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Knowledge and Preventive Measures of Wood Fuel-Related Health Risks Among Women in Anyigba Community, Kogi State, Nigeria

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Abstract

Wood fuel remains the dominant domestic energy source for women in rural and semi-urban communities across sub-Saharan Africa, despite its documented association with indoor air pollution and adverse respiratory outcomes. This study therefore, examined the knowledge and preventive measures of wood fuel-related health risks among women in Anyigba community, Dekina Local Government Area, Kogi State, Nigeria. The study was guided by five objectives, namely to determine the motivating factors responsible for wood fuel consumption, assess respondents' knowledge of the associated health risks, establish the prevalence of wood fuel use, examine respondents' perception of wood fuel consumption, and identify the preventive measures adopted to reduce the health risks associated with wood fuel use. A cross-sectional survey design was adopted, and a sample of 383 women was drawn using the Krejcie and Morgan (1970) formula and a purposive sampling technique across four locations within the community, out of which 350 questionnaires were correctly completed and analysed, representing a 91.4% response rate. A structured questionnaire was the principal instrument of data collection, and data were analysed using descriptive statistics (frequency and percentage) and inferential statistics (Chi-square test of independence and Pearson product-moment correlation) at the 0.05 level of significance. Findings showed that affordability and accessibility (74.3%) were the leading motivating factor for wood fuel consumption, and that a majority of respondents (68.9%) demonstrated a moderate-to-high level of knowledge of the health risks associated with wood fuel use, although this knowledge did not consistently translate into the adoption of preventive practices. The Chi-square analysis revealed a statistically significant relationship between motivating factors and preventive measures ($\chi^2 = 22.47$, $df = 6$, $p = .001$), and between selected socio-demographic characteristics and respondents' perception of wood fuel consumption. The Pearson correlation further revealed a significant positive relationship between knowledge of health risks and adoption of preventive measures ($r = .41$, $n = 350$, $p < .001$). The study concluded that knowledge alone is insufficient to drive behavioural change without corresponding access to affordable alternative energy sources, and recommended targeted health education, subsidised improved cook-stove programmes and sustained community-based sensitisation campaigns for women in the study area.

Keywords: Wood Fuel, Health Risks, Knowledge, Preventive Measures, Women

1. Introduction

1.1 Background to the Study

Wood fuel, comprising firewood, charcoal, wood chips, sawdust and other biomass derivatives, continues to serve as the principal source of domestic energy for millions of households in developing countries (Sepp & Mann, 2010). Firewood alone accounts for the largest share of wood energy production and consumption worldwide (UNEP, 2019), and along with charcoal is regarded as a comparatively sustainable form of biomass fuel when harvested within regenerative limits (Njenga et al., 2018). In sub-Saharan Africa, more than 70% of households depend on wood fuel as their primary source of domestic energy, underscoring its socio-economic importance even as its harvesting, processing and combustion continue to raise health and environmental concerns (Ndegwa et al., 2017).

The United States Environmental Protection Agency (2023) notes that wood smoke irritates the respiratory tract, provokes inflammation, compromises immune function and increases susceptibility to lung infection. Because women bear the primary responsibility for cooking and fuel collection in most households, they and their young children are disproportionately exposed to these hazards, alongside the physical burden and time costs associated with fuel gathering (Teko et al., 2016). Evidence from several settings indicates that women who hold deep-rooted traditional beliefs about wood fuel regard it as a reliable, affordable and culturally significant energy source, even where they simultaneously recognise its contribution to deforestation and air pollution (Adewuyi et al., 2022).

Within Nigeria, and specifically in communities such as Anyigba in Dekina Local Government Area of Kogi State, wood fuel remains central to household cooking practice notwithstanding the increasing, if uneven, availability of alternative energy sources such as liquefied petroleum gas (LPG), kerosene and electricity. The persistence of wood fuel use in such communities reflects an interaction of economic constraints, cultural preference and limited access to cleaner alternatives, and it is against this background that the present study examines women's knowledge of the health risks of wood fuel consumption and the preventive measures they adopt to mitigate these risks.

1.2 Statement of the Problem

Despite the availability of modern energy sources in many parts of Nigeria, millions of women in rural and semi-urban communities continue to depend heavily on wood fuel for cooking and heating. This dependence is compounded by limited access to education, economic opportunity and social empowerment, all of which perpetuate gender inequality and poverty (United Nations, 2021). The time invested in fuel wood collection and preparation further diminishes the time available for productive and leisure activities (International Energy Agency, 2020).

The World Health Organization (2020) identifies indoor air pollution from solid fuel combustion, including wood, as a major cause of respiratory illness and premature death, particularly among women and children. Exposure to particulate matter, carbon monoxide and volatile organic compounds released during wood combustion elevates the risk of cardiovascular disease, lung cancer and other chronic conditions (United States Environmental Protection Agency, 2022). Moreover, the sustained reliance on wood fuel constrains women's participation in income-generating and educational activities, thereby reinforcing the cycle of poverty and limiting broader empowerment (World Health Organization, 2016).

While interventions such as improved cook-stoves and cleaner fuel substitution have been promoted in various contexts, there remains limited empirical evidence on the extent to which women in Anyigba community are aware of the health risks associated with wood fuel consumption, and the degree to which such awareness translates into preventive action. This gap in localised, evidence-based understanding motivates the present study, which examines the knowledge and preventive measures of wood fuel health risks among women in Anyigba community.

1.3 Objectives of the Study

The broad aim of this study is to examine the knowledge and preventive measures of wood fuel-related health risks among women in Anyigba community, Dekina Local Government Area, Kogi State. The specific objectives are to:

a) determine the motivating factors responsible for wood fuel consumption among women in Anyigba community;
b) assess the level of knowledge of the health risks of wood fuel consumption among women in Anyigba community;
c) establish the prevalence of wood fuel consumption among women in the study area;
d) examine the perception of women in Anyigba community towards wood fuel consumption; and
e) identify the preventive measures adopted by women in Anyigba community to reduce the health risks associated with wood fuel consumption.

1.4 Research Questions

a) What are the motivating factors responsible for wood fuel consumption among women in Anyigba community?
b) What is the level of knowledge of the health risks of wood fuel consumption among women in Anyigba community?
c) What is the prevalence of wood fuel consumption among women in the study area?
d) What is the perception of women in Anyigba community towards wood fuel consumption?
e) What preventive measures do women in Anyigba community adopt to reduce the health risks associated with wood fuel consumption?

1.5 Hypotheses

The following null hypotheses were formulated to guide the study and were tested at the 0.05 level of significance:

HO1: There is no statistically significant relationship between respondents' motivating factors for wood fuel consumption and their adoption of preventive measures against wood fuel-related health risks in Anyigba community.

HO2: There is no statistically significant relationship between selected socio-demographic characteristics (age, religion, ethnic affiliation and educational level) of respondents and their perception of wood fuel consumption in Anyigba community.

HO3: There is no statistically significant relationship between respondents' knowledge of wood fuel health risks and their adoption of preventive measures against wood fuel consumption in Anyigba community.

1.6 Significance of the Study

This study is expected to enhance the awareness of women in Anyigba community regarding the dangers associated with wood fuel consumption, notwithstanding its acknowledged utility, and to propose practicable strategies for mitigating the associated harm. Beyond its immediate community relevance, the findings offer empirical insight of value to public health practitioners, energy policy makers, non-governmental organisations and local government authorities seeking to design context-appropriate interventions. As Talcott Parsons' sick role framework suggests, ill health impairs an individual's capacity to perform expected social roles; a healthier population of women is therefore better positioned to contribute productively to household and community welfare.

1.7 Scope of the Study

The study is delimited to women within the age range of less than 30 years to 54 years and above who reside in Anyigba community, Dekina Local Government Area of Kogi State. The substantive scope covers the motivating factors, prevalence, knowledge, perception and preventive measures associated with wood fuel consumption among this population.

2. Literature Review and Theoretical Framework

This section reviews relevant conceptual and empirical literature on wood fuel consumption, and presents the theoretical framework underpinning the study.

2.1 Conceptual Review

2.1.1 Concept of Wood Fuel Consumption

Wood fuel is a form of biomass energy derived from trees and other woody sources, and has been used for centuries as a source of heat and energy (Food and Agriculture Organization, 2022). Reliance on wood fuel is particularly high in sub-Saharan Africa, where more than 90% of wood cut on the continent is used as fuel (Food and Agriculture Organization, 2022). Although wood fuel is potentially renewable and relatively affordable for households lacking access to other energy sources, its combustion generates indoor air pollution that has been linked with respiratory discomfort, eye irritation and broader health deterioration (Chindo et al., 2017). Studies have consistently found that non-availability of alternative fuels and the low cost of firewood are the principal reasons cited by rural households for its continued use (Danlami, 2019).

2.1.2 Motivating Factors of Wood Fuel Consumption

A range of factors has been identified as motivating wood fuel consumption among women. Poverty limits access to modern fuels such as kerosene, gas and electricity, and prolongs dependence on traditional energy sources (Oyedepo et al., 2018). Affordability and accessibility make wood fuel the most practical option for many rural women (Dasgupta et al., 2020), while the absence of accessible alternative fuel sources such as solar and biogas leaves wood fuel as the only viable option for poor households (Adewuyi et al., 2019; Smith et al., 2019). Cultural norms and traditional practice also shape fuel choice, often independent of awareness of associated health risks (Wilson et al., 2018), while the cost of transitioning to modern cooking equipment discourages households from shifting away from wood fuel (Food and Agriculture Organization, 2016). Large household size has similarly been found to positively influence the intensity of wood fuel use (Olusola et al., 2023).

2.1.3 Knowledge of the Health Risks of Wood Fuel Consumption

Women, particularly in rural settings, may possess awareness of the health risks of wood fuel use without being able to act on that awareness because of socio-economic constraints (Patel et al., 2021). Lower educational attainment has been associated with more limited understanding of the health implications of wood fuel combustion and reduced awareness of cleaner alternatives (Kaur et al., 2018). In some communities, women prioritise the fulfilment of domestic obligations over their own health, resulting in the continued, if reluctant, use of wood fuel despite recognised risk (Wang et al., 2019). These findings collectively suggest that raising awareness is necessary, but not sufficient, for behavioural change unless accompanied by improved access to safer alternatives.

2.1.4 Prevalence of Wood Fuel Consumption Among Women

Prevalence refers to the proportion of a population exhibiting a given condition or behaviour within a defined period (Hoffman, 2017). Wood fuel consumption remains widespread in Nigeria, with a substantial majority of rural households and a considerable share of urban poor households relying on it for cooking, with women constituting the primary users (Chindo et al., 2017). The probability of wood fuel use is shaped by socio-economic characteristics such as household size, educational attainment and income, underscoring the need for affordable alternative energy sources to reduce continued dependence (Umar et al., 2016).

2.1.5 Perception of Wood Fuel Consumption Among Women

Perception concerns the way individuals interpret sensory information in light of experience, thereby shaping attitudes, beliefs and behaviour (McDonald, 2015). Women often regard wood fuel as a necessary and convenient energy source, particularly where access to alternatives is limited (Aderemi et al., 2022), although perceptions of scarcity and risk are conditioned by socio-cultural background and economic circumstance (Olorunfemi et al., 2022). Increasing awareness of respiratory and other health risks has, in some contexts, prompted women to seek alternative energy sources (Mwangi et al., 2021), while accounts from rural India and Kenya illustrate both the discomfort associated with wood smoke and the aspiration for cleaner fuel that would free time for income-generating activity (Singh et al., 2020; Mwangi et al., 2022).

2.1.6 Preventive Measures to Reduce the Health Risks of Wood Fuel Consumption

Preventive measures are proactive steps taken to reduce the likelihood or severity of harm (Khanna et al., 2022). In relation to wood fuel, these include promotion of alternative energy sources such as LPG, biogas and solar energy (Adekomaya et al., 2022), fuel substitution using agricultural waste or charcoal (Fawehinmi et al., 2018), energy education and awareness campaigns (Oyedepo et al., 2020), the design and use of improved, well-ventilated cook-stoves (Chen et al., 2022), behavioural change towards energy-saving practice (Nnaji et al., 2017), use of personal protective equipment such as masks during fuel handling (Aderemi et al., 2022), and improved access to micro-credit for the purchase of alternative energy technologies (Oyerinde et al., 2020).

2.2 Empirical Review

Kasim and Kemal (2020) examined wood fuel consumption and its implication for forest degradation in Agarfa Wereda, south-eastern Ethiopia, using a purposive sample of 134 households. Their multiple linear regression analysis showed that occupation, family size and time spent on fuel collection were significantly and positively associated with wood fuel consumption ($p < .05$), and that wood fuel use was the second leading cause of forest degradation after agricultural land expansion.

Chindo et al. (2017) investigated the impact of wood fuel consumption on under-five and adult mortality across sub-Saharan Africa using a generalised method of moments estimator, and found that wood fuel consumption significantly increased mortality, with a more pronounced effect among under-five children and female adults than male adults. The authors recommended the provision of affordable clean cooking energy to mitigate this outcome.

Maina et al. (2020) analysed the environmental impact of household wood fuel consumption in Nigeria using survey and Landsat remote-sensing data, applying descriptive statistics, chi-square tests and image classification. Their results showed that the majority of wood fuel-dependent households were headed by males aged 44 to 56 years, with household sizes of five to six persons and modest monthly income.

Naphtali and Atiman (2016) studied wood fuel as a determinant of household cooking choice and its climate implications in Jalingo metropolis, Taraba State, using a survey of 240 respondents analysed with the environmental Kuznets curve framework. The study found that households consumed more wood fuel than substitutes such as kerosene, LPG and electricity, principally due to the higher cost and limited availability of these alternatives.

Umar et al. (2016) examined the adverse environmental effects of wood fuel exploitation in Nasarawa Local Government Area, Nasarawa State, surveying 150 respondents through structured questionnaires. Findings indicated that households with more than six members consumed more wood fuel, and that low household income sustained continued dependence on wood fuel because of its relative affordability and accessibility.

Tolulope (2020) explored the socio-economic and cultural determinants of household cooking energy use in Ado-Ekiti, Ekiti State, using a semi-structured questionnaire analysed through multinomial logistic and marginal effect regression models. The study found that despite relatively high educational attainment in the study population, dependence on biomass energy for cooking remained widespread, contributing to deforestation, soil erosion and desertification.

Collectively, these studies demonstrate a consistent pattern across Nigerian and broader sub-Saharan African contexts: wood fuel dependence is shaped by household composition, income, cost of alternatives and cultural preference, and carries measurable environmental and health consequences. However, comparatively few studies have specifically examined the interaction between women's knowledge of wood fuel health risks and their adoption of preventive behaviour at the community level, a gap the present study addresses using data from Anyigba community.

2.3 Theoretical Framework

This study draws on three complementary theories: the Rational Choice Theory, the Fuel Stacking Theory, and the Health Belief Model, to explain the knowledge and preventive behaviour of women in relation to wood fuel-related health risks.

2.3.1 Rational Choice Theory

The Rational Choice Theory, associated with Adam Smith's (1776) An Inquiry into the Nature and Causes of the Wealth of Nations, holds that individuals make decisions by weighing the anticipated costs, risks and benefits of available courses of action in pursuit of self-interest. Applied to this study, the theory suggests that women weigh the immediate practical benefits of wood fuel, such as affordability and availability, against its longer-term health and environmental costs when deciding whether, and how much, wood fuel to consume. This framework is useful for understanding why awareness of health risk does not automatically translate into behavioural change when the perceived costs of switching to alternative fuels remain high.

2.3.2 Fuel Stacking Theory

The Fuel Stacking Theory describes the tendency of households, particularly in developing countries, to use multiple fuels simultaneously rather than transitioning wholly from traditional to modern energy sources (Masera et al., 2000). The theory helps explain why women in Anyigba community may continue to use wood fuel alongside kerosene, LPG or electricity depending on income, availability and convenience, and why energy transitions in such settings tend to be gradual and layered rather than abrupt.

2.3.3 Health Belief Model

The Health Belief Model, developed by Hochbaum and Rosenstock in the 1950s within the United States Public Health Service, explains health-related behaviour through constructs including perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action and self-efficacy (Hochbaum, 1958; Rosenstock, 1974). This study draws particularly on the perceived-benefit and perceived-barrier constructs. The perceived-benefit construct helps to explain how women weigh the practical advantages of wood fuel, such as warmth and cooking capability, against the long-term risk of respiratory illness, while the perceived-barrier construct clarifies the obstacles, including cost, limited access to alternatives and entrenched cultural preference, that impede the adoption of preventive measures even where awareness of risk exists. Together, these constructs provide a coherent lens for interpreting the relationship between knowledge and preventive behaviour examined in this study.

3. Methodology

3.1 Research Design

This study adopted a cross-sectional descriptive survey design, complemented by a brief structured interview component, to elicit data on the knowledge and preventive measures of wood fuel health risks among women in Anyigba community. The design was considered appropriate given its capacity to capture the distribution of relevant variables within the population at a single point in time and to permit statistical testing of the hypothesised relationships among them.

3.2 Study Area

The study was conducted in Anyigba community, located in Okura District of Dekina Local Government Area, Kogi State, in the North Central geopolitical zone of Nigeria. The community lies between latitudes 7°15'N and 7°29'N and longitudes 7°11'E and 7°32'E, at an average altitude of 385 metres above sea level, with a land area of approximately 420 square kilometres and an estimated population of 189,976 persons (Ifatimehin, 2012). Anyigba shares boundaries with Iyale ward to the north, Abocho ward to the north-west, Agbegi ward to the south, Egume-Ome to the east, Ofugolo to the west and Ojikpadala ward to the south-east, and is linked to numerous surrounding settlements. The area lies within the Guinea Savannah belt, with a tropical climate characterised by a wet season from April to October and a dry season from November to March, and monthly temperatures ranging between 21°C and 32°C (Ocholi, 2007). Trading, agriculture and the presence of Prince Abubakar Audu University have contributed to the community's rapid commercial and residential growth.

3.3 Population of the Study

The target population comprised women aged less than 30 years to 54 years and above, currently resident in Anyigba community, with

a total estimated population of 129,574 based on National Population Commission (2006) figures.

3.4 Sample Size and Sampling Technique

The sample size was determined using the Krejcie and Morgan (1970) formula:

$$n = X^2Np(1-P) / [e^2(N-1) + X^2P(1-P)]$$

where N is the population size (129,574), X^2 is the table value of chi-square for one degree of freedom at the 0.05 confidence level (3.841), P is the assumed population proportion (0.5), and e is the margin of error (0.05). Application of the formula yielded a minimum sample size of 383 respondents.

A non-probability, purposive sampling technique was used to select four locations within Anyigba community from which respondents were drawn, on the basis of population density and accessibility. Table 1 shows the distribution of the questionnaire across the selected locations.

Table 1: Distribution of Sample by Location

S/N	Location Selected	Number of Questionnaires
1	Iji Phase 1, Anyigba community	100
2	Anyigba community	98
3	University community	95
4	Ogane Aji, Anyigba community	90
Total	4	383

Source: Researchers' Computation, 2026

3.5 Instrument for Data Collection

A structured questionnaire, complemented by a brief interview schedule, served as the principal instrument of data collection. The instrument was divided into six sections covering respondents' socio-demographic characteristics and the five research objectives, namely motivating factors, knowledge of health risks, prevalence, perception, and preventive measures, using a combination of dichotomous, categorical and four-point Likert-type items.

3.6 Validity and Reliability of the Instrument

Content and face validity of the instrument were established through review by experts in sociology and public health, who assessed the items for clarity, relevance and alignment with the study objectives, and necessary corrections were incorporated prior to administration. A pilot test was conducted among 30 women outside the main study sample, and reliability was assessed using Cronbach's alpha, yielding a coefficient of 0.79, which was considered acceptable for the constructs measured.

3.7 Method of Data Analysis

Data were analysed using the Statistical Package for the Social Sciences (SPSS, version 26). Descriptive statistics, namely frequency counts and simple percentages, were used to address the socio-demographic profile of respondents and the five research objectives. Inferential statistics were used to test the three null hypotheses: the Chi-square test of independence was applied to Hypotheses One and Two, given the categorical nature of the variables involved, while the Pearson product-moment correlation coefficient was applied to Hypothesis Three, given the continuous, index-based measurement of knowledge and preventive measures scores. All inferential tests were conducted at the 0.05 level of significance.

3.8 Ethical Considerations

Ethical clearance was obtained prior to data collection, and the study adhered to the core ethical principles of voluntary participation, informed consent, anonymity and confidentiality (Bhandari, 2023; MacKinnon & Fiala, 2018). Respondents were briefed on the purpose of the study, assured that participation was voluntary and that responses would be used strictly for academic purposes, and were free to withdraw at any stage without penalty.

4. Results and Discussion

4.1 Response Rate

Of the 383 copies of the questionnaire administered, 350 were correctly completed and returned, representing a response rate of 91.4%, which was considered adequate for analysis.

4.2 Socio-Demographic Characteristics of Respondents

Table 2 presents the socio-demographic characteristics of the 350 respondents analysed in this study.

Table 2: Socio-Demographic Characteristics of Respondents (n = 350)

Variable	Category	Frequency	Percentage (%)
Age	Less than 30 years	84	24.0
	30–39 years	112	32.0
	40–49 years	91	26.0
	50–54 years	42	12.0
	54 years and above	21	6.0
Religion	Christianity	224	64.0
	Islam	112	32.0
	Traditional religion	14	4.0
Ethnic affiliation	Igala	245	70.0
	Yoruba	35	10.0
	Igbo	28	8.0
	Hausa	21	6.0
	Other	21	6.0
Educational level	No formal education	42	12.0
	Primary education	70	20.0
	Secondary education	133	38.0
	Tertiary education	105	30.0
Marital status	Single	63	18.0
	Married	231	66.0
	Widowed	35	10.0
	Divorced/Separated	21	6.0
Occupation	Trading	147	42.0
	Farming	84	24.0
	Civil/public service	49	14.0
	Artisan/craft work	42	12.0
	Unemployed	28	8.0

Household size	1–4 persons	91	26.0
	5–8 persons	182	52.0
	9 persons and above	77	22.0

Source: Field Survey Research, 2026

Table 2 shows that respondents aged 30 to 39 years constituted the largest age group (32.0%), and that the majority were Christian (64.0%), of Igala ethnic extraction (70.0%), married (66.0%) and engaged in trading (42.0%). Slightly more than a third of respondents (38.0%) had attained secondary education, while just over a quarter of households (52.0%) comprised between five and eight persons. This profile is broadly consistent with the demographic composition reported for Anyigba community and its environs (Ifatimehin, 2012), and reflects a population predominantly of reproductive and economically active age, for whom wood fuel-related exposure carries long-term implications for household health.

4.3 Motivating Factors Responsible for Wood Fuel Consumption

Table 3: Motivating Factors Responsible for Wood Fuel Consumption (n = 350)

Motivating Factor	Frequency (Agree)	Percentage (%)
Affordability and accessibility	260	74.3
Poverty/limited income	240	68.6
Cost of alternative fuel sources	215	61.4
Lack of access to alternative fuel sources	221	63.1
Cultural norms and traditional practice	200	57.1
Large household size	172	49.1

Source: Field Survey Research, 2026

As presented in Table 3, affordability and accessibility emerged as the most frequently cited motivating factor for wood fuel consumption (74.3%), followed by poverty and limited income (68.6%). Cultural norms and household size, while still notable, were comparatively less influential. This pattern corroborates earlier findings that economic constraint, rather than cultural preference alone, remains the dominant driver of wood fuel dependence among women in similar settings (Oyedepo et al., 2018; Dasgupta et al., 2020).

4.4 Knowledge of the Health Risks of Wood Fuel Consumption

Table 4: Knowledge of the Health Risks of Wood Fuel Consumption (n = 350)

Knowledge Item	Frequency (Aware)	Percentage (%)
Wood smoke causes respiratory illness	285	81.4
Wood smoke causes eye irritation	275	78.6
Indoor air pollution affects children more than adults	255	72.9
Prolonged exposure increases lung cancer risk	190	54.3
Prolonged exposure increases cardiovascular disease risk	161	46.0

Source: Field Survey Research, 2026

On the basis of a composite knowledge index, respondents were classified into three levels: 32.0% (n = 112) demonstrated a high level of knowledge, 36.9% (n = 129) a moderate level, and 31.1% (n = 109) a low level of knowledge of wood fuel health risks, giving a combined moderate-to-high knowledge share of 68.9%. While awareness of the more immediate effects of wood smoke, such as respiratory discomfort and eye irritation, was comparatively high, awareness of longer-term outcomes such as cardiovascular disease was markedly lower. This finding aligns with Kaur et al. (2018) and Patel et al. (2021), who similarly reported that awareness of acute health effects of wood fuel exposure typically exceeds awareness of chronic disease risk.

4.5 Prevalence of Wood Fuel Consumption

Table 5: Prevalence of Wood Fuel Consumption Among Respondents (n = 350)

Item	Category	Frequency	Percentage (%)
Current use of wood fuel as primary cooking source	Yes	274	78.3
	No	76	21.7
Frequency of use	Daily	241	68.9
	3–5 times per week	70	20.0
	Occasionally	39	11.1
Duration of wood fuel use	Less than 5 years	63	18.0
	5–10 years	120	34.3
	More than 10 years	167	47.7

Source: Field Survey Research, 2026

Table 5 shows that a substantial majority of respondents (78.3%) currently use wood fuel as their primary cooking source, with 68.9% reporting daily use and 47.7% having used wood fuel for more than ten years. This high and sustained prevalence is consistent with earlier national estimates indicating that a large proportion of Nigerian households, particularly in rural and semi-urban communities, rely on wood fuel for cooking (Chindo et al., 2017).

4.6 Perception of Wood Fuel Consumption

Table 6: Perception of Wood Fuel Consumption Among Respondents (n = 350)

Perception Category	Frequency	Percentage (%)
Positive perception (wood fuel viewed as necessary/beneficial)	191	54.6
Negative perception (wood fuel viewed as harmful; would switch if able)	159	45.4

Source: Field Survey Research, 2026

Slightly more than half of respondents (54.6%) held a broadly positive perception of wood fuel, regarding it as a necessary and dependable resource, while 45.4% expressed a predominantly negative perception, citing health discomfort and a preference for cleaner alternatives where affordable. This near-even split reflects the ambivalence documented by Aderemi et al. (2022) and Olorunfemi et al. (2022), who found that women's perception of wood fuel is shaped simultaneously by its practical necessity and its recognised health cost.

4.7 Preventive Measures Adopted

Table 7: Preventive Measures Adopted by Respondents (n = 350)

Preventive Measure	Frequency	Percentage (%)
Cooking in a well-ventilated area or outdoor kitchen	215	61.4
Attendance at health education/awareness programme	118	33.7
Use of improved cook-stove	100	28.6
Use of face mask while cooking	50	14.3
No preventive measure adopted	84	24.0

Source: Field Survey Research, 2026

As shown in Table 7, cooking in a well-ventilated area or outdoor kitchen was the most widely adopted preventive practice (61.4%), while use of improved cook-stoves (28.6%) and personal protective equipment such as face masks (14.3%) were comparatively less common, reflecting the cost and accessibility barriers previously identified in the literature (Chen et al., 2022; Oyerinde et al., 2020). Notably, almost a quarter of respondents (24.0%) reported adopting no preventive measure at all, underscoring a gap between awareness and protective action.

4.8 Test of Hypotheses

4.8.1 Hypothesis One

HO1: There is no statistically significant relationship between respondents' motivating factors for wood fuel consumption and their adoption of preventive measures against wood fuel-related health risks.

A Chi-square test of independence was conducted on a 4 × 3 contingency table cross-tabulating respondents' dominant motivating factor (grouped as economic/poverty-related, affordability and accessibility, lack of alternative fuel sources, and cultural/household-related factors) against their level of adoption of preventive measures (high, moderate, low).

Table 8: Chi-Square Test of the Relationship Between Motivating Factors and Preventive Measures

Statistic	Value
Chi-square (χ^2)	22.47
Degrees of freedom (df)	6
p-value	.001
Decision ($\alpha = 0.05$)	Reject HO1

Since the calculated p-value (.001) is less than the 0.05 level of significance, the null hypothesis (HO1) is rejected. This indicates a statistically significant relationship between respondents' motivating factors for wood fuel consumption and their adoption of preventive measures, suggesting that the reason underlying a woman's use of wood fuel has a bearing on whether, and how consistently, she takes steps to reduce its associated health risks.

4.8.2 Hypothesis Two

HO2: There is no statistically significant relationship between selected socio-demographic characteristics (age, religion, ethnic affiliation and educational level) of respondents and their perception of wood fuel consumption.

Four separate Chi-square tests of independence were conducted, cross-tabulating each socio-demographic variable against respondents' perception category (positive or negative).

Table 9: Chi-Square Test of the Relationship Between Socio-Demographic Characteristics and Perception of Wood Fuel Consumption

Socio-Demographic Variable	χ^2	df	p-value	Decision ($\alpha = 0.05$)
Age	12.85	4	.012	Reject HO2
Religion	3.41	2	.182	Fail to reject HO2
Ethnic affiliation	9.63	4	.047	Reject HO2
Educational level	16.28	3	<.001	Reject HO2

The results in Table 9 show that age ($\chi^2 = 12.85$, df = 4, p = .012), ethnic affiliation ($\chi^2 = 9.63$, df = 4, p = .047) and educational level ($\chi^2 = 16.28$, df = 3, p < .001) were each significantly associated with respondents' perception of wood fuel consumption, leading to rejection of the null hypothesis for these variables. Religion, however, was not significantly associated with perception ($\chi^2 = 3.41$, df = 2, p = .182), and the null hypothesis was retained in this instance. Overall, given that three of the four socio-demographic variables examined showed a statistically significant association, HO2 is substantially rejected, indicating that socio-demographic characteristics, particularly age, ethnicity and education, meaningfully shape how women in Anyigba community perceive wood fuel consumption.

4.8.3 Hypothesis Three

HO3: There is no statistically significant relationship between respondents' knowledge of wood fuel health risks and their adoption of preventive measures.

A Pearson product-moment correlation was computed between respondents' composite knowledge score and their composite preventive-measures score, both measured on a continuous 0–100 index.

Table 10: Pearson Correlation Between Knowledge of Health Risks and Adoption of Preventive Measures

Statistic	Value
Pearson correlation coefficient (r)	.41
Sample size (n)	350
p-value	<.001
Decision ($\alpha = 0.05$)	Reject HO3

The result shows a moderate, positive and statistically significant correlation between knowledge of wood fuel health risks and adoption of preventive measures ($r = .41$, $n = 350$, $p < .001$). The null hypothesis (HO3) is therefore rejected, indicating that women with a higher level of knowledge of wood fuel health risks are more likely to adopt preventive practices. The moderate, rather than strong, magnitude of the correlation, however, suggests that knowledge is only one of several factors, alongside affordability and access, that determine whether preventive action is actually taken.

4.9 Discussion of Findings

The findings of this study demonstrate that wood fuel consumption among women in Anyigba community is driven principally by economic considerations, namely affordability and accessibility, rather than by cultural preference alone. This finding is consistent with the Rational Choice Theory (Smith, 1776), which posits that individuals select courses of action that best serve their immediate self-interest given the resources available to them; in this context, the low monetary cost of wood fuel outweighs its recognised long-term health cost for many respondents.

The finding that most respondents possess a moderate to high level of knowledge of wood fuel health risks, yet a notable minority adopt no preventive measure whatsoever, illustrates the perceived-barrier component of the Health Belief Model (Hochbaum, 1958; Rosenstock, 1974): awareness of risk does not by itself overcome structural obstacles such as the cost of improved cook-stoves or the unavailability of alternative fuels. This is further reinforced by the moderate, rather than strong, correlation obtained under Hypothesis Three, which suggests that knowledge functions as a necessary but insufficient condition for behavioural change.

The significant association between socio-demographic characteristics, particularly age, ethnicity and educational attainment, and perception of wood fuel consumption lends support to the Fuel Stacking Theory (Masera et al., 2000), which anticipates that a household's position in the energy transition process, and therefore its perception of any single fuel, will vary according to its social and economic characteristics. Younger and more educated respondents in this study were more likely to hold negative perceptions of wood fuel, suggesting a generational and educational gradient in openness to energy transition that policy interventions could usefully target.

In al, these findings suggest that interventions aimed solely at raising awareness of wood fuel health risks are unlikely, on their own, to produce substantial behavioural change in Anyigba community. Rather, a combined strategy addressing affordability, access to alternative fuels and sustained community-level education is required to translate existing knowledge into consistent preventive practice.

5. Conclusion

This study examined the knowledge and preventive measures of wood fuel-related health risks among women in Anyigba community, Dekina Local Government Area, Kogi State. The findings show that wood fuel consumption remains highly prevalent and is driven primarily by affordability and limited access to alternative fuels rather than by cultural preference alone. Although a majority of respondents demonstrated a moderate to high level of knowledge of the associated health risks, this knowledge did not consistently translate into the adoption of preventive measures, and the statistical analysis confirmed significant relationships between motivating factors, socio-demographic characteristics, knowledge and preventive behaviour. The study concludes that closing the gap between knowledge and practice requires interventions that address both the informational and the structural barriers to safer cooking practice among women in the study area.

6. Recommendations

Based on the findings, the following recommendations are made:

a) Government and non-governmental organisations should design and subsidise improved cook-stove programmes to reduce the cost barrier to the adoption of cleaner cooking technology among women in Anyigba community.

b) Health education and awareness campaigns should move beyond general risk communication to address specific, practicable preventive actions, such as ventilation and protective equipment, that women can adopt in the absence of immediate fuel substitution.

c) Micro-credit and cooperative financing schemes should be extended to women to facilitate access to alternative energy sources such as liquefied petroleum gas and solar cooking technology.

d) Targeted interventions should give particular attention to older, less educated women, who were found to hold more positive perceptions of wood fuel and may therefore require more sustained engagement to encourage behavioural change.

e) Further community-based research should be undertaken to monitor the long-term health outcomes of wood fuel exposure and to evaluate the effectiveness of preventive interventions introduced in the study area.

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