhand smoke from cigarettes among never-smoked adult primary care patients in Eastern Nigeria. **Materials and Methods:** A hospital-based study carried out on a cross-section of 500 adult patients in a primary care clinic in Nigeria. Data were collected using pretested, structured, and interviewer-administered questionnaire. Exposure to secondhand smoke was defined as exposure to cigarette smoke in a never-smoked adult patient in the previous 1 year. Data were analyzed using Statistical Package for Social Sciences version 21 for the calculation of percentages for categorical variables. Bivariate analysis involving Chi-square test was used to test for significance of association between categorical variables at  $P < 0.05$ . **Results:** The age of the respondents ranged from 18 to 74 years, with a mean age of  $36 \pm 12.4$  years. There were 180 (36.0%) males with 320 (64%) females, with a sex ratio of 1.8. Awareness of general health effects of secondhand smoke on adults, children, and pregnant women was 95.6%, 92.8%, and 65.2%, respectively. The most common specific health effects the respondents were aware for adults, children, and obstetric population were lung cancer (95.6%), precipitation of asthmatic condition (92.8%), and delivery of small babies (65.2%), respectively. The predominant source of awareness of information was radio (93.6%). Awareness of general health effects of exposure to secondhand smoke on adults ( $P = 0.041$ ), children ( $P = 0.031$ ), and obstetrics population ( $P = 0.02$ ) was significantly associated with exposure status. **Conclusion:** The most common health effects of secondhand smoke the respondents had highest awareness were lung cancer, precipitation of asthmatic attacks, and delivery of small babies in adults, children, and obstetric population, respectively. Awareness of general health effects on adults, children, and obstetrics population was significantly associated with exposure status. The current level of awareness should be improved while effort should be intensified to address identified areas of low level of awareness.

**Key words:** Adult Nigerians, awareness, cigarettes, never-smoked, primary care, secondhand smoke

## INTRODUCTION

Active and passive smoking of cigarettes constitutes a significant cause of morbidity among global population

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and is one of the modifiable risk factors of preventable mortality.<sup>[1-3]</sup> Over the last decade, research studies on secondhand smoke and their health effects have been reported with high degree of convergence of research findings with stronger conclusion motivating the need to develop personal, family, and environmental protective policies.<sup>[4-6]</sup> However, research studies have established the fact that inhalation of secondhand smoke is not only hazardous but also harmful to the health,<sup>[1,2,6-8]</sup> with reported morbidity measured by disability-adjusted life years varying from one part of the world to the other.<sup>[1,6]</sup> The exposure to secondhand smoke has reportedly caused an estimated 5% of global burden of disease slightly higher than 4% from active tobacco smoking.<sup>[7]</sup>

The health effects of secondhand smoke have been reported among global population in Nigeria<sup>[9,10]</sup> and other parts of the world such as the United States of America,<sup>[11,12]</sup> India,<sup>[13]</sup> Italy,<sup>[14]</sup> and Canada.<sup>[15]</sup> In adult population, secondhand smoke is associated with increased risk of tobacco-related disorders such as lung cancer<sup>[12,14-16]</sup> and stroke,<sup>[17,18]</sup> increases the risk of tuberculosis infection and progression to tuberculosis disease,<sup>[19,20]</sup> and can trigger an asthmatic condition.<sup>[15,16]</sup> Among the obstetric population, exposure of pregnant women to secondhand smoke has been reported to be associated with low birth weight<sup>[13,21,22]</sup> and preterm delivery.<sup>[23]</sup> Globally, exposure to secondhand smoke constitutes a major hazard to health of millions of children.<sup>[1,4]</sup> Children are therefore vulnerable population and have little choices about exposure to secondhand smoke which has been reported to precipitate asthmatic attack,<sup>[11,14,23,24]</sup> respiratory infections,<sup>[13,25,26]</sup> ear infections,<sup>[27]</sup> and sudden infant death syndrome.<sup>[28]</sup>

The clinical and public health consequences of secondhand smoke are enormous warranting the need for patient, family, and population health education on the dangers of passive smoking.<sup>[1,2,29,30]</sup> Despite the growing problem of cigarette smoking, awareness of the primary care patients on the health effects of secondhand smoke has not been reported among primary care patients in Nigeria. These patients are likely to be affected by health effects of exposure to secondhand smoke, resulting in frequency of visits to general outpatient clinic and referral to other specialty clinics. It is against this background that the researchers described the awareness of health effects of exposure to secondhand smoke from cigarettes among ambulatory never-smoked adult Nigerians in a primary care clinic of a tertiary hospital in Nigeria.

## MATERIALS AND METHODS

This was a cross-sectional descriptive study carried out on 500 adult patients from August 2016 to September 2016 at the Department of Family Medicine of a tertiary hospital located in Umuahia, Southeast Nigeria.

Umuahia is the capital of Abia State, Southeast Nigeria. Abia State is endowed with abundant mineral and agricultural resources with supply of professional, skilled, semi-skilled, and unskilled personnel. Economic and social activities are low as compared to industrial and commercial cities such as Onitsha, Port Harcourt, and Lagos in Nigeria. Until recently, the Capital City and its environs have witnessed an upsurge in the number of banks, hotels, schools, markets, industries, junk food restaurants in addition to the changing dietary and social lifestyles. The Department of Family Medicine serves as a primary care clinic within the tertiary hospital setting of the medical center. All adult patients excluding those who need emergency health-care services, pediatric patients, and antenatal women are first seen at the Department of Family Medicine where diagnoses are made. Patients who need primary care are managed and followed up in the clinic while those who need other specialists care are referred to the respective core specialist clinics for further management.

The inclusion criteria were patients aged 18 years and above and patients who had never-smoked cigarette in their lifetime. The exclusion criteria were critically ill patients, ex-smokers, and current smokers.

Sample size was estimated using the formula<sup>[31]</sup> for calculating minimum sample size for descriptive studies when the population is equal or more than 10,000;  $N = Z^2pq/d^2$  where  $N$  = minimum sample size,  $Z$  = standard normal deviation usually set at 1.96 which corresponds to 95% confidence interval, and  $P$  = proportion of the population estimated to have a particular characteristic. Due to the absence of similar study on awareness of exposure to secondhand smoke among primary care patients in Nigeria, the authors assumed that 50% of the adult patients would be aware of the health effects of secondhand smoke from cigarettes at 95% confidence level and 5% margin of error.<sup>[31]</sup> This assumption was likely to maximize the estimated variance and provided a sample size that was precisely representative for the study population. This gave a sample size estimate of 384; thus,  $q = 1.0 - P = 1.0 - 0.5 = 0.5$ ,  $d$  = degree of accuracy set at 0.05. Hence,  $n = (1.96)^2 \times 0.5 \times 0.5 / (0.05)^2$ . Therefore,  $n = 384$ . A sample size of 500 patients was used for the study to improve the precision of the study.

The sampling method involved consecutive selection of every adult patient who registered to see the clinicians on each consulting day during the study period and who met the inclusion criteria until the sample size of 500 was achieved.

The study tool was designed by the researchers from Global Adult Tobacco Survey Global Tobacco Surveillance System,<sup>[32,33]</sup> National Human Activity Pattern Survey,<sup>[34]</sup> and robust review of literature on previous studies on awareness of health effects of exposure to secondhand smoke and active smoking.<sup>[10,21-29,34-37]</sup>

The questionnaire had sections on sociodemographic variables and awareness of general and specific health effects of exposure to secondhand smoke from cigarettes on adults, children, and obstetrics population. It consisted of dichotomous questions which were structured in such a way that could elicit immediate answers from the respondents in a yes or no format. The 17-item questions on awareness of health effects of exposure to secondhand smoke were interviewer administered due to limited health literacy of the study participants on medical lexicography to avoid incomplete information on the study tool. Three questions were asked on general health effects. Six questions were asked on specific health effects of exposure to secondhand smoke on adults (lung cancer, bronchitis, heart attack, stroke, hypertension, and diabetes mellitus); four questions were asked on specific health effects of exposure to secondhand smoke on children (precipitation of asthmatic condition, precipitation of respiratory infections, precipitation of ear infections, and sudden infant death syndrome); and four questions were asked on specific health effects of exposure to secondhand smoke on obstetrics population (early delivery of baby before date, birth defects, delivery of small babies, and miscarriage). Awareness of health effects of exposure to secondhand smoke referred to positive response to questions on health effects of secondhand smoke.

The questionnaire tool was also pretested for reliability and operational feasibility using ten ever-smoked patients. The pretesting was done to find out how the questions would interact with the respondents and ensure that there were no ambiguities. However, no change was necessary after the pretesting as the questions were interpreted with the same meaning as intended.

Operationally, secondhand smoke referred to involuntary inhalation of smoke from burning cigarettes generated by another person. Exposure to secondhand smoke was defined as exposure to cigarette smoke in a never-smoked adult patient in the previous 1 year.

Ethical certification was obtained from the Health Research and Ethics Committee of the hospital. Informed consent was also obtained from the respondents included in the study.

The data generated were analyzed using software International Business Machines Corporation, Statistical Package for Social Sciences (IBM SPSS) version 21, New York, USA. Categorical variables were described by frequencies and percentages. Bivariate analysis involving Chi-square test was used to test for significance of association between categorical variables. The level of significance was set at  $P < 0.05$ .

## RESULTS

The age of the respondents ranged from 18 to 74 years, with a mean age of  $36 \pm 12.4$  years. There were 180 (36.0%) males and 320 (64%) females, with a male to female ratio of 1:1.8. Other demographic variables are shown in Table 1.

Of the 500 respondents who participated in the study, 478 (95.6%) were aware of the general health effects of exposure to secondhand smoke from cigarettes on adults, 464 (92.8%) were aware of the general health effects of exposure to secondhand smoke from cigarettes on children, while 326 (65.2%) were aware of the general health effects of exposure to secondhand smoke from cigarettes on obstetric population.

On distribution of the study participants based on the awareness of specific health effects of exposure to secondhand smoke on adults, children, and obstetric population, the most common health effects the respondents were aware

**Table 1: Demographic variables of the study respondents (n=500)**

Variable	n (%)
Age group (years)	
18-39	95 (19.0)
40-59	260 (52.0)
≥60	145 (29.0)
Sex	
Male	180 (36.0)
Female	320 (64.0)
Marital status	
Single/separated/divorced/widowed	220 (44.0)
Married	280 (56.0)
Occupation	
Have work or job	358 (71.6)
Have no work or job	142 (28.4)
Educational status	
Primary and less	63 (12.6)
Secondary and more	437 (87.4)
Type of family	
Monogamous	460 (92.0)
Polygamous	40 (8.0)

for adults, children, and obstetric population were lung cancer (95.6%), precipitation of asthmatic condition (92.8%), and delivery of small babies (65.2%), respectively [Table 2].

On the distribution of the respondents based on the source of awareness information on the general health effects of exposure to secondhand smoke from cigarettes, the most common source of information was radio adverts (93.6%). Others included health workers (72.4%) and friends (55.6%) among others [Table 3].

On bivariate analysis of the awareness of general health effects of exposure to secondhand smoke on adults and the exposure status, the statistical association was statistically significant ( $\chi^2 = 8.63$ ;  $P = 0.041$ ). Similarly, on the awareness of general health effects of exposure to secondhand smoke on children and the exposure status, the association was statistically significant ( $\chi^2 = 14.05$ ;  $P = 0.31$ ) while the association between awareness of general health effects of exposure to secondhand smoke on obstetric population and the exposure status was statistically significant ( $\chi^2 = 8.73$ ;  $P = 0.020$ ) [Table 4].

## DISCUSSION

The awareness of general health effects of secondhand smoke was highest for the health effects on adult population when compared with children and pregnant mothers. This finding could be a reflection of research priorities and antismoking messages in Nigeria which are skewed toward the awareness of health effects of active cigarette smoking with emphasis on adult health.<sup>[38-40]</sup> Although there is absence of research reports on the awareness of health effects of exposure to secondhand smoke on children and obstetric population in Nigeria, there is a plethora of research on the awareness of health effects of exposure to secondhand smoke on children<sup>[1,24-28,37]</sup> and obstetric population<sup>[1,21-23,37,40]</sup> in advanced nations with variable results reported. The findings of this study therefore present an opportunity to initiate neighbor-to-neighbor and mass media campaign on health effects of secondhand smoke on adults, children, and pregnant mothers. This will help increase the public knowledge on secondhand smoke-related illnesses and diseases. Health warnings on cigarette pack can also help reinforce the message about harm from secondhand smoke. Relevant stakeholders should intensify health education campaign which should remind smokers of their responsibility to protect never-smoked adults, children, and obstetric population from exposure to secondhand smoke.

The most common specific health effect the respondents identified for adult population was lung cancer with

**Table 2: Distribution of the respondents based on awareness of specific health effects of secondhand smoke on adult, children, and obstetrics population, respectively**

Variables (health effects)	Awareness status	
	Aware, n (%)	Not aware, n (%)
Adult population		
Lung cancer	478 (95.6)	22 (4.4)
Bronchitis	473 (94.6)	27 (5.4)
Heart attack	220 (44.0)	280 (56.0)
Stroke	210 (42.0)	290 (58.0)
Hypertension	186 (37.2)	314 (62.8)
Diabetes mellitus	95 (19.0)	405 (81.0)
Children		
Precipitation of asthmatic condition	464 (92.8)	36 (7.2)
Sudden infant death syndrome	372 (74.4)	128 (25.6)
Precipitation of respiratory infections	356 (71.2)	144 (28.8)
Precipitation of ear infections	113 (22.6)	387 (77.4)
Obstetrics population		
Delivery of small babies	326 (65.2)	174 (34.8)
Birth defects	202 (40.4)	298 (59.6)
Miscarriage	198 (39.6)	302 (60.4)
Early delivery of baby before date	183 (36.6)	317 (63.4)

**Table 3: Distribution of the respondents based on the source of awareness of information on the general health effects of secondhand smoke**

Variable	n (%)
Source of information	
Radio	468 (93.6)
Health workers	362 (72.4)
Friends	278 (55.6)
Television	230 (46.0)
Family members and relatives	186 (37.2)
Print media	172 (34.4)
Internet	84 (16.8)

\*Multiple responses were recorded for some respondents

**Table 4: Association between awareness of general health effects of exposure to secondhand smoke on adults, health effects on children, and health effects on obstetrics population and exposure status, respectively**

Variable	Exposure status		$\chi^2$	P
	Exposed	Not exposed		
Awareness status (adults)				
Aware	208 (92.4)	270 (98.2)	8.63	0.041
Not aware	17 (7.6)	5 (1.8)		
Awareness status (children)				
Aware	195 (86.6)	269 (97.8)	14.05	0.031
Not aware	30 (13.4)	6 (2.2)		
Awareness status (obstetrics)				
Aware	95 (42.2)	231 (84.0)	8.73	0.02
Not aware	130 (57.8)	44 (16.0)		

95.6% of them been aware. The possible explanation of the comparatively highest level of awareness of lung cancer as the most common health effects of secondhand smoke on adults could be due to public information on dangers of active cigarette smoking on respiratory health

in Nigeria.<sup>[38,39]</sup> Globally, the increase in the prevalence of lung cancer and other tobacco-related diseases has been associated with exposure to secondhand smoke.<sup>[1,14-16,37,41]</sup> Research studies have also shown that the risk of lung cancer in nonsmokers exposed to secondhand smoke is increased by 20%–30%.<sup>[24,41]</sup> Of great concern in the study area was that cigarette smokers have poor knowledge of the magnitude of harm and hazards of sidestream and mainstream smokes from burning cigarettes while innocent nonsmokers are not knowledgeable of the possible adverse long-term consequences of exposure to carcinogenic chemicals from secondhand smoke. The longer one inhales secondhand smoke from burning cigarettes, the greater the risk of developing lung cancer.

The most common specific health effect of exposure to secondhand smoke the respondents were aware was precipitation of asthmatic condition with 92.8% of them been aware. The relatively higher awareness of the health effects of secondhand smoke on pediatric population among the study population is a mirror of the societal disgust and attitude to smoking in the presence of children, which exposed them to passive inhalation of toxic chemicals from secondhand smoke. Research studies have shown that young children are most affected by secondhand smoke from adult parents and significant others who smoke in the presence of children with the most common respiratory health effects being precipitation of asthmatic condition.<sup>[1,24,36,37]</sup> According to these reports, children are particularly at higher risk of the health effects of secondhand smoke because their bodies are still growing and they breathe more rapidly with a higher relative ventilation rate, inhaling more pollutants from secondhand smoke per body weight than adults. In addition, unlike adult who can choose to avoid smoking environment, children have little choice over secondhand smoke and are least able to avoid it. Furthermore, children whose parents smoke are more likely to cough, have shortness of the breath, and can trigger asthmatic attack resulting in frequent hospital consultations and hospitalizations.<sup>[37,42,43]</sup> The implication is that smokers can help protect children from secondhand smoke and should not wait for enabling laws and policies. This will enable the smokers to recognize that secondhand smoke is dangerous to health of children and will spur them not to smoke in the presence of children.

The most common specific health effect the respondents identified for obstetric population was delivery of small babies with 65.2% of them been aware. The comparatively low awareness of obstetrics effects of toxic chemicals from secondhand smoke on pregnant women is similar to reports from Riyadh, Saudi Arabia,<sup>[35]</sup> and Peoples Republic of China.<sup>[44]</sup> Research studies have demonstrated the health

risk associated with exposure to secondhand smoke in pregnant women with babies born to mothers exposed to secondhand smoke being at higher risk of low birth weight among other abnormalities.<sup>[1,21,22,35,37,44]</sup> Although there is poverty of research reports on health effects of exposure to secondhand smoke on pregnant women in Nigeria, available evidence from advanced nations has associated exposure to secondhand smoke with poor obstetrics outcomes such as low birth weight among others.<sup>[1,21,22,35,37,44]</sup> Pathophysiobiologically, the tobacco-related obstetric complications from secondhand smoke are due to fetal oxygen deprivation and placental anomalies induced by carbon monoxide, nicotine, and other toxic chemicals in secondhand smoke.<sup>[37,45,46]</sup>

The major source of awareness of information on the health effects of secondhand smoking was radio media advert. This similar to reports from a community-based study in Umuahia, Southeast Nigeria, Enugu,<sup>[47]</sup> Enugu, Southeast Nigeria,<sup>[48]</sup> and Ilorin, Western Nigeria.<sup>[48]</sup> The finding of radio advert as the most common source of information on dangers of secondhand smoking among the study respondents could be attributed to media message on firsthand smoking with primary objective of sponsors of radio jingles on warning on cigarette smoking which was previously that “smoking is dangerous to health” then currently that “smokers are liable to die young” in accordance with the mandate of the Federal Ministry of Health of Nigeria which is in agreement with the global tobacco control framework. However, studies in Nigeria have shown that such oral messages do not convey the magnitude of health effects of firsthand smoking<sup>[38-40]</sup> or exposure to secondhand smoke.<sup>[39,47,48]</sup> There is advocacy on the use of pictures to convey various organ and corporal system damage that are caused by smoking with favorable reports discouraging would-be smokers as well as persuading smokers to quit. There is a need to explore the effects of pictorial messages on pathologic insults of active and passive smoking among Nigerians. Multi-level tobacco-control strategies should therefore include exposures to secondhand smoke to protect innocent never-smoked individuals while warning on cigarette packets should also include information on deleterious effects of secondhand smoke on the health of adult, children, and pregnant women.

### Limitations of the study

The limitations of this study are recognized by the researchers. First and foremost, the study was hospital-based design. Hence, the results of this study may not be general conclusions regarding respondents in the community. Second, the sampled population was drawn from hospital attendees in the primary care clinic of the hospital. Thus,

extrapolation of the results of this study to the entire patients in the hospital should be done with caution because the findings may not be a true representation, of what may be obtained in the other clinics of the hospital. Third, this study was dependent in self-reported awareness of health effects of secondhand smoke and there is likelihood of under-reporting or over-reporting. More so, the respondents were studied in a clinical setting and were likely to have more awareness of the health effects of exposure to secondhand smoke.

## CONCLUSION

The study has demonstrated variabilities in the awareness of health effects of secondhand smoke on adult, children, and obstetric population. The most common health effects of secondhand smoke the respondents had highest awareness were lung cancer, precipitation of asthmatic attacks, and delivery of small babies in adults, children, and obstetric population, respectively. The predominant source of awareness of information was radio advert. Awareness of general health effects on adults, children, and obstetrics population was significantly associated with exposure status.

## Recommendations

The current level of awareness should be improved while effort should be intensified to address identified areas of low level of awareness through patient, family, and public health information, education, and communication. Legislation on cigarette smoking should be complemented with effective law enforcement on secondhand smoke to safeguard the health of the innocent never-smoked adult Nigerians and children. Warning on cigarette packets should also include information on deleterious health effects of secondhand smoke.

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## Conflicts of interest

There are no conflicts of interest.

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