

## EFFECT OF LIQUEFIED PETROLEUM GAS PRICE ON THE LEVEL OF PATRONAGE AMONG HIGHER EDUCATION STUDENTS

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### **Abstract**

This paper examined the effect of prices of LPG fuel, LPG cylinders, and LPG accessories on the patronage and use of LPG for cooking by students of higher education institutions (HEIs) in Lagos State. The paper is necessary because of the benefits of switching to a clean cooking fuel like LPG by students of HEIs in Nigeria and the important role of price in achieving this. The target population was the students of the Faculty of Science, University of Lagos. The research used a cross-sectional design and convenience sampling technique. A structured questionnaire was used to collect data from a valid sample of 250 respondents from University of Lagos, Akoka. A multiple regression statistical method was used to test the hypotheses. Results from the analysis suggested that prices of LPG fuel and cylinders did not significantly affect the patronage and use of LPG for cooking by the students of HEIs. On the contrary, the findings indicated that prices of LPG accessories significantly affected LPG patronage and use. It was concluded that prices of LPG fuel, LPG cylinders, and LPG accessories affected LPG patronage differently. The research also made recommendations. Finally, the research limitations and suggestions for future studies were provided.

**Keywords:** Price, liquefied petroleum gas, cylinders, accessories, cooking, and customer patronage.

### **Introduction**

Customers are valuable assets and must be perpetually satisfied. Every business organization exists to perform activities that will satisfy the needs of the customers and attain its objectives (Khaligh *et al.*, 2012). Organizations exist to achieve two major objectives, innovation and marketing (Drucker, 1975). Marketing is seen as all value-generating activities of a firm that creates and maintains a mutually exchange relationship between the firm and its customers (Aminu, 2022). An organization is established to attract customers and keep them (Dadras, 2016). A first-time customer will continue to do business with a firm if satisfied with the firm's offer. Johnson and Fornell (1991) described customer satisfaction as a customer's overall evaluation of their purchase and consumption experience. Satisfied customers increase their patronage of organizations (Krey *et al.*, 2014).

Customer patronage, customer retention, repeat purchases, and customer loyalty are synonymous and are used interchangeably by marketing scholars and practitioners. Lam *et al.* (2004) identified customer patronage as a component of customer loyalty and is concerned with a repeat purchase. Adiele *et al.* (2015) also suggested that customer patronage and customer loyalty can substitute for each other. Customer patronage is the commitment of an individual to purchase a

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product because of its quality or perceived quality (Adiele *et al.*, 2015). Customer retention is the company's maintenance of the existing customer base by establishing good relations with everyone who buys the company's product (Kotler *et al.*, 2015). Organizations succeed and make profits when they simultaneously acquire new customers and forge enduring and mutually beneficial relationships with them (Aminu, 2012).

Marketers depend on the marketing mix elements - product, price, place, and promotion - to influence the patronage behavior of their customers and accomplish their marketing objectives. Price is a major element used in many industries and by different kinds of companies to achieve and increase customer patronage. There is a consensus among scholars that customer patronage can be influenced by price (Aminu, 2022; Qalati *et al.*, 2019). Price significantly influences consumer patronage more than any other element of the marketing mix (Qalati *et al.*, 2019). Despite the major impact of price on consumer patronage of products, empirical research on this important topic in the context of LPG patronage in Nigeria is scarce. A few studies, including Aminu and Adebayo (2022), have examined the antecedents of customer retention, but the constructs of interest excluded price and the focus of the studies is not LPG. Further, a limited research projects on price have focused largely on the price of LPG fuel, ignoring prices of LPG cylinder and accessories. The present paper will extend the existing knowledge on customer patronage (as a dependent variable) to LPG, a sustainable cooking fuel, and fill the gap in the cooking energy literature.

LPG is a mixture of propane, butane, and other substances of a small amount (Amorin *et al.*, 2018; Norad, 2020; Transportation Research Board, 2024). It is obtained as a by-product of petroleum refining (Norad, 2020; Putri *et al.*, 2021; Transportation Research Board, 2024) and from natural gas or refinery gas streams (Norad, 2020; World Liquefied Petroleum Gas Association, WLPGA, 2019). It has several applications in different sectors, including the domestic sector (Association Européenne des Gaz dePétrole Liquéfés, AEGPL, 2019) and it is produced with different compositions, which reflect different economics, regional norms, and climates (Shen *et al.*, 2018). It is a sustainable fuel for cooking and heating, because of its high-efficiency burning (Larsen *et al.*, 2008; WLPGA, 2000) and lower pollution emissions (Roche *et al.*, 2024; World Bank, 2017).

Globally, LPG is applied in the domestic, industrial, agricultural, transport, and other sectors (AEGPL, 2019). Its major application in Nigeria is in the domestic sector, with 85% - 95% of households using it for cooking (Badmus & Bakri, 2021). LPG production in Nigeria in 2003 stood at 4 million tons while consumption was a paltry 50, 000 tons, which was 0.5kg per capita and lower than the average per capita consumption of the region (ESMAP, 2004). Although Nigeria is a top

producer of LPG in the continent of Africa, the number of households that have adopted LPG is low, compared to countries in the continent. However, the LPG demand trajectory has been on the positive side. For example, the country consumed 126, 000 tons in 2013 and 250, 000 tons in 2015. Local consumption is forecast to rise to 1.7 million tons in 2020 (Dombin, 2017). Nigeria's LPG domestic consumption reached 1.04 million tons in 2021 and the country's LPG per capita consumption increased significantly to 5kg in the same year (Omuojine, 2022). It climbed to 1.4 million tons in 2022 (Ogunsan, 2023).

The demand for LPG is growing worldwide as it is becoming a fuel of first choice (Vincente, 2019). Despite its efficient burning (Buba *et al.*, 2017; Chikezie *et al.*, 2020; Hammeed *et al.*, 2016), it is estimated that 2.5 to 3 billion people in developing countries still use solid fuels for cooking (Bonjour *et al.*, 2013; World Health Organisation, WHO, 2024). This is due to the high cost of LPG, LPG equipment, and low income of people (Karimu *et al.*, 2016; Kojima, 2011; Ruiz-Mercado & Masera, 2015). This is changing as many people in developing countries are combining LPG with biomass and kerosene, a behavior known as fuel stacking in the energy literature (Deweese, 1989; Bruce *et al.*, 2017). In Nigeria, a growing number of households is giving up dirty fuels for LPG, a situation that may be seen as promoting a sustainable environment in the country. The government-led reforms in Nigeria have encouraged more people to switch to LPG (KPMG, 2020), resulting in the growth of LPG consumption to 1.4 million tons in 2022 (Ogunsan, 2023). To meet this growing LPG consumption, NLNG (2024) promised to sell its entire output to the local market as from 2023. On a global stage, the abnormal increase in the prices of gas, supply uncertainty due to a significant fall in supply from Russia, and other factors caused global demand and supply of gas to drop in 2022. This has destroyed the image of gas as an affordable fuel (Augusto & Co, 2023). At the national level, the challenges in Nigeria's LPG sector, caused by the changing currency value and upset in the supply of the product, spiked LPG prices in 2023 (Jimoh, 2023). Consequently, the price of 1kg of LPG, which was around N225 in Lagos in 2015, is currently sold for N1,200, an increase of more than 500% in less than 10 years. The paper examined the effect of LPG price on the level of patronage of higher education students. In achieving this objective, the pertinent question is: Does LPG price has a significant effect on students' level of patronage?

## Literature Review

### Overview of Customer Patronage

Customer loyalty involves having a deep commitment toward repurchasing a firm's products at the expense of others in the same line of trade (Oliver, 1999). It is the degree to which a consumer

is willing to buy and continue to buy a product from the same organization while exhibiting a positive attitude toward the firm and its product (Gremler & Brown, 1999). It is the commitment of an individual to purchase a product because of its quality or perceived quality (Adiele *et al.*, 2015). It is five times more costly to recruit a new customer than retaining a current customer (Athanasopoulou, 2009). A winning firm in an intensely competitive market is the one that can persuade customers to come through the door and also persuade them to stay (Yves *et al.*, 2012). Consumer favorable and repeat purchase are two measures of customer patronage (Dick & Basu, 1994).

Customer loyalty, retention, or patronage offers companies significant benefits. They help in lowering marketing and operational costs; boosting a company's sales revenues, profits, and market shares; promoting a rapid growth; and achieving a competitive advantage (Ang & Buttle, 2006; Artun & Levin, 2015; Athanasopoulou, 2009; Heskett, 2002; Lin & Wu, 2011; Reichheld & Dawkins, 1990; Reichheld, 1993). For example, Heskett suggested that a 5% growth in customer retention could improve profitability from 25% up to 85%. A number of factors influences the level of customer patronage, including economic situation, price, location, competitors, social and psychological factors, product or service attributes, and marketing mix programs (Dadras, 2016; Qalati *et al.*, 2019).

#### **LPG Fuel Price and the Level of Patronage**

LPG is increasingly becoming the most popular globally. The growing patronage could be because of its affordability, efficiency, and environmental friendliness (Asamoah *et al.*, 2012). Energy affordability relates a household's income to a fuel price, a situation where money spent on fuel is a fair share of the household's disposable income (Bouzarovski & Petrova, 2015). High cost of LPG, LPG equipment, and low income of households in developing countries are the reasons why several households depend on biomass and solid fuels (Karimu *et al.*, 2016; Kojima, 2011; Ruiz-Mercado & Masera, 2015). A high price of LPG can discourage consumers from buying the product and encourage them to switch to a close substitute (Mohammed & Etim, 2015).

Further, a high price of LPG can limit access for lower-income consumers, making it beyond their reach and create a perception that LPG is for the wealthy households in society (Ranganath *et al.*, 2016), even if LPG is more efficient and environmentally friendly than their current options. This hesitation can hinder the adoption of LPG and perpetuate the use of less sustainable alternatives (Ogwumike *et al.*, 2014). In a 2014 draft national policy on LPG, affordability is one of the important areas required to stimulate LPG adoption in Nigeria (Dombin, 2017). The price of LPG in Nigeria constitutes a hindrance to its continuous use and patronage at the household level (Chikezie *et al.*, 2020). There is a slew of empirical research on the relationship between LPG price and LPG

patronage and usage. Kojima (2011) found that LPG price and household income are determinants of LPG patronage and the quantity consumed. Dalaba *et al.* (2018) found that affordability was the major reason for the low adoption of LPG in Ghana. It costs about \$63 for a potential adopter to adopt LPG in the country. Ozoh *et al.*'s (2018) research showed that kerosene was the most popular cooking fuel in Lagos, Nigeria. An overwhelming majority of the respondents cooking with kerosene expressed willingness to adopt LPG, but mentioned safety and higher price of LPG as a disincentive to usage. Martinez *et al.* (2020) found that the seasonal fluctuation of LPG prices was among the barriers preventing regular LPG use.

Further, Shupler *et al.* (2021) found that the cost of refilling LPG cylinders in Cameroon, Kenya, and Ghana was an important impediment to LPG use among the current and previous users. The findings indicated that there was a relationship between cheaper LPG refills and LPG per capita consumption in the three countries. The findings further showed that a high number of respondents, 37%, reported that they stopped cooking with LPG due to the high cost of refilling their cylinders. Finally, Sapanken *et al.* (2023) found that price is among the three determinants of LPG consumption in Cameroun; the other two factors are income and urbanization. However, unlike the other two factors, price negatively affected LPG consumption in the country. From the aforementioned, we hypothesize that:

**H01:** LPG fuel price has a significant effect on the level of patronage among students of higher education.

### **LPG Cylinder Price and the Level of Patronage**

LPG cylinder is a kind of pressure vessel that stores pressurized gases (Dey *et al.*, 2022; Tom *et al.*, 2014) and it is used to meet energy requirements in household applications (Fadel & Yahya, 2022). LPG cylinders are designed in various sizes (Karimu, 2015; WLPGA, 2013). For domestic applications, LPG cylinders are available in 4kg to 15k (WLPGA, 2013) and in 5kg, 12kg, 14.2kg, and 19kg (Karimu, 2015). In Ghana, cylinders of 3kg to 52kg are used by households with 14.5kg being the popular cylinder (Dalaba *et al.*, 2018). Smaller cylinders from 1kg to 3kg have applications in camps and in developing countries (WLPGA, 2013). The adoption of LPG in developing countries often begins with a household procuring a cylinder with a burner. With growing familiarity with LPG and increasing income, the household may procure a modern cooker supplied with gas through a rubber pipe attached to the cylinder (Morgan, 2018).

The high initial cost of procuring a cylinder has been identified as a major barrier to its adoption in developing countries (Jain *et al.*, 2015; Norad, 2020; Ozoh *et al.*, 2018). Ozoh *et al.*

indicated that the initial cost of equipment is a major barrier to the adoption of LPG in developing countries and curbing this high cost will facilitate the increase in the LPG uptake. Norad noted that as LPG use requires the up-front purchase of a stove and other accessories, the cost is an important barrier to adoption and/or repeat patronage. Further, the cost of purchasing and maintaining LPG and its major accessory, which is the gas cylinder has reduced the patronage of most potential users in the rural areas (Broni-Bediako & Amorin, 2018).

Reducing the high price of LPG equipment will make LPG competitive with traditional fuels (Shylag & Zuzarte, 2008) and promote its usage (WLPGA, 2000). Indian government, under the Pradhan Mantri Ujjwala Yojana (PMUY) scheme introduced in 2016, provided 50% subsidized LPG cylinders to 5 crore rural households to make them affordable. The scheme resulted in a high uptake of LPG among the rural households (Jeuland *et al.*, 2023). In Ghana, the government provided free LPG cylinders, stoves and other logistics to households in some rural areas to promote adoption of an improved cooking method (Larsen *et al.*, 2020). There is a limited amount of empirical research relating LPG cylinder price to LPG patronage in the cooking fuel literature. Labriet and Alfaro (2015) found that the initial cost of LPG cylinders and stoves did not constitute a hindrance to LPG uptake for urban and semi-urban households in Guatemala. Instead, the authors found that households were concerned about cylinder safety and quality. Dombin (2017) found that costs of cylinders have negative effects on affordability of LPG in Lagos State and Abuja. Jeuland *et al.* (2023) found that a subsidized LPG cylinder in rural India led to a significant number of LPG cylinders purchased among the low-income households in India. The purchases were in response to the magnitude of discounts offered. Based on the foregoing, we propose that:

**H0<sub>2</sub>:** LPG cylinder price has a significant effect on the level of patronage among students of higher education.

### **LPG Accessories Prices and the Level of Patronage**

LPG accessories are safety equipments used in storing, transporting, and loading LPG (Limtim, 2017). LPG accessory is a variety of products associated with the storage, handling, distribution, and use of the product, such as storage tanks, cylinders, pressure regulators, gauges and controls (WLPGA, 2018). LPG accessories are parts that enhance the functionality of the LPG cylinder and offer different uses. Some of these accessories include a gas hose, stove head, camping burner, camping valve, regulator, standard valve, gas stove etc. (Ozoh *et al.*, 2018). LPG tank accessories and equipment are needed for a safe and efficient operation (Koran, 2022). The adoption of LPG in Ghana has generated employment opportunities in the LPG accessories retail sector where

rubber tubing, gas, gas lighters, gas stove stands, and others are sold (Broni-Bediako & Amarin, 2018).

Most of the costs of accessories relate to the initial costs of acquiring the equipment to be able to cook with LPG namely the stove, the cylinder, the pipe and valve, and any related installation costs (Morgan, 2018). Alem *et al.* (2014) pointed out the high start-up cost as the key factor that hinders households from switching to appliances that use clean energy, such as LPG stoves and other accessories. In Tanzania, the pay-as-you-cook model, which allows poor households in the country to hire cylinders and accessories without having to own them outrightly, can help increase LPG adoption (Ndunguru, 2021). Initiatives such as free or subsidized LPG cylinders, stoves, and accessories have been executed in some countries to stimulate market demand (Ahunu, 2015).

According to Broni-Bediako and Amarin (2018), Ghanaian government gifted rural dwellers 50,000 cylinders, stoves, and accessories to motivate them to abandon firewood and adopt LPG. Further, the authors identified persistent increases in the cost of LPG accessories as one of the reasons why the interests of most potential adopters in the rural areas of Ghana has waned. They argued that people in these areas may not be able to afford the accessories. Alem *et al.* (2015) found that 93% of respondents identified high costs of cooking stoves accessories as the primary reason for not adopting LPG in Dar es Salaam. Thus, we state that:

**H<sub>3</sub>:** LPG accessories prices haav a significant effect on the level of patronage among students of higher education.

## Methods

The study employed a cross-sectional design, involving the students of Faculty of Science, University of Lagos, Akoka, Lagos State. Lagos State is the financial, commercial, and economic center of Nigeria (Resilient City Network, 2023). The target population was the entire students of the Faculty of Science, University of Lagos, Akoka, Lagos State, Nigeria. Data was collected from a valid sample of 250 respondents. The respondents were selected on the basis of their availability and readiness to participate in the survey. A self-developed and self-administered questionnaire was used to collect the primary data. The questionnaire was a Likert-type scale on a five-scale point. 1 represents Strongly Disagree (SD); 2 represents Disagree (D); 3 represents Undecided (U); 4 represents Agree (A); and 5 represents Strongly Agree. The questionnaire consisted of two sections. Section A was designed to collect personal data of the respondents. Section B contained relevant statements with response options relating to the operational variables of the study – price of LPG fuel,

price of LPG cylinder, and price of LPG accessories (independent variables), and customer patronage (dependent variable).

The prices of LPG fuel, cylinders, and accessories were measured by five items each. LPG patronage was measured by four items. Three Professors, including two Professors of Marketing and one Professor of Business Administration, validated our instrument, enabling us to make necessary adjustments to the instrument. This helped the researchers make the wordings and items of the scale simple for the respondents to enhance the response rate. The pilot study was conducted on the students of Lagos State Polytechnic, Ikorodu to pretest the questionnaire and the necessary adjustments were made based on the responses to the pilot study. The Cronbach's Alpha for the variables are: customer patronage has the highest with 0.668, followed by price of LPG fuel with 0.617. Others, in higher orders are, price of cylinder with 0.551, and price of accessories, .515. With the help of research assistants, the main data was collected from the students of University of Lagos, Akoka. Cronbach's Alpha was used to test the internal consistency of the items in the questionnaire. Multiple regression analysis was used to test the three hypotheses of the paper.

## Results

**Table 1:** *Model Summary*

| Model | R                 | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|-------------------|----------|-------------------|----------------------------|
| 1     | .210 <sup>a</sup> | .044     | .032              | 2.292                      |

a. Predictors: (Constant), Price of accesspries, Price of cylinder, Price of LPG.

**Note:** Data collected by authors (2023).

The table shows that R square value is 0.440 which indicates that 44.0% of the variation in the dependent variable (LPG adoption) is explained by the study variables while 56.0% is explained by other factors not considered by the study. The study also shows that the correlation coefficient value (R) is 0.210, which indicates a strong relationship between the research variables.

**Table 2:** *ANOVA<sup>a</sup>*

| Model |            | Sum of Squares | Df  | Mean Square | F     | Sig.              |
|-------|------------|----------------|-----|-------------|-------|-------------------|
| 1     | Regression | 59.271         | 3   | 19.757      | 3.760 | .011 <sup>b</sup> |
|       | Residual   | 1287.484       | 245 | 5.255       |       |                   |
|       | Total      | 1346.755       | 248 |             |       |                   |

a. Dependent Variable: Customer Patronage

b. Predictors: (Constant), Price of accesspries, Price of cylinder, Price of LPG

**Note:** Data collected by authors (2023).

The ANOVA results show that the regression model is significant since the P-value  $0.011 < 0.05$  at 95% confidence level. This shows that the regression model is a good predictor of customer patronage.

**Table 3:** *Coefficients<sup>a</sup>*

|   | Model                | Unstandardized Coefficients |            | Standardized Coefficients | T     | Sig. |
|---|----------------------|-----------------------------|------------|---------------------------|-------|------|
|   |                      | B                           | Std. Error | Beta                      |       |      |
| 1 | (Constant)           | 5.612                       | .735       |                           | 7.635 | .000 |
|   | Price of LPG fuel    | .007                        | .083       | .006                      | .079  | .937 |
|   | Price of cylinder    | .036                        | .077       | .001                      | .009  | .993 |
|   | Price of accessories | .184                        | .060       | .207                      | 3.048 | .003 |

a. Dependent Variable: SUMCP

**Note:** Data collected by authors (2023).

### Multiple regression results for price of LPG and customer patronage

In testing the three hypotheses stated in the study. The values of standardized beta ( $\beta$ ) and t-test statistics level of significance (Sig.) for each of four variables examined in the co-efficient table were used. As a rule, where  $p < .05$ , the null hypothesis is rejected while the alternative hypothesis is accepted, otherwise it is rejected.

**Hypothesis One:** LPG fuel price has a significant effect on the level of patronage among students of higher education students.

From the coefficient table above, the p-value for regression coefficient of price of LPG fuel is 0.937, which is greater than 0.05. Therefore, we reject the hypothesis. The result of the hypothesis 1 indicates that price of LPG fuel is not statistically significant for students' patronage of LPG ( $\beta = .937$ ,  $p > .05$ ). This suggests that price of LPG fuel does not significantly affect students' patronage of LPG fuel for our dataset.

**Hypothesis 2:** *LPG cylinder price has a significant effect on the level of patronage among students of higher education students.*

From the coefficient table above, the p-value for regression coefficient of price of LPG cylinder is 0.993, which is greater than 0.05. Therefore, we reject the hypothesis. The result of hypothesis 2 means price of LPG cylinder does not significantly affect students' patronage of LPG ( $\beta = .993$ ,  $p > .05$ ). This suggests that price of LPG cylinder does not significantly affect students' patronage of LPG for our dataset.

**Hypothesis Three:** LPG accessories prices have a significant effect on the level of patronage among students of higher education students.

From the coefficient table above, the p-value for regression coefficient of prices of accessories is 0.03, which is less than 0.05. Therefore, we accept the hypothesis. The result of hypothesis 3 shows that prices of accessories are statistically significant and significantly affect students' patronage of LPG for the sample ( $\beta = .003, p < .05$ ). This suggests that prices of accessories have a significant effect on students' patronage of LPG.

## Discussion

LPG is increasingly becoming a fuel of first choice in many developing countries and among people of different demographics, including students of tertiary institutions. Studies on LPG adoption have focused largely on LPG adoption drivers and barriers and mainly in the context of households in the urban and rural areas in developing countries. These studies have identified LPG price as one of the LPG adoption drivers and barriers. The present research built on extant research and presented empirical evidence on the effect of LPG price on LPG patronage in the context of tertiary institutions. Two of our results are unexpected. The two results suggest that prices of LPG fuel and LPG cylinder do not significantly affect patronage of LPG by students of tertiary institutions. The first result indicates that price of LPG fuel does not significantly affect students' patronage of LPG. This result is significant in the sense that it was not expected and inconsistent with the findings of extant studies (Dalaba *et al.*, 2018; Kojima, 2011; Martinez *et al.*, 2020; Ozoh *et al.*, 2018; Sapnken *et al.*, 2023; Shupler *et al.*, 2021). The findings of all these studies indicated that LPG fuel price is a major determinant of LPG patronage and usage in a number of countries.

The result suggests that the high price of LPG did not deter students of University of Lagos from patronizing and using LPG for cooking. This may be as a result of the perception of the fuel as a cleaner and better alternative to kerosene and other solid fuels like firewood, charcoal, animal dungs, and so on. Further, kerosene, the most viable alternative to LPG fuel used by households in urban and sub-urban areas for cooking, has lost its competitiveness in terms of price in relation to LPG. The removal of subsidy on kerosene in Nigeria has spiked its price and made it less competitive with LPG fuel. Therefore, many students prefer to use LPG fuel for cooking, notwithstanding its market price. Like the first result, the second result is also not expected because it shows that price of LPG cylinder does not significantly affect students' patronage of LPG. This result is at variance with the findings of similar research, which suggested that price of LPG cylinder negatively affected adoption of LPG (Dombin, 2017; Jeuland *et al.*, 2023). In contrast, Labriet and Alfaro (2015) found that the initial cost of LPG cylinder and stove is not a barrier to increase in LPG usage for urban and semi-urban households in Guatemala.

That the price of LPG cylinder did not significantly affect students' patronage of LPG may suggest that any student desirous of substituting LPG fuel for kerosene and other solid fuel alternatives need a cylinder to hold the LPG fuel. According to Morgan (2018), the adoption of LPG in developing countries often begins with a household procuring a cylinder with a burner. This suggests that students will not be able to use LPG fuel unless they purchase cylinders and accessories. Interestingly, more than 80% of respondents said they were using a 3kg cylinder, which is more economical and affordable than the bigger sized cylinders. This is in line with the explanation of WLPGA (2013) that smaller cylinders of 1kg to 3kg are mostly used in camps and in developing countries.

Finally, our results suggest that prices of accessories have a significant effect on students' patronage of LPG. This finding is in line with the result of Labriet and Alfaro (2015) and Alem *et al.* (2015). That the prices of accessories have a significant effect on students' patronage of LPG may be because LPG accessories are consumables for LPG cylinders and Stoves. Consequently, they are purchased more regularly, and unfortunately, many of these accessories are substandard products and damaged quickly, requiring regular replacements. It may also be because many of the accessories aid the effective operations of LPG cylinders. According to Ozoh *et al.* (2018), LPG accessories are parts that enhance the functionality of the LPG cylinder. They are also required for a safe and efficient operation (Koran, 2022).

Therefore, high prices of accessories are a barrier to regular use of LPG for students. Due to the cost-of-living crisis in Nigeria, students in Nigeria are currently struggling to get money for their livelihood and sustenance. Many students will be more comfortable paying high initial prices for cylinders than paying high prices for frequent accessories replacements, especially when the accessories are of low quality. On the contrary, kerosene stoves' accessories are more durable and not purchased regularly. Finally, students using solid fuels, such as firewood, for cooking does not require any hardware or accessory before they can cook.

## **Conclusion**

Marketers manipulate the Four Ps of marketing - product, price, place, and promotion - to elicit customer patronage. Price is an important element used to achieve and enhance customer patronage. The literature has reported that price significantly influences consumer patronage more than other elements of the mix. Despite the major impact of price on consumer patronage of products, empirical research relating LPG price to LPG patronage in the context of students of tertiary

institutions is scarce. This paper has examined the relationship between these two variables focusing on LPG fuel price, LPG cylinder price, and LPG accessories prices.

The paper established two unusual results: that prices of LPG fuel and LPG cylinder do not significantly affect the patronage of LPG by students of tertiary institutions. The third and final result shows that LPG accessories prices significantly affect the patronage of LPG by students of tertiary institutions. Therefore, the research concludes that prices of LPG fuel and cylinders did not discourage students from patronizing and using LPG for; rather prices of LPG accessories deterred the students from regularly using LPG for cooking.

### **Recommendations**

The following recommendations are made based on the conclusion of the paper:

- LPG marketers should effectively target the student segment for higher sales, revenue, and profit. This is because the students of higher education value the relative advantage (Rogers, 2003) and usefulness (Davis, 1989) of LPG more than its price. They would rather cook with LPG and avoid biomass fuel and kerosene.
- The Federal Government should consider removing VAT from LPG accessories as well as reducing import and other taxes and levies on the accessories to make them more affordable to the student segment.

### **Limitations and Directions for Future Studies**

In spite of the contribution of this research to the literature on LPG adoption, it has its limitations, which will necessitate suggestions for further research. One, data for this study was obtained from a small sample of 250 respondents, which is limited to generalize the findings of the study to the entire students population in Lagos State. Future researchers should collect data from a larger sample to make the findings more generalizable to the population. Two, the scope of the study was limited to the students of University of Lagos in Southwest. Future researchers should collect a large dataset from many universities in two or three geo-political zones in the country to expand the scope of the study. Finally, the explanatory power of our regression model is 44%. Researchers considering to expand the frontier of knowledge in the context of LPG price should introduce additional constructs not covered in this research. This will provide deeper insights into the influence of LPG price on LPG patronage.

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