KADUNA JOURNAL OF GEOGRAPHY
2026, VOL. 8, No. 1, 355-364
https://doi.org/10.47514/kjg.2026.08.01.037

Research Article

Effect of Fuel Scarcity on Households Mobility in Lagos State, Nigeria

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ABSTRACT

Petrol scarcity is no longer a rare event in Nigeria. It has become a reoccurring issue that residents have learned to accept as something that occurs at least once a year. Its scarcity has led to economic strain, daily life difficulty and social instability. This study examined the effect of fuel scarcity on household mobility in Lagos State. Quantitative research design using questionaire was used while household members residing in Lagos State served as the population. A total number of 75 respondents were selected from the study area using multi-stage sampling methods while face-to-face questionnaire were administered for data collection. The data were analysed using descriptive and inferential statistics. The findings showed that 81.3% of the households agreed that fuel scarcity limited their commuting choices, 78.6% agreed that fuel scarcity increased their transport fares, limited 89.3% households from their daily mobility while 82.6% households were unable to move freely due to scarcity and significantly affected their family's well-being. The correlation test showed a significant relationship between fuel scarcity and household mobility in Lagos State. Therefore, the study recommends enhancing public transport, improving fuel supply, investing in alternative energy transport, developing non-motorised transport infrastructure and promoting adaptive mobility strategies by both Federal and Lagos State of Nigeria.

ARTICLE HISTORY
Submitted 21 March 2025
Accepted 19 May 2026
Published 28 May 2026

GUEST EDITOR
A. M. Ahmed

KEYWORDS
Fuel Scarcity; Household Mobility; Lagos State; Transportation; Nigeria

1 Introduction

The importance of fuel to both human activities and automobiles cannot be overstated, just as water and air are essential for human survival and the performance of daily tasks. Fuel is widely used in several sectors of the economy, including transport, production, cooking, power generation and as a source of foreign exchange. It plays a critical role in facilitating human mobility. Mobility refers to the ability to move or be moved freely and easily (Moulton et al., 2019), while household mobility describes the movement of households within urban or metropolitan areas (Adey, 2017; Skeldon, 2018). In urban centres, most movements occur through motorised transport systems such as road vehicles, waterways, and railways (Agunloye, 2011; Agunloye and Ilechukwu, 2011; Adeyinka, 2013; Ademiluyi et al., 2016; Abdulkadir and Halimat, 2020; Okeke et al., 2021; Agboga et al., 2025), with relatively few people relying on cyclings or walking (Gbadamosi et al., 2021). These transport modes except bicycles and walking largely depend on fuel to power their engines, making fuel a fundamental component of daily mobility and economic activities. The relationship could be better explained through the Demand and Supply Theory (Marshall & Guillebaud, 1961), which stated that scarcity becomes inevitable when the demand for a commodity exceeds its available supply.

In Nigeria, however, fuel scarcity has become a recurring challenge rather than an occasional occurrence. Periodic shortages have been recorded for many years, with reports indicating at least six incidents of petrol scarcity in 2009 alone (Okolie-Osemene, 2015). In early 2022, the country again experienced a major shortage of fuel due to the importation of contaminated fuel (Lagos State Chambers of Commerce and Industry, 2023). This explained the incident in which a Lagos socialite, Erelu Okin Pearl Ogbulu was sharing fuel-filled jerrycans as souvenirs to guests at Havillah Event Centre, Oniru, Lagos as a gesture to compensate them for attending the event amid the prevailing fuel scarcity in 2022. As a result, citizens across the country spent several hours queuing at filling stations for limited supplies of petrol during this period. Although the Nigerian National Petroleum Corporation reportedly distributed about 387 million litres of petroleum products to ease the shortage, the situation persisted across the country.

In response this menace and subsidy issues that brought about scarcity of fuel in Nigeria, President Bola Tinubu announced the removal of fuel subsidy in the year 2023 and declared that the era of fuel scarcity had come to an end (Uwak et al., 2024; Elazeh & Tsegyu, 2026). Despite this policy shift, Nigeria is experiencing another significant fuel scarcity in early 2026, with petrol prices selling at different retail shops exceeding ₦1,000 per litre. For instance, on 9 March 2026, the Prevail Filling Station, Aroje Ogbomoso sold fuel at ₦1,080 per litre in the morning and the price increased to ₦1,280 in the evening.

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Part of what authorities identified as responsible for the recent fuel scarcity includes refinery supply constraints, rising global crude oil prices (The Guardian Nigeria, 2026) and geopolitical tensions, particularly the United States and Iran war. The fuel scarcity has wide-ranging implications for living standards and socio-economic activities of Nigerian citizens, as consistently highlighted by the previous studies. For instance, study of Aina and Odebiyi (1998) showed that fuel shortage has effect on the family include changes of eating habits and food consumption. Addah (2025) found that fuel scarcity also leads to increased cost of living, particularly through rising food prices. Similarly, Obileke (2026) observed that fuel scarcity in Nigeria contributed to energy poverty and reliance on alternative energy sources, where a large proportion of the households lacks reliable energy access, and often resort to inefficient and hazardous alternatives, including firewood and kerosene.

Furthermore, news media reports have highlighted the broader impacts of fuel scarcity in Nigeria which include substantial lost of man-hours due to prolonged queues and the unavailability of fuel (The Nigerian Guardian, 2022). However, despite the growing body of literature on the economic impacts of fuel scarcity and subsidy removal, limited research attention has been given to its effects on household mobility, particularly Lagos State Nigeria. Majority of the existing studies have largely concentrated on macroeconomic effects, household welfare, energy poverty, and cost-of-living outcomes in Nigeria, with insufficient empirical attention given to how fuel scarcity specifically shapes household mobility patterns in Lagos. This study seeks to address the identified gap by examining effect of fuel scarcity on household mobility patterns in Lagos, which previous studies has not been addressed. Therefore, the objective of this study is to examine the effect of fuel scarcity on household mobility in Lagos State, Nigeria.

1.1 Literature Review

Theories of Scarcity

Different scholars have developed theories to explain commodity scarcity by focusing on the factors that generate scarcity, the behavioural responses of individuals to scarcity and the conditions under which scarcity becomes noticeable in society. Among the prominent theories used to explain scarcity are the Frustration–Aggression Theory, the Hubbert Peak Theory and the Theory of Demand and Supply. This study was anchored on these three theories.

The Frustration Aggression Theory

The Frustration–Aggression Theory was originally developed by John Dollard, Neal E. Miller, Leonard Doob, O. H. Mowrer, and Robert Sears (1939). The theory suggested that frustration arises when individuals are unable to obtain essential resources needed for their daily survival. In the case of petrol scarcity, frustration emerges when people are unable to access sufficient fuel for transport and other socio-economic activities. Fuel scarcity is often evident through long queues at filling stations, where both motorists and individuals carrying containers wait to purchase petrol. In such situations, large crowds may gather and tensions often rise among consumers seeking access to the limited supply of fuel. This could lead to consumers pushing each other before getting the product at the filling stations.

Filling station attendants may prioritise customers willing to pay higher prices or offer tips (bribe), which can further aggravate the situation. Instances of verbal confrontations and physical altercations could be reported when large numbers of vehicle operators compete for scarce fuel supplies. During this period, abnormal increases in petrol prices and transport fares are common and significant man-hours are lost as people spend long periods waiting to obtain fuel.

The Hubbert Peak Theory

The Hubbert Peak Theory was developed by M. King Hubbert (1956) to explain the pattern of oil production in a given region. The theory provided a framework for understanding fuel scarcity from the perspective of resource availability and production cycles. According to the theory, oil production follows a bell-shaped curve: production rises as new reserves are discovered and exploited, reaches a peak point and subsequently declines as reserves become depleted. Based on this theory, shortages of petroleum products may occur when oil production reaches its peak and begins to decline. As production decreases while demand remains high, shortages of petrol may emerge. Although other factors such as distribution challenges and policy decisions may also contribute to fuel scarcity, the Hubbert Peak Theory highlights the structural and long-term supply constraints that can influence the availability of petroleum products.

The Theory of Demand and Supply

The Law of Supply and Demand is a fundamental economic principle used to explain market behaviour and price determination. The theory was popularised by Alfred Marshall and further discussed by Marshall and Guillebaud (1961). It stated that scarcity becomes inevitable when the demand for a commodity exceeds its available supply. In the context of petrol scarcity, this theory explains shortages as a result of demand-side pressures combined with limited supply. In Nigeria, the demand for fuel is extremely high due to its widespread use in transport, electricity generation and economic activities. When the supply of petrol becomes insufficient to meet this demand, shortages occur, leading to long

queues at filling stations. During this period, consumers often spend several hours attempting to purchase fuel, resulting in significant loss of productive man-hours. With high demand and limited supply, transport services slow down and mobility of household becomes constrained. Therefore, this is relevant to this study because it explains how imbalances between fuel demand and supply contribute to petrol scarcity and reduced mobility.

1.2 Empirical Review

There is a substantial body of literature on the empirical analysis of fuel scarcity, with various scholars examining its causes, effects and policy implications. One notable study is that of Agiri and Morka (2018) which investigated the causes of chronic fuel scarcity and its implications on Nigerian economy. Their findings indicated that fuel shortages in Nigeria are largely attributed to inadequate foreign exchange for petroleum marketers to import fuel, aging and non-functional refineries, pipeline vandalism, and the hoarding of petroleum products by marketers. Similarly, Akpoghomeh and Badejo (2006) examined the Federal Government's withdrawal of subsidies on locally consumed petroleum products.

Plate 1: Sharing of kegs of petrol as souvenirs at an event in Lagos State during fuel scarcity in February, 2022.

Consequently, Okpo and Okonkwo (2025) interrogated the cost of living in Nigeria vis-à vis the fuel price hike mantra using secondary source, including Documentary method of data collection and data collected were analysed with Content Analysis. They found that the high cost of living in Nigeria is connected to the fuel price hike because fuel as essential commodity and the mainstay of Nigerian economy is central to Nigerian economy to the extent that what affect fuel price affects other aspects of the economy. The investigation of Akpan and Nnamseh (2015) focused on the strategic management approaches for minimizing its occurrence. From their analysis, excessive corruption, mismanagement of government treasury, etc., were found as causes of petrol scarcity while socioeconomic unrest, hike in transport fare, retardation of economic growth, etc were found as its associated risks.

The impact of petrol scarcity in Nigeria has been so

severe that it has provoked numerous rhetorical questions among citizens. Such questions include: *"What kind of hardship is this after the government has removed subsidy? Can we still regard Nigeria as a functioning country? Why do we work so hard only to spend excessively on basic necessities? Do we truly have an effective government? Why are citizens suffering in Nigeria while the President travels abroad for rest?"* These questions reflect the frustrations and hardships experienced by Nigerians during periods of fuel scarcity in Nigeria.

2 Materials and Methods

2.1 Study Area

Lagos state Nigeria served as the study area for this study (Figure 1). The city is the most populous urban centre in Nigeria and one of the fastest-growing cities globally. The metropolitan population is estimated at approximately 17.8 million in 2026 (World Stats, 2026), reflecting its megacity status and continuous rural–urban migration. This rapid population growth places immense pressure on city's infrastructure, especially transport systems leading to long distances commuting and increased dependence on fuel-powered mobility. As a result this, disruptions in supply of fuel tend to have widespread and immediate effects on household mobility and access to services. Economically, Lagos is the commercial and financial centre of Nigeria, contributing to over 26% of the national GDP and accounting for more than 50% of the country's non-oil industrial capacity. The city hosts major industries, and transport hubs. The city economy is driven by a mix of formal and informal activities, which many of it depend on frequent and reliable mobility. The high level of economic activity generates substantial daily travel demand, making transport in the city a critical component of livelihoods and productivity. Means of transport in Lagos is predominantly road, with heavy reliance on fuel-powered modes such as private cars, commercial buses (*danfo*), motorcycles (*okada*), and tricycles (*keke*). This made availability of fuel to play a central role in sustaining mobility within the state and any disruption in fuel supply leads to increased transport fares, reduced service availability and longer waiting times.

Furthermore, Lagos is characterised by chronic high transport demand, traffic congestion and long commuting durations. This made residents of the city to spend several hours commuting daily due to urban sprawl and housing pressures. During periods of fuel scarcity, these challenges may exacerbate, resulting in delayed access to workplaces and essential services, and increased reliance on coping strategies such as walking longer distances, trip consolidation, and shared transport. Lastly, the combination of Lagos strategic location, large and rapidly growing population, intense economic activities as well as heavy reliance on fuel-dependent transport systems made Lagos State amidst other cities a highly suitable and critical context for this study. The population of this study cut across three local governments areas across Lagos State and they were 11,367,265 (Nigerian Informer, 2026).

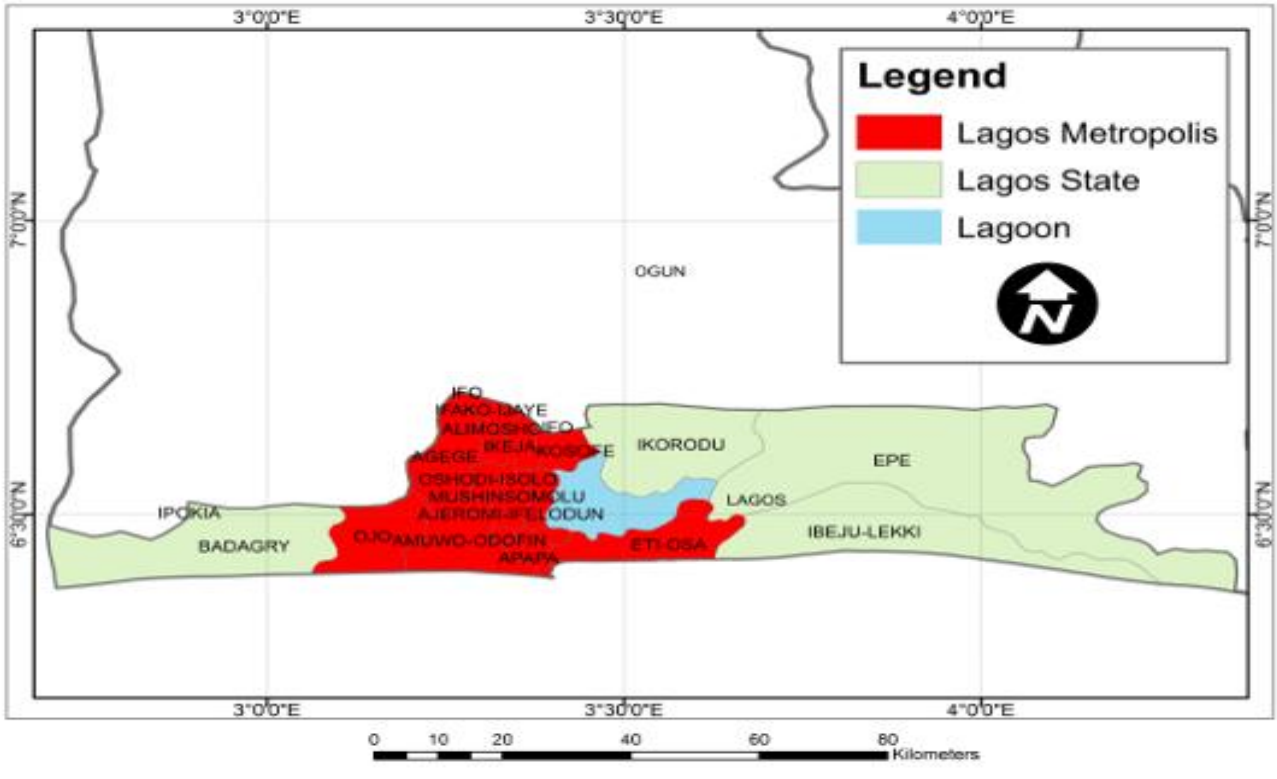

Figure 1: Map of Lagos State

2.2 Research Design

The study adopted a quantitative research design. A cross-sectional survey approach is employed to collect data from households at a single point, allowing for the analysis of mobility patterns responses during fuel scarcity periods. This design is suitable for this study as it enables the researchers to establish relationships between key variables including fuel availability, transport fares, travel time and household mobility patterns during scarcity. It relied on primary source of data obtained through structured questionnaires administered to selected households across different locations of Lagos State. The questionnaire was designed to capture information regarding households' mobility during fuel scarcity. Collected data were analysed using descriptive and inferential statistical methods. Descriptive statistics including table, frequency and percentage were used to summarise fuel scarcity effect on household mobility while inferential tools especially chi-square was employed to examine the relationships between independent variable (fuel scarcity) and dependent variables (household mobility).

2.3 Sampling Technique and Sample size

A multistage sampling technique was adopted for this study. This was to ensure adequate households' representation across Lagos. Firstly, the city is stratified into its major senatorial districts, Lagos Central, West and East. This was to reflect spatial and socio-economic diversity. Secondly, a selection of Local Government Areas (LGAs) was made from each senatorial using simple random sampling and to ensure that both highly urbanised and peri-urban areas were included in the study. Lagos Island was picked from Lagos Central, Ikorodu from Lagos East and Oshodi-Isolo from Lagos West. Thirdly, specific communities or area within the selected LGAs were chosen purposively based on population density, level of commercial activities and transport intensity. Agarawu / Oroyinyin area was picked from Lagos Island, Oshodi was picked from Oshodi-Isolo while Agric was picked from Ikorodu. Finally, households within the selected communities are sampled using systematic random sampling, where it has assumed that each community has approximately 60 household and from that 60 households, the study required about 25 households from each community or area. The sampling interval is calculated as 60/25 yielding 2.4 and since a fraction cannot be used for human being, it is approximated to 2. A random number between 1 and 2 was selected and **s**tarting from the chosen number, every 2nd household is selected (e.g., 2nd, 4th,…) until approximately 25 households were selected from each community or area, making it 75 households. This approach is suitable for this study to ensure that households are selected in a structured and unbiased manner, while capturing variations in patterns of mobility and exposure to fuel scarcity.

The head of the family served as a respondent and in the case where neither of the parents are present, the person serving as the head was considered. Permission to carry out the study was sought from the Local Government Chairmen of the selected communities or areas. Informed consent from the participants was obtained verbally, who were assured of total confidentiality and their right to withdraw from the study at any time without any penalty.

2.4 Instrument for Data Collection

Data was collected primarily. Structured questionnaire was developed by the researchers to obtain in-depth responses from participants about their mobility means prior and during fuel scarcity period and responses regarding its effect on their households Mobility. Agreed and disagreed questions were used to measure respondents' perceptions regarding fuel scarcity impact of households' mobility in Lagos State.

2.5 Data Collection and Analysis

Data were collected through face-to-face questionnaire with selected participants. Each questionnaire lasted approximately 10–15 minutes and was conducted at a convenient time. Collected data were analysed using descriptive and inferential statistics. For better understanding, frequency, percentage and tables were used to analyse the collected data while spearman rank was used to test the relationship between fuel scarcity and household mobility.

3 Results

Total questionnaires of seventy-five (75) were distributed to respondents during the course of this study. All the questionnaires were successfully retrieved and found analysable. This represents 100% response rate. The data provided was used for the presentation, analysis and interpretation of the findings. The gender analysis of the respondents was shown in Table 1. According to this data, 60% of the respondents were males while 40% were females.

Table 1: Gender

No	Variables	Frequency	Percent
i	Male	45	60
Ii	Female	30	40
	Total	75	100

The employment status of the respondents was shown in Table 2. Civil servants constituted 29.3% of the respondents while farming accounted for 6.6%. Trading/business represented the largest proportion of the respondents at 40%, 13.3% of artisans while 10.6%

made other occupations. The other occupations mean those that were not mentioned by this study. The overall data indicated that the majority of the respondents were into trading/businesses. The finding of this study was consistent with several previous studies conducted in Nigeria, where a significant proportion of the population operates within the informal sector. Studies have shown that artisans and other forms of self-employment dominate the occupational structure in many cities of Nigeria due to limited formal employment opportunities availability (Ojeomogha, 2025; Igwe et al., 2019; Akinwale, 2012). Similarly, the study of Adesugba (2016) and Onwe (2013) on labour patterns in Nigeria showed that many individuals rely on vocational trades and small-scale enterprises as primary sources of livelihood.

Furthermore, the relatively smaller proportion of respondents employed by government and non-governmental institutions reflected the limited absorption capacity of the formal sector. Past literature has equally emphasised that formal employment opportunities in government and organised private sectors remain inadequate compared to the labour force growing (Virk et al., 2023; Odigwe & Okoi, 2020). Therefore, the trading/business predominance and other self-employed respondents for this study supported existing literature that highlighted the informal economy importance as a major Nigeria's employment source. It's also underscoring the structural employment challenges that push a large segment of the population toward self-employment.

Table 2: Respondents' Employment Situation

No	Variables	Frequency	Percent
i	Civil Service	22	29.3
ii	Farming	5	6.6
iii	Trading/business	30	40
iv	Artisan	10	13.3
v	Others	8	10.6

Table 3 shows household perceptions regarding fuel scarcity. It showed that all the respondents, (100%) agreed that they experience fuel scarcity whenever it occurs in Nigeria. This means that fuel scarcity is universally felt on households in Nigeria.

Table 3: Perception of Respondents regarding Fuel Scarcity

No	Question	Responses	Frequency	Percent
i	As the head of the family, do you experience fuel scarcity	Yes	75	100
		No	00	00

The means of transport used by respondents prior to the fuel scarcity in the study area were depicted in Table 4. The results showed that 25.3% of the respondents used personal vehicles as their mean of transport while majority of 53.3% relied on commercial vehicles. In addition, 8% of the respondents walked, 4% used water, 6.6% used train and only 2.6% used bicycles. The findings revealed that prior to the fuel scarcity in the study area, more than half of the respondents depended largely on commercial public transport to reach their various destinations while less than 5% cycled. The same Table 3 further illustrated the changes in transport patterns during fuel scarcity in Lagos. The results showed that 14.6% of respondents used their personal vehicles, 48% used commercial vehicles, 6.6% relied on water transport, 18.6% walked, 8% used the train and 4% cycled. This demonstrated a shift in choices of transport as individuals adjusted their mobility approaches due to fuel scarcity.

Comparing the two scenarios showed that the number of respondents using personal vehicles declined from 25.5% to 14% while the use of commercial vehicles also declined from 53.3% to 48% during the fuel scarcity period. Conversely, the respondents' proportion who walked increased significantly from 4% to 18.6%. There were also slight increases in the use of alternative transport modes, including cycling, which rose from 2.2% to 4%, and train usage from 6.6% to 8%. These findings aligned with the study of Tijjani et al. (2025) on transport behaviour during fuel scarcity and economic disruptions which found that when fuel price increases, essential goods and services face reduced affordability. This means that when fuel becomes scarce or expensive, individuals tend to reduce their reliance on fuel-dependent transport, including private and commercial vehicles. Instead, they adopt alternative and more affordable modes of transport such as walking and cycling. With this analysis, Private car owners tend to park their vehicles at their different homes and use alternative modes.

Table 4: Means of transport used by the respondents before and during fuel scarcity in Lagos State

No	Variables	Variables	Frequency	Percent
i	Prior to the scarcity of fuel, modes of transport utilised	Personal vehicle	19	25.3
		Commercial vehicles	40	53.3
		Walking	06	8
		Water	03	4
		Train	05	6.6
		Cycling	02	2.6
		Total	75	100
ii	Modes of transport utilised when there is a shortage of fuel	Personal vehicle	11	14.6
		Commercial vehicles	36	48
		Water	05	6.6
		Walking	14	18.6
		Train	06	8
		Cycling	03	4
		Total	75	100

The fuel scarcity effect on households was depicted in Table 5. It showed that 81.3% of the respondents agreed that fuel scarcity limited their commuting choices while 18.6% disagreed. Similarly, 78.6% agreed that there was an increased in transport fares as a result of fuel scarcity had reduced their mobility whereas 21.3% disagreed. Furthermore, 89.3% indicated that fuel scarcity issue had severely limited respondents' mobility while only 10.6% disagreed. In addition, 89.3% of the respondents agreed that the hike in fuel prices had a significant impact on their daily mobility against 10.6% who disagreed. Lastly, 82.6% of the respondents agreed that their inability to move freely due to fuel scarcity had significantly affected their family's well-being while 17.3% disagreed.

These findings were consistent with the work of Adepoju and Balogun (2023) and Adeniran (2016) on impacts of fuel scarcity in Nigeria which shown that fuel scarcity and increases in fuel prices often led to higher transport costs and reduced mobility among citizens. From these findings, it means that when fuel becomes scarce, operators of public transport tend to increase fares and in turn limited public passengers' ability to travel for work and other daily activities. The scarcity disrupted the transport system in the Lagos by making commuting more difficult for residents, reduced commercial vehicles availability and increased travel costs. This forced many Lagos residents to either reduce their trip numbers or resort to less convenient alternatives, including walking and cycling for shorter distances. Finally, past research has also highlighted that transport related challenges caused by fuel scarcity have broader impact for household welfare (Yahaya, 2026).

Table 5: Effects of Fuel Scarcity on Household Mobility

No	Question	Responses	Frequency	Percent
i	Fuel scarcity limits my commuting choices.	Agreed	61	81.3
		Disagreed	14	18.6
ii	Rise in transport fares as a result of fuel scarcity reduced my mobility.	Agreed	59	78.6
		Disagreed	16	21.3
iii	As a result of the lack of fuel, my movement rate is drastically reduced.	Agreed	67	89.3
		Disagreed	08	10.6
iv	Fuel price increases have negative impact on my daily mobility.	Agreed	67	89.3
		Disagreed	08	10.6
v	My inability to move as a result of fuel shortages has a significant negative impact on my family's well-being.	Agreed	62	82.6
		Disagreed	13	17.3

3.1 Test of Hypothesis

The relationship between fuel scarcity and household mobility was tested using chi-square in Table 6. The result indicated a statistically significant relationship at χ^2 = 47.04, df = 1, $p < 0.001$). The size of the effect was shown as Phi = 0.561 which showed fuel scarcity has effect on household mobility by 56.1%. a strong correlation and it implying that fuel scarcity has negative effect on household mobility. An increase in fuel scarcity will decrease household mobility in Lagos State and vice versa.

Table 6: Test of Relationship

Variable	Category	Freq (O)	Expected Freq (E)	χ^2 Value	df	p-value	Phi / Cramer's V	Decision
Fuel price increases have negative impact on my daily mobility	Yes (Affected)	67	37.5	23.52				
	No (Not affected)	8	37.5	23.52	1	< 0.001	0.561	significant
	Total	75		47.04				

4 Conclusion

The study examined the impact of fuel scarcity on households' mobility in Lagos State Nigeria. The findings showed that a significant proportion of respondents experienced restricted commuting choices, increased transport fares and severe limitations in their daily mobility as a result of fuel scarcity. The scarcity that led to the rise of fuel prices further compounded these challenges, making transport for households less affordable and accessible. As a result of this, many households were unable to move freely and thereby affecting their ability to engage in essential socio-economic activities including work and access to services. Furthermore, the study established that the effects of fuel scarcity extend beyond mobility to overall household well-being. Increased transport costs and reduced commercial vehicles availability, including *molues* and *danfos*. This disrupted the urban transport system, forcing households to reduce their trip frequency and adopt less convenient alternatives, including walking. The hypothesis test showed that there is relationship between fuel scarcity and household mobility in Lagos State. Finally, the study concluded that fuel scarcity has a profound and far-reaching impact on households' mobility in Lagos State Nigeria.

Based on the findings of this study, it is recommended that government authorities both at federal and state levels should strengthen policies aimed at ensuring a stable and consistent fuel supply to reduce recurring scarcity and price volatility through improved refinery revitalisation. Additionally, there is a need to expand and improve public transport systems in Lagos, such as Bus Rapid Transit (BRT), rail and water transport, to provide affordable and reliable alternatives that are less vulnerable to fuel shocks compare to road public transport. Furthermore, the Federal Government of Nigeria, Lagos State Government and private sector should invest in reliable and affordable alternative energy for transport, including electric and gas-powered vehicles to reduce dependence on petroleum products. Non-motorised transport infrastructure such as cycling lanes and pedestrian walkways should be provided to reduce dependence on petrol. Lastly, there is a need to promote adaptive mobility strategies including carpooling, ridesharing and trip planning at the household level.

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