

SOCIO-CULTURAL FACTORS ASSOCIATED WITH BIOMASS FUELS IN PERI-URBAN AREAS OF ADO EKITI, NIGERIA

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Abstract: The total reliance on biomass fuels freely collected from the forests has been the major means of meeting household energy demands in developing countries. The burning of these fuels – wood, charcoal, sawdust, crop residues and animal dung often compromise air quality in homes, especially when cooking is carried out in open fires. This paper analyses the socio-cultural factors associated with indoor air pollution in peri-urban areas of Ado Ekiti, Southwest Nigeria. A survey of households in these areas expound on the traditional values the people have in keeping to and persevering norms, as against the problem of indoor air pollution linked with the burning of biomass fuels. Furthermore, as revealed, perceptions about the use of some type of trees show that adherence to ethnic norms and values has made these householders fail to see the health impact(s) from exposure to indoor air pollution in their communities. Hence, in understanding indoor air pollution in developing countries, it is important to consider the underlying socio-cultural contexts peculiar to each environment so that appropriate interventions can be provided. Not only should focus be on socio-economic factors (income, education, age, occupation etc), but also on traditional beliefs and norms which do also contribute to the use of biomass fuels for cooking and lighting in developing countries.

Keywords: biomass fuel; indoor air pollution; socio-cultural context

INTRODUCTION

In Nigeria, the rural populace use about 80 million cubic meters of wood fuel annually for household energy [1], which is often complemented with kerosene. With reference to the *Ebira* ethnic minority group, residing at the peri-urban areas of Ado Ekiti, Nigeria, who contributes towards the economic growth of the area, mainly uses biomass fuel to cook. The peri-urban zone is an interface of rural and urban areas characterised by mixed land uses [2], though close to the urban areas, the communities yet lack basic facilities – safe drinking water, electricity, hospitals and roads. These group of people benefit from better market information and lower transaction costs [3], however, inequalities in living condition(s) characterise their environment as compared to the urban areas. Their houses are constructed mainly with mud blocks and wood which do not meet minimum housing requirements that are durable, safe, dry and well ventilated [4]. Also, being an ethnic minority, they are more likely to be poorer than their counterparts in the cities [5]. Besides, their living environment could make them vulnerable to environmental health risks [6], especially when biomass fuels are sought to meet energy needs, thus, creating indoor air pollution problem. At the same time, when cooking places are indoors without proper ventilation, the air quality indoor is lower than that outdoor.

The rural areas in least economically developed countries (LEDCs) are faced with problems of indoor

air pollution [7]. About 80% of the rural populace in Sub-Saharan Africa rely on biomass fuels (wood, charcoal, animal dung, agricultural residues, sawdust) and coal for household energy [8], [9]. A large amount of these fuels are burnt on open fires in poorly ventilated areas, thus exposing the householders to health hazards. Regular exposure to indoor air pollution from the incomplete combustion of biomass fuels and kerosene results in major health concerns, leading to an estimated 36% mortality from respiratory diseases in developing countries [10], [11].

Of the pollutants, particulate matter and carbon monoxide increases susceptibility to adverse health risk amongst the rural people, especially to women and children [12], [13].

Therefore, understanding the factors that expose the rural poor in developing countries to indoor air pollution would allow for more appropriate interventions to be provided. The complex interactions between technology, economy, behaviour and infrastructure have often been neglected in the past [14]. Recent interventions regarding indoor air pollution have shifted from ideal operating conditions, to monitoring stove performance under actual situation of usage, bearing in mind social, behavioural and physical factors that would limit optimal performance of the stoves [14]. Though, access to fuel is often informed by the type of household energy to be used for cooking and lighting, however, the social settings of communities further constrain householders in their choices of fuel for domestic use [15]. As Bruce et al [16] explain there are complex linkages between energy choices

and behaviour, and, the households' economy and available infrastructure. Thus, characterising these determinants can be important in designing and delivering solutions to indoor air pollution.

Factors such as high cost and accessibility to other cleaner cooking fuels (LPG, electricity etc) influencing the use of biomass fuel should also not be overlooked. Consequently, Dasgupta et al. [8] observe that, the non-adoption of clean fuel among the rural populace could have resulted from its capital and maintenance costs, inconveniences and incompatibility with traditions of cooking methods. Besides all these, this paper particularly identifies the socio-cultural context associated with the use of biomass fuels in peri-urban areas of Ado Ekiti occupied by Ebira ethnic minority.

MATERIALS AND METHODS

The study was carried out in 18 peri-urban settlements where *Ebira* groups resides in Ado Ekiti, Southwest, Nigeria with geographical coordinates 7° 40' North and 5° 16' East, having varying distances of between 5 – 20 km to the city centre. Here most buildings in the communities are built with mud blocks, with the corridor in some instances serving both as the cooking and eating areas. The floors are of hardened mud with the rooms having one small window. Overall, the buildings are poorly ventilated and when cooking is taking place it is discomforting to the eyes, and breathing is difficult. The cooking is done by the women, while the children assist in tendering the firewood until the food preparation is over as shown in Figure 1.



Figure 1: A woman cooking along the corridor with children in attendance



Figure 2: Interview with householders in peri-urban areas of Ado Ekiti

The study population was selected based on convenience sampling technique. Householders were interviewed between February and June 2011. By using semi-structured interviews, which was conducted with about 30 householders to unravel the socio-cultural factors associated with the use of biomass fuels in these communities as shown in Figure 2. Both men and women were interviewed all of which were from *Ebira* ethnic group. The semi-structured interviews further uncover the in-depth underlying norms and values perceived in the gathering and use of wood fuel. Notes were made during conversations and later transcribed into themes.

RESULTS AND DISCUSSION

The choice of household energy type (wood fuel) is often constrained by social conditions prevailing in the environment of the rural people [17]. Torres-Duque et al. [18] attribute this to household low income which is prevalent in rural areas of developing countries. Where wood fuels are freely and readily available without restrictions to access and gather forest wood(s), it serves as a means of meeting domestic energy demand. Therefore, strategies in achieving cleaner air quality in homes should consider the cultural aspects in seeking interventions at the local environment [7].

An evaluation of the local conditions is necessary in understanding specific local culture often associated with traditions and beliefs [16] in the harvesting of forest wood fuel, predominately common in developing countries. In this study, it is found that cautions are taken by the householders not to gather trees that are forbidden as wood fuel in accordance with the *Ebira* traditional norms. Traditional values are very instructive, more so when such are passed on from generations, and it is believed that any act of disobedience attracts ancestral punishment – death [19].

As the elders amongst them have the responsibility of pass unto the on coming generations peculiar traditional belief that hold forth for their communities. This informs the belief in many rural communities of Nigeria, where some trees are believed to be emblems of clans, thus sacred with the belief of having some supernatural powers [20]. For example, the *crescentia cujete* tree (*Ochuku* in *Ebira* language) is highly esteemed and never harvested from the forest to cook. One reason for this, as believed, is that children around the vicinity where such is used for cooking would convulse. One of the interviewee's even offered to have me see it real by experimenting with one of his children. To them the mere gathering of the tree and placing them where

Ebira children are would immediately trigger them in having convulsion. Obviously, I would not want to record any fatality during the fieldwork, so I immediately objected the request. The real experiences of the negative effects of going against established norms, were further acknowledged by Douglas cited in Tansey and O'riordan [21] in that, 'the linkage between danger and blame is to uphold judgements of appropriateness and hence to reproduce a particular social order' (p.74). This makes the people in wanting to comply with laid down traditional norms for their community to avoid any form of danger. However, Rehfuess et al. [22] affirm, that exposure of under 5 children to solid fuels smoke increases their risk of having acute lower respiratory infections (ALRIs) of which cough, convulsion, chest indrawing, fast breathing, runny nose, throat pain etc are its symptoms. Also, other causes of death associated with ALRIs, is the build up of particulates either indoors or outdoors where biomass fuels are used for cooking [23].

Another highlight of their belief I was also made aware of is the effect of the tree on child bearing women. It is held that where such women use the sacred tree, the consequences will be on their children, who as believed, will often have one ailment or the other. Without any much doubt in their assumption about the health impact on their children, I however, could not scientifically proof the *myth* surrounding the prohibited tree. This type of *myth* have deep roots in their traditional beliefs, an attempt to ignore such do have negative consequences which ultimately leads to death. But often you find women and children by the fire place tending the wood during cooking, whereby they have direct exposure to wood smoke, which is constantly inhaled in the process. The constituent of biomass smoke is a complex mixture of pollutants - carbon monoxide, nitrogen dioxide, benzene, formaldehyde, poly-cyclic organic compounds and particulate matter, which are hazardous to human health [24]. Of these carbon monoxide and particulate matter poses the greatest risk to infant mortality [25]. Khalequzzaman et al. [26] findings reveal that, indoor air pollution affects under fives because their respiratory systems are not fully developed, which invariably make them physiological susceptible to inhaled wood smoke. In addition, the study conducted by Rinne et al. [24] further shows the significant trend between higher infant mortality and greater use of biomass fuels among households of Santa Ana, Ecuador. It became clear in my interview that, it is only the *Ebira* group that experiences health problems when the tree is used for cooking, because other ethnic groups (Yoruba, Hausa, Tiv) in these environments do not

experience same problems if the tree is harvested and or use.

In the light of both the negative effect attributed to the *crescentia cujete* tree, it shows of the householders that violating their traditional belief about the revered use of the tree brings about health problems. On the contrary, Bruce et al. [16] argue that the incomplete combustion of biomass fuels results in indoor air pollution, which is often the cause of some health problems amongst women and children, who spend hours by the fireplace preparing meals. Obviously, this group of people remain ignorant of the dangers of their continued exposure to smoke from wood fuels used for cooking. Their hold to taboos of harvesting and using a particular tree to cook, without acknowledging the negative health impact of wood smoke remains their greatest undoing. Meanwhile, it is worthwhile to know that the tree do have some benefits to the villagers, in dealing with their emergency health needs.

There is the practice of traditional medicine in rural areas of Nigeria, incorporating health practices, approaches, knowledge and beliefs that involve the use of plant, animal, mineral based medicines, spiritual therapy, manual techniques and exercises in diagnosing, treating and preventing illness [27]. Health practices of this nature are still being sought and relied upon in treating diseases in Nigeria's rural environment [28]. The *crescentia cujete* tree is significantly useful as an antidote against snake bite. This study compares with the findings of Ilesanmi and Olawoye [29] where mistletoe which grows on orange trees is used in treating amenorrhoea, uterine haemorrhage and fibroids. In recognition of the medicinal value of some trees, some ethnic groups culturally forbid their harvesting, thus, making it a *taboo*, as with the *crescentia cujete* tree amongst the *Ebira* group.

At the same time, the remedy the tree have in treating emergency health problems (snake bite) further shows the perceived positive impact amongst the householders, in upholding it's revered medicinal value, by not harvesting it for wood fuel. While this view might be helpful in forest conservation, the true medicinal value of the tree remains scientifically unproven.

For the reasons stated above, it is very important to understand why traditional values about wood fuels considered in this paper should often be incorporated in the interventions aimed at solving the problem of indoor air pollution in rural areas of developing countries. Hence, the problem of indoor air pollution is therefore beyond the socio-economic factors of income, education, etc, but also entails understanding what traditional norms holds for such local environments.

LIMITATIONS OF THE STUDY

The major limitation of this study was not being able to assess health records of children in these communities and to systematically review reported cases of infant mortality and respiratory problems. Consequently, I have to rely on expressed symptoms (cough, convulsion) given by the householders. Therefore, in making them aware of the prevailing dangers inherent in exposure to wood smoke, and not just in gathering some specific trees, determining their indoor air quality levels could be a precursor to addressing the problem of indoor air pollution in the area. Also, in respect of any tree types, incomplete combustion biomass fuels cause indoor air pollution.

CONCLUSION

In conclusion, the results of this study contribute to an understanding of the underlying socio-cultural factors associated with biomass fuels. While it is easy to understand the socio-economic aspect of householders, the socio-cultural context is complex and ethnic specific in rural environments of Nigeria. Also, the perception about the harvesting and use of forest wood(s), are issues that must be addressed in providing measures against indoor air pollution in developing countries. The emphasis on traditional norms and beliefs indicate that householders do not connect their health problems to their exposure to indoor air pollution. Further research should extrapolate from health records to determine actual causes of deaths.

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