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Socioeconomic Determinants of Household Cooking Energy Choices in Mtendere Lusaka, Zambia

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Abstract

Purpose: The study aimed to identify the key socioeconomic determinants influencing household cooking energy choices in Mtendere, with particular emphasis on income, education, household size and cultural preferences.

Methodology: A mixed-methods design was used, combining quantitative data from structured Likert-scale questionnaires with qualitative insights from interviews. The study adopted a cross-sectional approach and targeted 395 households. Primary data were gathered through surveys and interviews, while secondary data came from journals and reports.

Findings: The study established that 92.4% of households rely primarily on charcoal for cooking, while 50.1% engage in fuel stacking. Around 78% experience more than 18 hours of power outages per day. Nearly half of the households (47.8%) earn between ZMW 1,001-3,000 monthly, and 50.4% spend ZMW 101-300 on cooking fuel. Income, education, household size, and cultural norms emerged as the major determinants of cooking energy choices.

Unique contribution to theory, practice and policy: The study highlights how socioeconomic realities and cultural practices jointly shape energy choices in low-income urban settings. It provides evidence-based guidance for policy by recommending awareness campaigns on the health and environmental risks of charcoal, financial incentives such as subsidies, and improved infrastructure for electricity and LPG access. It also offers practical direction by emphasizing community engagement, culturally grounded interventions, fuel-efficiency technologies, diversification of energy options, and regular monitoring to support a gradual shift toward clean cooking solutions.

Keywords: *Household Energy Choices, Socio-Economic Determinants, Cooking Energy, Multinomial Logit Analysis, Cultural dynamics*

1.0 INTRODUCTION

Access to clean and sustainable cooking energy is one of the most persistent challenges in Sub-Saharan Africa. Approximately 85% of households in the region still rely on solid fuels like firewood, charcoal, and agricultural residues for cooking (IEA, 2023). This widespread use contributes significantly to indoor air pollution, leading to over 500,000 premature deaths each year from respiratory illnesses (WHO, 2023). Furthermore, using solid fuels speeds up deforestation, harms the environment, and increases carbon emissions, making it harder to achieve climate resilience and sustainable development.

In Zambia, especially in low-income urban areas like Mtendere in Lusaka, the situation is similar. Charcoal and firewood are still the main cooking fuels, despite having electricity infrastructure. Recent statistics show that over 90% of urban households rely heavily on charcoal (Zambia Statistics Agency, 2022). This reliance arises mainly from high electricity prices, an unreliable power supply, low-income levels, and a lack of awareness about the health and environmental risks of solid fuel use (Mulenga, Tembo, & Richardson, 2019; Tetra Tech, 2024). Cultural preferences, traditional cooking methods, and beliefs about food flavour also contribute to dependence on these fuels, hindering the shift to cleaner options (Bailis, Drigo, Ghilardi, & Masera, 2015).

Although the Government of Zambia and development partners have launched various clean cooking initiatives, such as improved biomass stoves and liquefied petroleum gas (LPG) programs, adoption rates remain low. Ongoing socioeconomic issues, like poverty, insecure housing, and poor energy infrastructure, continue to limit access to and acceptance of cleaner technologies (Ministry of Energy, 2019; Mamuye, Lemma, & Woldeamanuel, 2018). To address these barriers, it is essential to understand the underlying socioeconomic factors that influence household cooking energy choices.

This study examines the main socioeconomic factors affecting household cooking energy decisions in Mtendere, Lusaka. It looks at factors like household income, education levels, household size, and fuel costs, which together determine the types and combinations of fuels urban households use. By identifying these drivers, the study aims to guide policy changes and development programs that can encourage a gradual and fair shift to clean energy. Ultimately, this research aims to promote a more sustainable, health-focused, and economically sound household energy system in urban Zambia.

3. METHODS AND PROCEDURES

3.1 Study Area

The study was conducted in Mtendere Township, a densely populated peri-urban settlement located in Lusaka, Zambia's capital city. Mtendere is characterized by mixed socioeconomic conditions, with most residents engaged in informal employment and low-income activities. The area experiences infrastructural challenges such as unreliable electricity supply, limited access to

clean energy technologies, and high dependence on charcoal for domestic use. The township was chosen because it exemplifies urban communities where energy poverty and environmental stress intersect, making it a suitable case for exploring the socioeconomic determinants of household cooking energy choices.

3.2 Study Design

A cross-sectional mixed-methods research design was employed to capture both quantitative and qualitative data on household cooking energy choices. The quantitative component utilized structured questionnaires to obtain measurable household-level data, while the qualitative component involved semi-structured interviews to gain in-depth insights into household attitudes, perceptions, and decision-making processes. The combination of both methods provided a comprehensive understanding of the multifaceted factors influencing cooking energy choices in Mtendere.

3.3 Sampling Strategy

The study applied a multistage cluster sampling technique to select households for participation. Mtendere Township was first divided into clusters based on geographic zones, from which specific clusters were randomly chosen to ensure representativeness across socioeconomic categories. A total sample of 395 households was targeted for the survey. Within each selected household, the head or principal decision-maker responsible for energy use was interviewed. Additionally, purposive sampling was employed to identify key informants, such as community leaders and energy stakeholders, who provided qualitative insights through in-depth interviews. This combination of random and purposive sampling enhanced both the reliability and contextual depth of the data collected.

3.4 Data Collection

Primary data were collected through structured questionnaires, designed with both closed- and open-ended questions, and administered using a Likert scale to measure perceptions and preferences. The questionnaires captured demographic characteristics, income levels, household size, energy expenditure, and preferred cooking fuels. Qualitative data were gathered using interview guides that facilitated discussions around cultural norms, awareness of health and environmental effects, and barriers to adopting clean energy. Secondary data were sourced from published journals, national statistics, and government reports to complement primary findings. The research instruments underwent pilot testing to ensure validity, reliability, and internal consistency.

3.5 Data Analysis

Quantitative data were analysed using the Statistical Package for the Social Sciences (SPSS) to generate descriptive statistics and perform inferential analysis. The multinomial logit model (MLM) was applied to estimate the significance and direction of socioeconomic factors influencing household cooking energy choices. The model allowed for comparison among

multiple fuel options charcoal, electricity and firewood relative to selected reference categories. Qualitative data were transcribed verbatim and analysed using thematic analysis, identifying recurring patterns and themes related to affordability, accessibility, cultural influence, and awareness. The integration of quantitative and qualitative findings ensured triangulation, enhancing the robustness and credibility of the study's conclusions.

RESULTS

4.0 Socio-Demographic Characteristics of Respondents

Table 1 provides a summary of demographic information. The majority of household heads in Mtendere were male (56.5%), and most respondents (68%) were within the economically active age range of 31-60 years. Nearly two-thirds (62.8%) were married, while 40.8% had attained secondary education, reflecting moderate literacy levels. Income distribution showed that almost half (47.8%) of households earned between ZMW 1,001 and 3,000 per month, indicating a predominantly low-income community. Most households were medium-sized, with 4-6 members, and nearly half of the respondents depended on informal employment as their main source of income. These demographic characteristics underline the socioeconomic vulnerability influencing household energy choices in Mtendere.

Table 1. Socio-Demographic Characteristics of Respondents

Variable	Category	Frequency (n=395)	Percentage (%)
Gender of Household Head	Male	223	56.5
	Female	172	43.5
Age of Household Head (years)	18-30	62	15.7
	31-45	148	37.5
	46-60	120	30.4
	Above 60	65	16.4
Marital Status	Married	248	62.8
	Single	84	21.3
	Widowed/Divorced	63	15.9
Education Level	No formal education	39	9.9
	Primary	128	32.4
	Secondary	161	40.8
	Tertiary	67	17.0
Monthly Household Income (ZMW)	≤1,000	82	20.8
	1,001-3,000	189	47.8
	3,001-5,000	75	19.0
	≥5,001	49	12.4
Household Size (members)	1-3	89	22.5
	4-6	192	48.6
	≥7	114	28.9
Primary Source of Income	Informal employment	187	47.3
	Formal employment	92	23.3
	Small business	89	22.5
	Other (casual work, remittances)	27	6.9

Quantitative Data Findings

4.1 Primary energy sources of household

The use of multiple cooking energy sources in households is common worldwide (Heltberg, 2003). The study revealed that 1.8% of the households use firewood as cooking energy source, the cooking fuel portfolio is dominated by charcoal with 92.4% of the sampled households using it, 4.3% use electricity, while1.3% use Liquefied Petroleum Gas and 0.3% use biogas as a cooking energy source. The study also revealed that 50.1% of the households use more than one source of cooking fuel while 49.9% use only one source. Figure 1 illustrates the use of various cooking fuels in Mtendere.

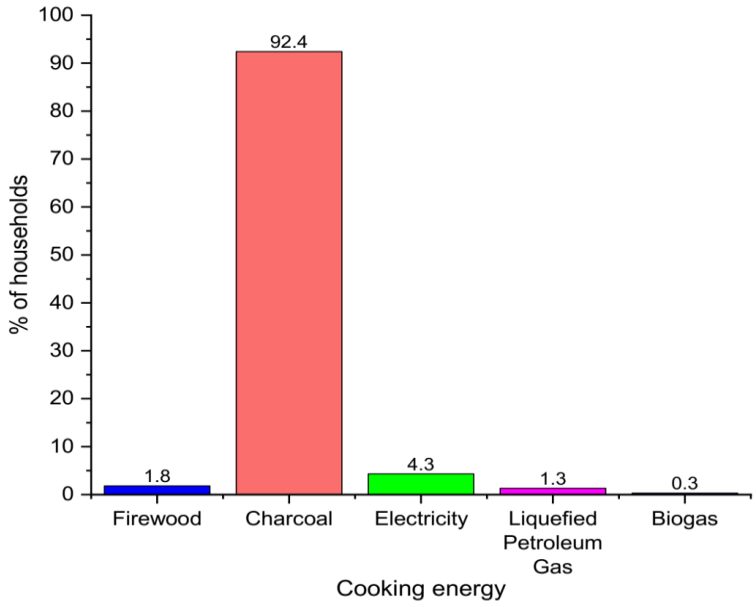

***Figure 1**: Household cooking energy choices*

4.2 Secondary cooking energy sources of household

The data explores secondary cooking fuel use among 395 households, highlighting fuel switching practices as shown in Figure 2. While 50.1% of households report a secondary cooking energy source, 49.9% rely solely on their primary source. Electricity is the dominant secondary choice (40.5%), reflecting its flexibility and growing accessibility. Charcoal (6.1%) and firewood (1.8%) are used to supplement, likely for cost management or during power outages. Cleaner options like LPG (1.5%) and biogas (0.3%) are rarely utilized indicating economic, infrastructural, or awareness barriers that hinder a full transition to modern fuels. Fuel switching reveals diverse adaptation strategies among households.

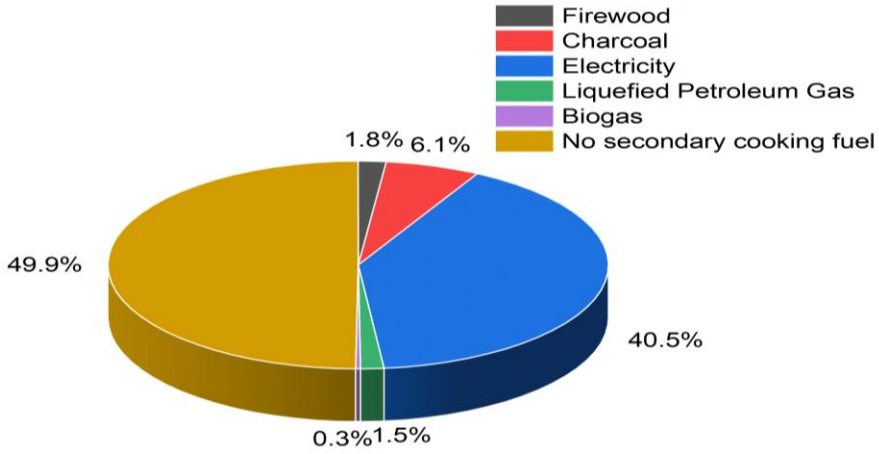

***Figure 2**: Secondary cooking Fuel*

4.3 Perceived health and environmental impacts of primary cooking

Table 2, presents respondents' perceptions of the health impacts associated with various primary cooking energy sources. The findings show that charcoal, the predominant fuel in Mtendere, was perceived to have the most significant health effects, with 72 respondents (19.7%) reporting severe impacts and 65 (17.8%) indicating moderate effects, while a majority (62.5%) perceived no or minor health impacts. This pattern suggests limited awareness of the health risks associated with charcoal use despite its link to indoor air pollution and respiratory illnesses. Firewood users also showed low recognition of health risks, with most reporting no or minor impacts. In contrast, cleaner fuels such as electricity and LPG were largely viewed as safe, with 58.8% of electricity users and all LPG users perceiving no or minor health effects. These findings reveal a distinct perception gap where traditional fuels are seen as more harmful than modern alternatives, yet overall awareness of health hazards remains inadequate, underscoring the need for public health education to promote cleaner and safer cooking practices.

Table 2: Perceived health impacts of primary cooking energy

		No impact	Minor impact	Moderate impact	Severe impact	Total
Primary cooking energy source	Firewood	3	2	1	1	7
	Charcoal	111	117	65	72	365
	Electricity	10	1	3	3	17
	LPG	3	2	0	0	5
	Biogas	0	0	1	0	1
	Total	127	122	70	76	395

Table 3, illustrates household perceptions of the environmental impacts of different cooking fuels in Mtendere. Charcoal, used by the majority of households, was identified as having the greatest environmental impact, with 46 respondents reporting moderate and 85 reporting severe effects. However, a large proportion (64.1%) perceived little or no environmental harm, indicating limited awareness of charcoal's role in deforestation and carbon emissions. Similarly, most firewood users perceived minimal impact, suggesting low recognition of its contribution to forest degradation. In contrast, electricity and LPG were largely viewed as environmentally friendly, with most users associating them with negligible impacts, reflecting greater awareness of their cleaner nature. Overall, the results show a clear gap in environmental awareness among charcoal and firewood users, underscoring the need for targeted education and policy interventions to promote sustainable and low-impact cooking energy alternatives.

Table 3: Perceived environmental impacts of current cooking energy

		No impact	Minor impact	Moderate impact	Severe impact	Total
Primary cooking energy source	**Firewood**	4	2	0	1	7
	Charcoal	119	115	46	85	365
	Electricity	11	1	0	5	17
	LPG	1	3	1	0	5
	Biogas	0	0	0	1	1
	Total	135	121	47	92	395

4.4 Multinomial Logit Analysis for charcoal and Electricity as Compared to Firewood

The multinomial logit analysis (Table 4) revealed that several socioeconomic and cultural factors significantly influence household cooking fuel choices in Mtendere when comparing charcoal and electricity to firewood. Household size was a strong predictor, with larger households being over three times more likely to use either charcoal or electricity, suggesting that these fuels better meet the cooking demands of bigger families. Income level also had a positive and significant effect, with higher-income households nearly twice as likely to adopt charcoal or electricity, reflecting their ability to afford relatively costlier fuels. Conversely, education showed a negative association, indicating that more educated household heads were less likely to choose charcoal or electricity, possibly due to greater awareness of health and environmental implications. Cultural preferences significantly influenced fuel choice, as respondents with strong cultural attachment to specific fuels were over twice as likely to select them over firewood. Frequent power outages further increased the likelihood of using charcoal or electricity by more than four times, underscoring the role of energy reliability in shaping fuel decisions. In contrast, gender, marital status, income source, and awareness were not statistically significant predictors. The model was statistically significant ($p = 0.00021$) and explained 34.5% of the variance (Pseudo $R^2 = 0.3454$), confirming that household size, income, education, cultural norms, and electricity reliability are key determinants of cooking energy choices in Mtendere.

Table 4: Multinomial Logit Analysis for charcoal and Electricity as Compared to Firewood

Variable	Charcoal			Electricity		
	Coefficient	P-value	Odds Ratio	Coefficient	P-value	Odds Ratio
Constant	1.950	0.498	7.026	2.500	0.362	12.182
Gender	0.400	0.210	0.670	0.980	0.290	2.664
Age	-0.400	0.041	0.670	-0.450	0.035	0.637
Marital Status	0.450	0.305	1.568	0.550	0.289	1.733
Household Size	1.120	0.004***	3.065	1.200	0.006***	3.320
Income Source	0.390	0.190	1.477	0.440	0.167	1.552
Income Level	0.670	0.027**	1.954	0.700	0.031**	2.014
Education	-1.100	0.038**	0.332	-1.050	0.042**	0.349
Awareness	-0.180	0.860	0.835	-0.150	0.845	0.861
Cultural Preferences	0.880	0.013**	2.410	0.920	0.016**	2.510
Power Outage	1.460	0.001***	4.305	1.540	0.001***	4.665
Log-Likelihood Ratio Test p-value: 0.00021						
Pseudo R^2: 0.3454						

***significant at 1% level (p<0.01); **significant at 5% level (0.01≤p<0.05); *significant at 10% level (0.05≤p<0.100)

4.5 Binary logit analysis for charcoal as compared to electricity

The binary logit analysis (Table 5) comparing charcoal and electricity as cooking fuels reveals several statistically significant predictors influencing household choices. The model demonstrates a good overall fit (Pseudo R^2 = 0.3454; p = 0.00021), indicating that it effectively explains variations in fuel preference. Among the demographic and socio-economic variables, age, household size, income level, education, cultural preferences, and power outages emerge as key determinants. Age (p = 0.04; OR = 1.405) positively influences charcoal use, suggesting that older household heads are more likely to rely on charcoal. Household size shows a strong positive effect (p = 0.005; OR = 3.183), implying that larger households are significantly more inclined to use charcoal likely due to cost efficiency and ease of meeting higher cooking energy demands. Similarly, income level (p = 0.028; OR = 1.969) positively affects charcoal choice, indicating that

households with moderate income levels still find charcoal more affordable or accessible than electricity.

Conversely, education negatively affects charcoal use ($p = 0.04$; OR = 0.343), meaning that higher educational attainment substantially reduces the likelihood of choosing charcoal, possibly reflecting greater awareness of clean energy benefits. Cultural preferences ($p = 0.015$; OR = 2.46) significantly increase the odds of choosing charcoal, underscoring the influence of traditional cooking habits and taste preferences. Power outages exhibit the most pronounced effect ($p = 0.001$; OR = 4.482), confirming that unreliable electricity supply is a major driver pushing households toward charcoal use. Meanwhile, gender, marital status, income source, and awareness of clean cooking technologies show no significant effects. Overall, the results suggest that while socio-cultural and infrastructural factors particularly cultural norms and electricity reliability strongly shape household energy decisions, education remains a crucial pathway toward promoting cleaner energy transitions.

Table 5: Binary logit analysis for charcoal as compared to electricity

Variable	Coefficient	P-value	Odds Ratio
Constant	2.137	0.461	8.475
Gender	0.83	0.25	2.294
Age	0.34	0.04	1.405
Marital Status	0.497	0.299	1.644
Household Size	1.158	0.005***	3.183
Income Source	0.411	0.177	1.508
Income Level	0.678	0.028**	1.969
Education	-1.07	0.04**	0.343
Awareness	-0.168	0.856	0.845
Cultural preferences	0.90	0.015**	2.46
Power outage	1.50	0.001***	4.482
Log-Likelihood Ratio Test p-value: 0.00021			
Pseudo R^2: 0.3454			

***significant at 1% level ($p<0.01$); **significant at 5% level ($0.01\leq p<0.05$); *significant at 10% level ($0.05\leq p<0.100$)

Qualitative Results

4.6 Factors Influencing Cooking Energy Choices

The qualitative analysis explored the underlying factors shaping household cooking energy choices in Mtendere, guided by the question: *"What socioeconomic factors affect household energy choices?"* The analysis revealed six interrelated themes; affordability and accessibility, environmental awareness, income constraints, educational influence, household composition, and cultural cooking practices that together illuminate the complex interplay between economic realities, infrastructure reliability, and social norms.

4.6.1 Affordability and Accessibility

Affordability and accessibility emerged as the most dominant factors influencing cooking energy decisions. Most households favored charcoal due to its low cost, ease of access, and reliability, especially during frequent power outages. The dual burden of economic limitations and unreliable electricity infrastructure reinforced dependence on traditional fuels. One participant explained,

> *"Cost is everything; if it's cheap, we go for it. With load-shedding, it's even harder to switch from charcoal"* (R1).

Another added,

> *"The convenience of charcoal is unbeatable, especially with regular power cuts disrupting other options"* (R5).

These perspectives underscore that economic and infrastructural challenges significantly constrain transitions to cleaner fuels such as LPG or electricity. Hence, affordability, accessibility, and reliability collectively dictate household energy preferences.

4.6.2 Awareness of Environmental Impact

While participants demonstrated varying levels of environmental awareness, many acknowledged the negative ecological effects of charcoal but felt constrained by financial realities. As one respondent stated,

> *"I know that using charcoal affects our environment, but it's hard to stop"* (R3).

Similarly,

> *"There's awareness, but cost and access make it difficult to shift"* (R4).

This pattern indicates that environmental consciousness alone is insufficient to drive behavioral change without economic support. Education and awareness programs, if combined with affordable alternatives, could strengthen the community's capacity to adopt cleaner energy options.

4.6.3 Income Constraints

Income was consistently identified as a major determinant of energy choice. Households with lower income levels relied heavily on charcoal for its affordability and minimal upfront cost, while higher-income households occasionally adopted LPG. As noted by one participant,

> *"Charcoal is affordable and doesn't require a big upfront cost"* (R2),

while another remarked,

> *"For many, daily survival comes first; clean energy costs are secondary"* (R1).

These findings highlight the need for targeted subsidies and financial incentives to make modern fuels more attainable.

4.6.4 Educational Influence on Energy Awareness

Education shaped awareness and attitudes toward alternative energy sources, with better-informed individuals demonstrating greater openness to cleaner options. Yet, affordability and electricity reliability remained major obstacles.

> *"For those with education, it's easier to understand why cleaner energy is better,"* observed one respondent (R5),

though another noted,

> *"Even educated families face cost barriers, so awareness alone isn't enough"* (R3).

This suggests that educational initiatives must be complemented by economic and infrastructural interventions to yield meaningful change.

4.6.5 Household Composition

Household size significantly influenced energy preferences. Larger families preferred charcoal due to its bulk affordability and ease of storage, while smaller or wealthier households were more likely to use electricity or LPG. One participant remarked,

> *"With many family members, it's easier to use charcoal because it lasts longer"* (R4).

This indicates a practical preference for charcoal in meeting the energy demands of large families, highlighting the need for scalable clean energy solutions suited to different household sizes.

4.6.6 Cultural Cooking Practices

Cultural norms and traditional cooking practices also shaped household energy decisions. Several participants expressed attachment to charcoal-based cooking due to taste, familiarity, and social custom.

> *"Using charcoal feels natural for us and load-shedding just reinforces that"* (R5).

Another added,

> *"Tradition plays a role; changing practices requires more than just availability"* (R7).

These insights suggest that sustainable energy interventions must integrate cultural considerations to ensure social acceptance and long-term adoption.

5.0 Discussion

The study's findings reveal that household cooking energy choices in Mtendere are shaped by a complex interplay of socioeconomic, infrastructural, and cultural factors. Quantitative results from the multinomial and binary logit analyses, supported by qualitative evidence, underscore that income, education, household size, cultural preferences, and electricity reliability are the most significant determinants of fuel choice. These results reinforce previous studies across Sub-Saharan Africa that emphasize how affordability, accessibility, and social norms drive dependence on traditional fuels despite the availability of modern alternatives (Boudewijns, et al., 2022; Mulenga, Tembo, & Richardson, 2019)

Affordability and accessibility emerged as dominant themes influencing household decisions. The statistical significance of income level and household size in both logit models aligns with respondents' emphasis on the economic practicality of charcoal. Larger households were over three times more likely to use charcoal, reflecting its cost-effectiveness and availability during power outages. Qualitative evidence confirmed that "cost is everything; if it's cheap, we go for it" (R1), highlighting how poverty and unreliable energy infrastructure perpetuate reliance on solid fuels. This pattern mirrors findings from similar urban settings, where energy poverty limits adoption of cleaner fuels even among households aware of their health and environmental benefits (Malah-Kuete, 2025; Mohammed, James, & Bahaj, 2025). Frequent power outages further compound this problem, as shown by the strong positive association between electricity unreliability and charcoal use ($OR = 4.482$, $p < 0.01$). This supports arguments that infrastructural instability undermines the transition to sustainable energy in African cities (IEA, 2023; Tornel, Iglesias, & Loureiro, 2024).

Cultural norms and cooking practices play an equally critical role in shaping energy decisions. The significance of cultural preferences ($p = 0.015$) and consistent qualitative references to "traditional cooking methods" suggest that charcoal use is deeply embedded in social identity and food culture. Similar findings have been reported in Ethiopia and Tanzania, where cooking preferences and beliefs about taste constrain adoption of LPG or electricity (Gebreegziabher, Mekonnen, Kassie, & Köhlin, 2012; Pueyo, Carreras, & Ngoo, 2020). These cultural dynamics indicate that energy transitions cannot rely solely on economic incentives but must incorporate behaviorally informed, culturally sensitive approaches that respect local traditions while promoting modern alternatives.

Education emerged as a powerful determinant inversely associated with charcoal use ($p = 0.04$; $OR = 0.343$), suggesting that higher education fosters greater awareness of clean energy benefits. Respondents with tertiary education demonstrated stronger environmental consciousness, consistent with global literature linking education to sustainable energy adoption (Lewis & Pattanayak, 2012; Su & Azam, 2023). However, the qualitative insights reveal that awareness alone does not guarantee behavior change as one participant noted, "Even educated families face

cost barriers, so awareness alone isn't enough" (R3). This highlights a critical policy gap: educational campaigns must be complemented by affordability measures, infrastructure improvement, and supportive financing mechanisms to translate knowledge into practice.

The persistence of charcoal use among moderate-income households suggests that income alone is not a sufficient predictor of clean energy adoption. While higher-income households occasionally used LPG, most still resorted to charcoal during power interruptions or due to LPG refilling costs. This dual reliance, or "fuel stacking," supports the energy ladder hypothesis only partially, as households do not fully abandon traditional fuels when their incomes rise (Heltberg, 2003; Pachauri & Rao, 2013). Instead, they diversify energy use to manage cost, reliability, and convenience a behavior also documented in Lusaka and other African urban contexts (Mulenga, Tembo, & Richardson, 2019; Wang, Mondela, & Kuuluvainen, 2022). Although some respondents recognized the environmental degradation caused by charcoal, financial limitations constrained their choices. The statement, "I know that using charcoal affects our environment, but it's hard to stop" (R3), exemplifies the tension between awareness and survival needs. Quantitative data showing low recognition of charcoal's environmental harm (64.1% perceiving little or no impact) further illustrates limited environmental literacy. This underscores the need for targeted awareness programs emphasizing the health and ecological consequences of biomass fuels complemented by affordable alternatives and incentives for clean energy adoption (Bailis, Drigo, Ghilardi, & Masera, 2015; WHO, 2024).

These findings carry important policy implications for Zambia's clean energy agenda. First, addressing affordability through targeted subsidies, microfinance, or pay-as-you-go systems could enhance access to LPG and electricity among low-income households. Second, investment in grid reliability and decentralized renewable systems would reduce dependence on charcoal during load-shedding. Third, culturally responsive education campaigns should promote behavioral change without alienating traditional cooking values. Finally, multi-sectoral collaboration between government, private investors, and community leaders is essential to align economic, cultural, and infrastructural strategies for a just energy transition.

6.0 Conclusion

This study demonstrates that household cooking energy choices in Mtendere are primarily driven by socioeconomic and infrastructural realities intertwined with cultural preferences. The dominance of charcoal reflects not only its affordability and accessibility but also the inadequacy of reliable electricity supply and the persistence of traditional cooking practices. Quantitative analyses identified income level, education, household size, cultural preferences, and power reliability as the most significant determinants of fuel choice, while qualitative findings reinforced the importance of affordability, convenience, and cultural familiarity in sustaining charcoal dependence. These results collectively reveal that energy decisions are rational responses to economic constraints and infrastructural shortcomings rather than a lack of awareness alone.

Recommendations

Promoting a transition to cleaner cooking energy in such contexts therefore requires multidimensional strategies. Policy interventions should combine financial incentives, such as targeted subsidies and micro-credit schemes, with infrastructure investments that enhance electricity reliability and expand LPG distribution networks. Equally important is the integration of culturally responsive awareness programs that address behavioural and traditional barriers to change. By coupling economic empowerment, education, and reliable energy services, Zambia can foster a gradual yet sustainable shift from charcoal toward modern, cleaner energy options advancing national commitments to SDG 7 (Affordable and Clean Energy), SDG 3 (Good Health and Well-being), and SDG 13 (Climate Action).

Acknowledgement

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Ethical Approval

This study was permitted by the University of Zambia ethics committee. Permission to collect data from the study site was also obtained from Board of Graduate Studies and other relevant authorities. Participants who took part in the study completed consent forms and were assured of anonymity.

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