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Assessment of Health Hazards Incurable from Charcoal Production and its Usage in Ogbomoso Zone of Oyo State

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Abstract – Charcoal has been a blessing to the rural populace who are either producers or users. It contribution to the society is evident and this has encouraged people to engage in the charcoal production and usage but nevertheless, it is associated with its own risk to both producers and users. This study therefore identified the health hazards and methods used to control health hazards incurable from the production and usage of charcoal in Ogbomoso zone of Oyo state. Data for this study were elicited through the use of a well-structured interview schedule and were analyzed with frequency counts, percentages, mean and Chi-square. The mean age of the respondents was 33.8 years, both male (68.9%) and female (31.1%) constituted the sampled population, almost all the respondents were literate with varied level of educational status with a mean of 6.7 years of experience in production and usage of charcoal. All (100%) the respondents indicated back pain and injuries while majority indicated headache as health hazard incurable. Bathing immediately after production and use of charcoal and use of nose pad when producing and utilizing charcoal produced. Chi-square revealed that selected socio-economic variables (sex- x^2=76.364, p<0.01; primary occupation- 248.750, p<0.01; secondary- 157.648, p<0.01; membership to association -77.175, p<0.01) exhibited significant association with health hazards incurable from charcoal production and usage. Subject matter specialist should make provision for availability of safety materials and seminars to curtail the side-effects of charcoal producers and users in the study area.**

Keywords – Assessment, Health hazard, Incurable, Charcoal production, Usage.

I. INTRODUCTION

Charcoal is the dark grey residue consisting of Carbon and any remaining ash, produced by the slow process of heating wood and other substances in the absence of oxygen, called Pyrolysis (1). It is an impure form of Carbon, which contains ash. However, it is an excellent domestic fuel, and can be made from virtually any organic material like wood, coconut shells rice husks and bones. Usually hardwood species like Acacia, Mangroves, Oaks and Prosopis are preferred for Charcoal production (1). Charcoal is a major source of energy in both the rural and urban households and this is due to the relatively cheap price it is gotten when compared to other source of energy such as kerosene and gas.

Charcoal is an old source of energy, but it is as well still a modern source of energy for making charcoal heat for ironing, cooking and warming house in both rural and urban centres (2). Nigeria currently ranks second to Brazil in the production of charcoal. The western countries particularly prefer Nigeria's charcoal, as the country is rich in tropical hardwood, which burns slower and hotter. Nigeria presently exports 380,000 metric tonnes of charcoal annually (3). More than 2 billion people use wood, charcoal, dung or agricultural residues as the primary fuel for their cooking and heating needs, leading to significant health, economic and

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environmental consequences [4]. Burning wood or agricultural residues produces smoke with a variety of irritant pollutants, some of which are known carcinogens.

More than 1.5 million deaths a year are caused by acute respiratory infections from breathing smoke from indoor cooking fires. Women and children are generally exposed to the greatest levels of pollutants and it is children who suffer the greatest health risk. Respiratory infections are the leading cause of death of young children worldwide. Several factors constitute to the health effects of charcoal production; charcoal is produced both traditionally and use of modern techniques, methods of producing charcoal require great effort by the producers, especially in the traditional way [5]. Increased dependence on the production and usage of charcoal has resulted in various health hazards incurred by people associated with charcoal. As cited in Eniola and Odebode [5], many people suffer from one ailment or the other ranging from acute to chronic diseases such as head ache, respiratory diseases, cough, sputum production, dyspnea, and hemoptysis as a result of their involvement in charcoal production. In Ogbomoso zone of Oyo state, charcoal production is massive and its usage is extraordinary as it is evident from the daily transportation of charcoal from the region and state to other neighbouring towns and states as a major source of income. It is expected that the massive production and usage is attached with serious concern for health status of the rural dwellers and users. It is in this note that this study aims to assess the health hazards incurable from the charcoal production and usage in Ogbomoso zone of Oyo state. The study described the socioeconomic characteristics of the respondents in the area, identified the health hazards incurable from the production and usage of charcoal by the respondents and identified the methods used to control the health hazard experienced in the production and usage of charcoal by the habitants of the study area.

II. Methodology

This research work was carried out in Ogbomoso zone of Oyo state with the use of multistage sampling procedure in the selection of the respondents engaged for this study. During the first stage, three Local Government Areas (LGAs) were purposively selected from the five LGAs that constitute the zone, because of their dominance in charcoal production. The second stage involved the random selection of thirty (30) respondents in the study area, the selected population constituted both charcoal producers and the charcoal users in the study area and this sum up to a total of ninety (90) respondents used for this study. The descriptive statistical tools used in the research work includes frequency counts, percentages and mean while Chi-square was used as inferential tool to test the association that exists between the variables.

III. Results And Discussion

Socio-economic characteristics of respondents

Result in Table 1 reveals the socioeconomic characteristics of the respondents used for this study. Majority (70.0%) of the respondents were male while 31.1% were female. This result is an indication that both male and female were involved in the production and usage of charcoal production in the study area. The major role exhibited by the male is connected to the production of charcoal while the females are majorly involved through the usage of charcoal as source of energy for the household chores, though they disclosed that they are involved in menial activities involved in the production process. The result correlates with the findings of Shackleton *et al.,* [6] and Eniola *et al.,* [7] where male dominated their study as it was not expected that female will dominate the production process of charcoal due to the tedious activity involved in charcoal production. It was found that44.4% and 41.1% of the respondents were not more than 30 years and between 31-50 years respectively while 14.4% indicated they were above 50 years of age. The mean age was revealed to be 33.8 years. This result implies that charcoal producers and users in the study area were still economically active, matured and agile. This result is in consonance with the findings of Kofoworola [2], which reported that majority of the respondents were not one than 50 years of age , an indication of a viable productive status. Charcoal production is tedious and this has an influence of the domineering status of youth in the production activities. Charcoal usage for domestic activities especially cooking and ironing of clothes contributes significantly to the hygienic status of the rural dwellers as their household is devoid of smokes and burnt surface and brings about status stratification among their peers in the rural settings, hence the domination of youths in charcoal production.

Moreso, 34.4% indicated trading as their primary occupation, 27.8% and 26.7% indicated charcoal production and farming respectively while 11.1% indicated that they were artisan. Meanwhile, above average (51.1%) of the respondents indicated trading as their secondary occupation while 24.4% indicated farming and charcoal production as their secondary occupation respectively. This result affirms that charcoal production is used as a coping strategy by the rural people as they engage in other occupation for their livelihood. Their engagement in the production of charcoal might be associated with the fact that they have proximity to the

forest where trees are fell at little or no cost, hence the benefit they derived in living in the rural area. This result is against the findings of Eniola and Odebode [5], where majority of the respondents have charcoal production as their primary occupation. Also, the result is in consonance with the findings of Kofoworola [2], where the respondents engage in several other occupations such as traders, artisan, farming aid their financial capabilities.

Furthermore, above average (55.6%) of the respondents indicated that they belong to several community associations while 44.4% do not belong to any association. The belongingness to community association is expected to enlighten them on the methods used to control health hazard incurable from the usage and production of charcoal as different enlightenment programmes and seminars are held in community association. The usage of charcoal for domestic activities such as cooking and ironing of clothes are expected to be gained from their relationship with other members of the community which is facilitated due to their participation in community association. Lastly, 42.2% of the respondents indicated they produced above 50 bags of charcoal while 16.7% indicated they produced not more than 50 bags of charcoal per production cycle respectively. The mean bag of charcoal produced in the study area per month was revealed to be 162 bags. This result is an indication that charcoal production is an enviable business venture in the study area; hence it is expected to have influence on the ailments incurable by the rural dwellers as they have ease of access to charcoal. Meanwhile, health is wealth, the production and usage of charcoal should be judiciously managed.

Table 1 Socioeconomic characteristics of the respondents n=90

Socio economic characteristics	Frequency	Percentages	Mean
Sex			
Male	62	68.9	
Female	28	31.1	
Age			
≤ 30	40	44.4	33.8
31-50	37	41.1	
Above 5	13	14.4	
Primary occupation			
Farming	24	26.7	
Trading	31	34.4	
Artisan	10	11.1	
Charcoal production	25	27.8	
Secondary occupation			
Farming	22	24.4	
Trading	46	51.1	
Charcoal production	22	24.4	
Membership to association			
Yes	40	44.4	
No	50	55.6	

Quantity of charcoal produced per month			
≤ 50	15	16.7	161.9
Above 50	38	42.2	

Source: Field survey, 2021

Health Hazards Incurable

The production of charcoal and the usage in the household creates serious health concern to the rural household and this is evident based on the responses gotten from the respondents. All (100.0%) of the respondents indicated back pain with injuries and cuts as the health hazard incurred with the production and use of charcoal. This might be so as producers and users of charcoal tend to be in a bend and lower position when using or producing charcoal. For charcoal production, people are exposed to injuries and cuts during the gathering of tree lump and other essential materials needed for charcoal production. Also, 76.7%, 62.2%, 54.4% and above average (52.2%) of the respondents indicated headache, running nose, cough and eyes defect as the health hazard incurable from the production and usage of charcoal by the rural household respectively.

Furthermore, 44.4%, 32.2% and 28.9% of the respondents indicated asthma, difficulty to inhale or exhale and breathlessness respectively as the health hazards incurable with the production and use of charcoal in the household. The persistence or occurrence of the indicated health hazards might be related to the smoke and pollution of the air with offensive odour that comes with the use of charcoal or its production.

Meanwhile, 18.9% and 10.0% indicated lung cancer and low birth weight as the health hazard incurable with the production and usage of charcoal by the household. Lastly, acute respiratory infection was indicated by 7.8% of the respondents as an incurable health hazard associated with the production and usage of charcoal in the study area. The minimal percentage of the respondents indication of the acute respiratory infection as a health hazard incurable from the production and usage of charcoal might be connected to the few experiences households in the study area have had due to the usage of charcoal, hence it is not a widely known health hazard associated with charcoal production and usage in the study area.

The result from this findings affirmed that production and usage of charcoal in the study area has brought about various health hazard to the respondents and this is expected to have a negative effect on the economic growth of the study area if necessary caution steps are not take. This result is in tandem with the findings of Eniola and Odebode [(2)], where charcoal producers and users indicated they encountered health hazards such as body wounds, respiratory diseases, spinal hernia, cut, crush and laceration of hand, back and muscle pains, frequent head ache, asthma, skin and respiratory track irritation/infection, body irritation, falling and slipping, burns, fatigue, eyes problem during the production and usage of charcoal.

Table 2 Distribution of respondents according to health hazards incurable from charcoal from production and usage of charcoal

Health hazards incurable	Frequency	Percentage
Headache	69	76.7
Asthma	40	44.4
Eyes defect	47	52.2
Running nose	56	62.2
Back pain	90	100.0
Injuries and cuts	90	100.0
Lung cancer	17	18.9
Acute respiratory infection	7	7.8

Cough	49	54.4
Breathlessness	26	28.9
Difficulties to inhale or exhale	29	32.2
Low birth weight	9	10.0

Source: Field survey, 2021

***:** Multiple responses

Methods Used to Control Health Hazard Experienced in Charcoal Production

The result in the table below revealed the various methods employed by the respondents to avert or control health hazard encountered during the production and usage of charcoal production in the study area. Almost all (94.4%) of the respondents indicated bathing immediately after the production and use of charcoal in order to maintain good health and wade away health concerns associated with charcoal production and usage. The utilization of this control method might be connected with the absence of financial implication attached to it and normal daily hygiene method known by all and sundry. In addition, citing charcoal production site far away from residential areas, staying away from the kitchen when charcoal stove is in use or use of ventilated area, use of nose pad when producing charcoal and wearing of hand gloves and farm boots during charcoal production stages were indicated by 44.4%, 31.3%, 21.1% and 18.9% of the respondents respectively.

Lastly, 16.7% and 8.9% indicated wearing of face mask to reduce inhaling of smoke during the production and use of charcoal for cooking and preventing under-age children from the use of charcoal for cooking were indicated by 16.7% and 8.9% of the respondents respectively as health hazard control methods used during the production and usage of charcoal by the respondents.

On a general note, the result from this study revealed that respondents in the study area were aware of various control methods that can be used to curtail health hazards incurable from the production and use of charcoal in the study area. Despite their awareness status of the various control methods, their usage of the control methods is low and this might be related to financial commitment that most of the control methods demands of. Also, level of knowledge of the respondents about the potency of the hazards from the use of charcoal might influence their non-challant attitude towards control methods towards the health hazard incurable from the production and usage of charcoal by respondents in the study area, this is an assertion that subject matter specialist such as extension health workers are in dire need in the study area.

Table 3 Distribution of respondents according to methods used to control health hazard experienced in charcoal production

Methods used to control health hazards	***Frequency**	**Percentage**
The use of nose pad when producing charcoal	19	21.1
Wearing of hand gloves and farm boots during charcoal production stages	17	18.9
Citing charcoal production site far away from residential areas	40	44.4
Preventing under-age children from the use of charcoal for cooking	8	8.9
Regular visitation to health centres by charcoal producers and rural dwellers that use charcoal	15	16.7
Staying away from the kitchen when charcoal stove is in use or use of ventilated area	28	31.1
Wearing of face mask to reduce inhaling of smoke during the production and use of charcoal for cooking	15	16.7
Bathing immediately after the production and use of charcoal	85	94.4

Source: Field survey, 2021

***:** Multiple responses

Testing of Hypothesis

Table 7 shows that significant association exist between selected socioeconomic characteristics of the respondents such as sex (X^2= 76.364, p=0.000), primary occupation (X^2= 248.750, p=0.000), secondary occupation (X^2= 157.648, p=0.000) and membership to association (X^2= 77.175, p=0.000) and the health hazards incurred by the respondents in the study area. This result implies that selected socioeconomic characteristics of the respondents has an underlining factors on the type of health hazard incurred by the respondents which is as a result of the rate and level of exposure they have with the usage and production of charcoal by the rural dwellers. Sex being significant might be connected to male being dominated in the charcoal processing and being prone to hazard associated with charcoal production and the female being exposed to skin burn, irritation that are associated with the usage of charcoal for domestic activities. Primary and secondary occupation being significant might be connected to charcoal production being a major source of income in the study area, as the respondents cannot do away with it coupled with the fact that usage of charcoal as a source of energy is quite affordable to rural households compare to other source of energy. Membership to association might influence their engagement in the production and usage of charcoal and this might increase their level of exposure to the health hazard incurable from charcoal production and usage in the study area.

Therefore, the null hypothesis stated is rejected hence; there is significant association between the selected socio-economic characteristics of the respondents and the health hazard incurable from charcoal production and usage in the study area.

Table 4 Test of significant association between some selected socio-economic characteristics and health hazard incurable from charcoal production and usage in the study

Socioeconomic characteristics	Chi-square value (X^2)	p-value	df	Decision	Remark
Sex	76.364	0.000	13	S	Reject
Primary occupation	248.750	0.000	39	S	Reject
Secondary occupation	157.648	0.000	26	S	Reject
Membership to association	77.175	0.000	13	S	Reject

Source: Computed data, 2021

IV. Conclusion And Recommendations

Almost 70.0% of the respondents were male, young and active with a mean age of 33.8 years. Almost all (97.2%) had formal education though with majority having low educational status. Injuries and cuts, back pain and headache were the major health hazard incurred from the usage and production of charcoal by the respondents. Respondents engaged in the use of several methods to control the health hazard incurred though they majorly engage in bathing immediately after the production and use of charcoal while only few engage in the use of other several other curing skills to health hazard incurred during production and usage of charcoal on human health in the study area. Significant relationship exists between selected socioeconomic characteristics of the respondents' and the health hazards incurable by the respondents. Based on the result gathered from this study, it is recommended that stakeholders in charcoal driven economy should make provision for modern ways of producing charcoal like the use of metal Kiln so as to reduce the release of offensive odour and smoke to the environment. Also, technologically induced charcoal pot should be made available to charcoal users to. These are expected to limit the health hazard associated with charcoal production and usage.

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