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RURAL WOMEN AND THE HEALTH RISKS ASSOCIATED WITH WOOD FUEL CONSUMPTION IN RURAL NIGERIA: IMPLICATIONS FOR SUSTAINABLE DEVELOPMENT IN THE THIRD WORLD.

[1]Atoyebi T. A., [2]Owoeye M. O. and [3]Oloyede Olusayo
[1,2&3]Department of Sociological Applications, Bowen University, Iwo, Osun State, Nigeria.

ABSTRACT

In developing countries and more importantly in sub-Saharan Africa, majority of the people lack assess to sustainable and modern energy supply. Many families in rural areas and poor city inhabitants now depend on wood and charcoal for their basic energy needs. Unfortunately, women and children are the victims of the health effects of wood fuel consumption. Therefore, this research focused on the attitude of rural women towards the health risks associated with the use of wood fuel and its implications for sustainable development. The study was conducted in Iwo community in southwest Nigeria and the results presented are based on primary data collected from a random sample of 150 rural women selected from the community through the aid of structured questionnaires. The result showed that education, family size and level of monthly income indicate significant relationship with the type of domestic fuel used by respondents. The result also revealed that majority (54%) of the rural women claimed to be aware of the detrimental effects of cooking with wood fuel, although they are unaware of its far reaching effects. The study concludes that there is need to encourage and assist rural women by improving their standard of living, in order to reduce their dependency on wood energy and to achieve effective participation in rural and sustainable development activities.

Keywords: Rural women, Wood fuel consumption, Health risks, Sustainable development.

INTRODUCTION

More than any other time in history, there has emerged a realization of the need to approach the problem of energy supply in rural areas and among poor city inhabitants from a broader and more understanding perspective. Nowhere is this realization more relevant than in poor developing countries of sub-saharan Africa. In such countries, wood fuel continues to be the most popular energy source and even accout for over 80% of energy consumption (Aina and Odebiyi, 1998; Bruce, 2001). According to Mc Dade (2005) more than two billion people in the world lack access to sutainable and modern energy supply, using traditional solid fuels for cooking and heating. For many centuries, wood fuel which belong to the traditional biomass energy group has been in existence since man discovered fire. However in the past few decades, its health implications has been recieving serious attention due to alarming increase in the rate of poverty and population conjestion (UNDP, 2005; Smith, 2008). According to Smith(2002) wood fuel encompasses all form of fuels originating from wood including firewood, charcoal and twigs. These fuels are often burned indoors in simple household cook stoves, such as pit, three pieces of brick, or a U- shaped construction made of mud, which often burn these fuels insufficienty and are often not vented with hoods to take the pollutantants out. Even when the cook stoves are vented to the outside, combustion of unprocessed solid fuels produces enough pollution which significantly affect local "neighbourhood" pollution levels. As far back as 3 decades ago, Wamakko (1977) have noted that wood and charcoal are used for cooking food, melting of iron, heating of rooms and providing light for many families in most rural areas of developing countries especially in sub-saharan Africa. It is important to note that in rural areas of developing countries wood fuel cosumption affects women along with small children, as they spend many hours in collecting, preparing and using of biomass fuels for cooking (Mc Dade,2005). According to World Bank (2000) cooking consumes more fuel than any other activity in rural areas of low income countries. As a matter of fact,increasing use of wood fuel and other biomass fuels has implications for deforestation and air pollution which invariably affects women's health and their effective participation in rural development activities (Aina and Odebiyi, 1998). In fact, wood fuel, when used over a long period, has health implications as it causes irritation, choking and chronic respiratory repercussions (Yakubu and Zagga, 2006). Sanders (2005) observed that mostly chidren and women die from respiratory diseases caused by pollution from firewood and charcoal.In the light of this,there is the need to examine the attitude of rural women (who constitute majority of rural populace and primary users of wood fuel) towards the health risks assciated with wood

fuel consumption and its implications for sustainable development in the third world. Specifically, the study:

1. Identified factors that account for the consumption of wood fuel among rural women.
2. Identified the health risks associated with the consumption of wood fuel.
3. Examined their attitude towards the usage of wood fuel and its health effects
4. Identified measures they have taken to reduce health risks associated with wood fuel consumztion.

In addition, the study investigated the following null hypotheses:

HO_1:- There is no significant relationship between level of education and the type of domestic fuel used most by rural women.

HO_2:- There is no significant relationship between monthly income and the type of domestic fuel used most by rural women.

HO_3:- There is no significant relationship between family size and the type of domestic fuel used most by rural women.

METHODOLOGY

The study was carried out in Iwo community in Osun State,in South Western Nigeria.Osun State is predominantly agrarian with about 70.0 percent rural population.Iwo community is located mid way between the capital cities of Osogbo and Ibadan and it is between latitude 7^0 37^1 and longitude 4^0 9^1 E.The population is mainly Yoruba speaking with few Fulani nomads,who share the same fundamental cultural heritage with people in surrounding Yoruba towns. The main occupations of the indigenous people are farming in arable crops,trading, transportation and hunting.The population of Iwo is 191,377 people (Census News,2006). The study area was chosen due to its degree of rurality and for the fact that it possesses characteristics that are common to most Nigerian rural communities. Major crops grown in the area are : yam, coco yam and okro. Some farmers have live stock farms. The poulation for the study consists of rural women in the study area. The respondents were selected for the study using multi-stage random sampling technique. Iwo Community was divided into five clusters and a total of 150 respondents were selected,30 from each cluster. This method was adopted due to none avalaility of a comprehensive list of all the women who make use of wood fuel in the study area. Personally administered interveiw schedules were used to elict information from the respondents and the structured interview schedule reflected the study objectives. The data collected were analyzed using decriptive and inferentials methods.Frequency counts and percentages were also used to describe data while chi-square was used to determine the relationship between selected characteristics of respondents and thier attitude towards the health effects of wood fuel usage.

RESULTS AND DISCUSSION

Socio-Economic Characteristics of Rural Women

Womens socio-economic characteristics table 1 shows the distribution of the women by their personal characteristics. Results revealed that majority of the respondents were within the age bracket of age 31 and 40 years (38.7%). This implies that women of productive age are still prevalent in the rural area of iwo community. Also, 62.7% of the respondents were christians, while 31.3% of them were muslim. This may due to the fact some women who were muslim in Iwo are placed in purdah and are not allowed to work. It is also evident from the table that 41.3% of the respondents had pimary education. This implies that majority of the respondents have low level of formal education and this has implications for thier attitude towards the health risks associated with the usaged of wood fuel. Majority of the respondents (48%) are petty traders who engage in menial, low income business. This of course has implications on the choice of domestic fuel used by the respondents. Also, the table indicates that the monthly income of a sizable proportion of the respondents (46.7%) was between the range of #5000 and below. Only 7.3% of the respondents earned above # 25000 on a monthly basis. Thus, it can be inferred that majority of the respondents were low income earners. This is to be expected taking into consideration the low educational status of most of the respondents and the kinds of occupation majority of them engage in.

Table 1: Socio-economic characteristics of rural women

Variables	Categories	Frequency	Percentage
Age (year)	Less than 20	14	9.3
	21-30	32	21.3
	31-40	58	38.7
	41-50	19	12.7

	51 and above	17	11.3
	No Response	10	6.7
	Total	**150**	**100.0**
Religion	Christian	94	62.7
	Muslim	47	31.3
	Traditional	5	3.3
	No Response	4	2.7
	Total	**150**	**100.0**
Occupation	Trading	39	26.0
	Hair Dressing	8	5.3
	Farming	2	1.3
	Teaching	30	20.0
	Tailoring	15	10.0
	Laundry Woman	17	11.3
	Others	33	22.0
	No Response	6	4.0
	Total	**150**	**100.0**
Formal Education	Primary	62	41.3
	Secondary	31	20.7
	Tertiary	37	24.7
	Adult Education	7	4.7
	No Response	13	8.7
	Total	**150**	**100.0**
Income	5000 And Below	70	46.7
	5001-10000	20	13.3
	11001-15000	25	16.7
	15001-20000	6	4.0
	20001-25000	12	8.0
	Above 25000	11	7.3
	No Response	6	4.0
	Total	**150**	**100.0**

Source: Field Survey, (2009)

Table 2: Distribution of Respondents According to Factors that account for Wood Fuel consumption

Determinants of Wood Fuel Choice	Frequency	Percentage
Cost	64	42.7
Availability	34	22.7
Size of Family	13	8.7
Food Tastiness	11	7.3
Type of food being cooked	11	7.3

Choice of the Husband	17	11.3
Total	**150**	**100.0**

Source: Field Survey, (2009)

Table 2 shows that majority (42.7) of the respondents' choice of wood fuel was determined mainly by cost, while for 22.7% of the respondents their choice was based on availability.About 8.7% of the respondents, chose their wood fuel on the basis of the size of their family and 7.3% claimed that they chose based on the fact that wood fuel would make the food taste nice. Others (7.3%) gave a variety of reasons that are classified together such quantity of food being cooked, type of food being prepared etc.

Health Risks Associated with Wood Fuel Consumption.

Table 3 below shows that 29.3% the respondents claimed that using wood fuel to cook resulted in watering eyes, while 15.3% claimed that it caused peppery eyes (i.e causing stinging sensation in eyes). Dryness of skin and coughing were seen as possible effects of cooking with wood fuel by 1.3% and 2.0% of respondents respectively. This table points out that the respondents agree that wood fuel affects the normal functioning of the body especially the eyes.

Table 3: Distribution of Respondents According to the Specific Health Risks Associated With Wood Fuel Consumption.

Specific Effects	Frequency	Percentage %
Watering Eyes	44	29.3
Peppery Eyes	23	15.3
Dryness of Skin	2	1.3
Coughing	3	2.0
Others	44	29.3
No Response	34	22.7
Total	**150**	**100.0**

Source: Field Survey, (2009)

Attitude Towards the Usage of Wood Fuel and its Health Effects

Table 4 below shows that majority of the respondents were aware of the effect wood fuel consumption can have on the respiratory system because 16.3% strongly agreed, while 24.7% agreed that wood fuel usage can lead to respiratory problem. However, 33.3% of the respondents indicated their uncertainty concerning the statement. A sizeable proportion of the respondents asserted that wood fuel consumption is a contributory factor to the development of respiratory problem although most are not aware of how serious the respiratory problem could be (most complained of catarrh and shortness of breath). This result corroborated the findinds of Davidson, (1999) as he stated that organic pollutants like dust and smoke have some irritating substances that stimulate over activity of the mucus secreting glands and goblet cells in the bronchi and bronchiole of human respiratory tract. These cause excess mucosal irritation which eventually gives an avenue for infection to set in.The chronic effect of inhaled smoke or inert particles such as particulate wood dust leads to chronic obstructive airway disease (COAD). Aristanti,(1997) reported that studies have shown that women who do not smoke but who have cooked on biomass stoves for many years exhibit a higher prevalence respiratory related problems than women who have had less contact with biomass stoves.

Table 4: Respondents' attitude Towards the Usage of Wood Fuel and its Health Effects

Statements	Percentage Response				
	SA	A	U	D	SD
Usage of wood fuel causess respiratory probles e.g catarrh	16.6	24.7	33.3	11.3	14.0

Wood fuel affects the health of women generally	19.3	38.0	35.3	1.3	6.0
Wood fuel usage affects the health of pregnant women	12.7	24.7	42.7	12.0	8.0
Usage of wood fuel does not cause eye irritation	2.0	18.7	4.0	30.7	44.7
Wood fuel is not the best form of fuel for cooking	43.3	24.7	12.7	9.3	10.0
Wood fuel does not affect skin negatively	1.3	4.0	60.7	17.3	16.7

Source: Field Survey,2009

The above table also indicates that majority of the respondents (54%) believed that cooking smoke do actually affect the health of women generally, 35.3% of the respondents were uncertain and only 7.3 % disagreed with the statement that cooking smoke can affect the health of women. The distribution signifies that many rural women in Iwo community are aware that the smoke inhale from wood fuel affects the health of women. A few of the respondents disagreed with the statement that cooking smoke affect women's health. However, a relatively high number of the respondents are unaware of the health risks that are associated with smoke emitted during the process of cooking with wood fuel. Smith et al (2004) observed that the burning of simple household biomass fuels-wood, but also fuels derived from trees, crops, animal dung, shrubs, grasses and root plants-is responsible for some 1.4 million premature deaths annually, mainly among women and young children of developing countries. Majority of the respondents (42.7%) were uncertain on whether cooking smoke affects the health of pregnant women and their unborn babies; 23.4% felt that the health of the pregnant women and their unborn babies could be affected by cooking smoke, while 20 % disagreed with it. Since a greater number of respondents do not see cooking smoke as posing a significant danger to the pregnant woman and her unborn child it follows that she may not take any necessary steps to protect herself. Smith (2008) however, reported that a number of studies have shown an effect on the birth outcomes of women exposed to biomass smoke during pregnancy. This was supported by World Health Organization when it stated that increased rates of stillbirth and low birth-weight have been reported among women exposed to biomass smoke during pregnancy (WHO, 2007). Majority of the respondents (75.4%) disagreed with the view that wood fuel does not cause eye irritation- 31.3% disagreed, while 45.6% strongly disagreed. A total of 18.7% of the respondents agreed that wood fuel does not cause eye irritation and only 4.1% are uncertain as to the effect wood fuel on eyes. This implies that majority of the respondents believe that wood fuel usage in cooking cause eye irritation which according to them on further enquiry by the researcher includes watery eyes, red eye balls and often results in blindness at old age. This is in agreement with Ellegrad (1996) and other authors who argued that indoor air pollution that are associated with the use of biomass fuels causes eye irritation and may increase the risk of developing cataracts (Mohan et al. 1989; Mishra et al. 1999b). According to the table above 68% of the respondents believed that wood fuel was not the best form of fuel for cooking, 19.3% disagreed with this view and 2.7% were uncertain. The table shows that there is an overwhelming agreement that wood fuel is not the best form of fuel, thus signifying that most of this rural women have some level of awareness of the negative health implications of wood fuel consumption, although they might not be aware of the exact nature of its shortcoming or the full extent of its ills. Majority of the respondents (52.7%) were not certain of the effects wood fuel consumption can have on the the skin of the user.About 34% disagreed with the statement that wood fuel consumption does not have negative effects on the skin of the cook. This is because most of them believed that the skin of the user darkens and becomes wrinkled over a long time of usage of wood fuel in cooking. Only 5.3% the respondents of agreed that wood fuel does not affect the skin of the cook negatively.

Table 5: Respondents' action to reduce health risks associated with wood fuel consumption

Actions Toward Health Risk Reduction	Frequency	Percentage (%)
Using dry biomass fuels for reducing smoke	80	53.3
Use more of kerosene stove	9	6.0
Use improved stove designed to reduce smoke	37	24.7
Cooking outdoor to reduce air pollution	6	4.4

Improve household ventilations	2	1.3
Use dry wood with Kerosene	2	1.3
Reduce time spent in smoky environment	14	9.3
Total	**150**	**100.0**

Source: Field Survey, (2009)

Action/Measures adopted to reduce health risks associated with wood fuel consumption

Table 5 presents measures adopted by rural women to reduce health risk associated with wood fuel consumption. About 53.3% are willing to use dry biomass fuel for reducing smoke, while 24.7% believed that an improvement in their financial standard will enable them purchase and use an improved stove designed to reduce smoke. Out of the respondents, 4.4% said they will cook outdoor to reduce air pollution, while 9.3% said they will reduce time spent in smoky environment.The remaining 2.6% claimed they will improve household ventilations and use dry wood with kerosene.

Results of Statistical Analyses

As shown in Table 6,Chi square analysis revealed that level of education($X^{2=}$ 000,p=0.05),monthly income($X^{2=}$.000,p=0.05) and family size($X^{2=}$ 000,p=0.05) are significantly related to the form of domestic fuel used most by rural women. Which means that level of education is a determinant factor in the choice of domestic fuel used. The improvement of educational standards among rural women is bound to increase their awareness of the health related impact of wood fuel consumption as well as their realization of the gravity of these health risks. The result of the analysis also showed that there is a significant relationship between monthy income and domestic fuel used most by respondents. It can therefore, be inferred that monthly household income range is a major determinant of the choice of fuel used most by respondents. This is supported by the findings of Douglas and Qian (1992), in a study of eleven developing countries including Nigeria, where it was discovered that income is most related to the total quantity of energy use. This is because, with increased income, households opt for more efficient fuels. The result of the chi-square test further showed a significant association between family size and the domestic fuel used most. This signifies that the numbered of people within a household will not only influence their choice of cooking fuel but in the long run may impact on their health.

Table 6:Chi-Square test of relationship between some selected personal Characteristics

Variables	Df	X^2	P	Decision
Level of Education	9	.000	0.05	**Significant**
Monthly Income	15	.000	0.05	**Significant**
Family Size	9	,000	0.05	**Significant**

IMPLICATIONS OF WOOD FUEL CONSUMPTION FOR SUSTAINABLE DEVELOPMENT IN DEVELOPING NATIONS

As a matter of fact, sustainable development are human centered. Majority of rural dwellers in most developing countries of sub-Saharan African are involved in agricultural and other income genarating activities (farming, food production and processing among others) for livelihood and it is only a healthy population that can effectively carry out these all-important activities.The detrimental effects of wood fuel are mostly felt by rural women and this energy crisis has often resulted in women's loss of time. Several hours are now spent on gathering wood fuel as well as on cooking (World Bank 2000). According to Aina and Odebiyi (1998), the more time women spend on biomass collection, preparation and use, the less they have for other domestic functions such as child care, breast-feeding, cooking of meals, sanitation and income gerating activities.

Other effects of wood fuel consumption on the family include change in eating habits and food consumption which has implications on the health of the rural dwellers. Infact, Cecelski (1985) observed that shortage of fuel energy can lead to fewer meals cooked, the substitution of quickly cooked foods for slow cooking foods and the substitution of raw and cold dishes for well cooked and hot ones. Another fundamental factor in domestic energy consumption that has implications for sustainable development in the third world is the

wide spread inequality in income distirbution. Douglas and Qian (1992) in a study of eleven developing countries including Nigeria, found that income is mostly related to the total quantity of energy used. Most rural dweller especially women are within the low income group, as such cannot afford clean fuels, safe stoves and in most cases cannot even afford the cost of biomedical treatments,which may not even be within the reach of the rural poor. As a matter of fact, when death occurs, it reduces available farm labour and increase household poverty if it is the bread winner. Wood fuel consumption has had a most devastating effect on people across the globe, with a greater percentage in sub-Saharan Africa. About 1.6 million people die each year worldwide (400,000 in sub-Saharan Africa) from respiratory diseases caused by the pollution from such fires (Sanders, 2005). This has implications for the anticipated dwindlling size of agricultural labour force and other income generating activities in rural Africa. The concern before now was how agriculture and humans resource development will keep pace with population growth. However, with the onset of fuel consumption, a downward spiral of family's welfare begins when a particularly women falls ill due to the smoke inhaled from solid fuel combustion.There is increased spending on health care and decrease productivity.Food production and income drop as more rural women who perform multidimensional role at home and on the farm are affected.Expenses incurred for biomedical treatments further reduce the productive capacity of rural women,thus,effectively hindering rural prosperity and sustainable development.

CONCLUSION

The study revealed a high level of awareness of the health risks associated with wood fuel consumption,although they are unaware of its far reaching effects.The study concludes that there is a need to develop adequate strategies that will not only address the direct effects of wood fuel consumption, but also finance problems: There is the need for change agents in rural Africa to incorporate teachings on wood fuel health risks and implications to rural life, into the innovation packages introduced to rural families. Adequate information should be given on the various alternatives to wood fuel. The study concludes that there is need to encourage and assist rural women by improving their standard of living, in order to reduce their dependency on wood energy and to achieve effective participation in rural and sustainable development activities.

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