

A Study on Customers Attitude and Satisfaction towards HP LPG in House Hold, Coimbatore

M. Maheshkumar* & Vishwajeet **

*Assistant Professor, Department of Master of Business Administration, Guru Nanak Dev Engineering College, Bidar, Karnataka, India.
E-Mail: meenkera_maheshmba@rediffmail.com

** MBA, Department of Master of Business Administration, Guru Nanak Dev Engineering College, Bidar, Karnataka, India.

Abstract—Humanity faces a unique and far-reaching challenge. Our energy needs are growing as a result of continued population increases, economic growth, and individual fuel/energy consumption. At the same time, emissions from fuel wood and fossil fuels, the main energy source for heating in homes and powering our economies, are contributing to climate change and affecting the local air quality. Liquefied Petroleum Gas is used as fuel for thousands of applications. In developing countries the main benefits of LPG is in helping people to switch from unsustainable biomass use to a clean and safe cooking fuel. LPG's domestic uses can never be ignored. It has played a revolutionary role when it comes to changing the face of domestic fuels used for heating and cooking. HPCL commenced marketing of LPG under the brand name "HP GAS". The data is fully based on Primary & Secondary data collection. Four objectives are framed for this analysis. The statistical tools applied for this study are Pearson's correlation coefficient, chi square test and ANOVA. Through this study the HP Gas Company is suggested to improve their service quality among the consumers.

Keywords—Domestic Fuel; Energy; HPCL; Liquefied Petroleum Gas; Service Quality.

Abbreviations—Analysis of Variance (ANOVA); Bharat Petroleum Corporation Limited (BPCL); Exploration and Production (E&P); Hindustan Petroleum Corporation Limited (HPCL); Liquid Petroleum Gas (LPG); Million Metric Tons (MMT); Oil and Natural Gas Corporation Ltd. (ONGC).

I. INTRODUCTION

LPG's domestic uses can never be ignored. It has played a revolutionary role when it comes to changing the face of domestic fuels used for heating and cooking. LPG for household consumption is nearly 89% of total LPG off-take in India. Total LPG consumption in the country for the year 2011-12 is projected to be more than 16.5 MMT (Million Metric Tons) and is expected to grow at 8-9% as envisaged in Vision 2015 document of Ministry of Petroleum and Natural Gas. There are still many rural areas where they have no awareness on use of LPG for domestic purpose. In developing countries the main benefits of LPG is in helping people to switch from unsustainable biomass use to a clean and safe cooking fuel. This provides enormous health benefits helping to avoid the 1.6 million deaths per year from respiratory problems caused by smoke and other pollutants released by inefficient biomass burning in enclosed spaces. It also releases women and children from the drudgery of collecting firewood and health problems associated with carrying heavy bundles long distances. The

main domestic uses of LPG are with respect to lighting, refrigeration, cooking and most of all heating. It is as good for powering standalone stoves and huge cooking stoves. It has been found to be cost effective and hence is used in large scale cooking also. The main reason behind this is easy accessibility, low cost per unit and the environment friendly properties of LPG.

1.1. Liquefied Petroleum Gas

LPG, otherwise also known as Liquefied Petroleum Gas, is used as fuel for thousands of applications, in commercial business, industry, transportation, farming, power generation, cooking, heating and for recreational purposes. It is actually a mixture of hydrocarbon gases. It includes butylenes, propylene, butane as well as propane, which is present in substantial part. It is a flammable mixture and one needs to be highly cautious when dealing with it. Propane and butane gases that become liquid under pressure and can then be stored in pressurized containers. The proportion of each gas varies depending on the source and climate. Propane is preferred where the climate is cold and butane where it is

warm. LPG has a high energy per unit volume and is convenient to use. Its calorific value per unit volume is about 2.5 times larger than that of natural gas (methane).

1.2. LPG Agencies in India

LPG here stands for the liquefied petroleum gas which is flammable gas used for several of the purposes all over the world as a fuel in the vehicles and in several of the chemical industry where the flammable gas is required. In several of the uses of the gas the main use of it lies as the cooking gas. In India, the use of LPG in the cooking is very high as compared to the other uses of it. There are various companies in India which are in the business of manufacturing the LPG gas in India. Most of the companies are under the government authority while some of them are private organizations also. The several LPG manufacturing companies are as follows:

1.2.1. Bharat Petroleum Corporation Limited

It is mainly known as the BPCL. The company is very large and mainly a state owned company which is having its headquarters at Mumbai. The company deals in lubricants, fuels and mainly the LPG gases. They are in the field of the manufacturing LPG gases from very long time and have listed themselves in the fortune 500 lists. Bharat Gas is a product of Bharat Petroleum Corporation Limited (BPCL). At present, the Bharat gas has coverage of around 25 million households across the country as well as hundreds of commercial and industrial establishments. Bharat gas has always been the frontrunner in maximizing the efficiency and in enhancing the customer satisfaction.

1.2.2. Hindustan Petroleum Corporation Limited

It is mainly known as the HPCL all over the world. The company is a state owned organization which is mainly involved in the oil refinery mainly LPG gases. HPCL commenced marketing of LPG under the brand name "HP GAS" in 1979 with takeover of these concessionaires and merger with HPCL with a customer holding of 7.8 lakhs. The field marketing set up consists of 32 exclusive LPG Regional Managers. There are sales areas in each region with an exclusive Sales Officer looking after the various aspects of LPG marketing of a particular geographical area including control on the HP Gas distributorships. In addition to Domestic LPG, HPGAS also markets LPG cylinders for Commercial and Industrial purposes and Bulk LPG by tankers for Industries.

1.2.3. Indian Oil

Indian Oil is India's flagship national oil company with business interests straddling the entire hydrocarbon value chain - from refining, pipeline transportation and marketing of petroleum products to exploration & production of crude oil & gas, marketing of natural gas and petrochemicals. It is the leading Indian corporate in the Fortune 'Global 500' listing, ranked at the 83rd position in the year 2012. The Indian oil is that much largest company in the India which is having 10 out of 18 oil refineries in India. It is having its head

office at Delhi. The company is the largest in terms of the sales among all the companies in India. For the benefit of its LPG cooking gas customers, Indian Oil is promoting fuel-efficient, safe & quality products through its Indane distributorships.

1.2.4. ONGC

ONGC stands for the oil and natural gas Corporation limited. The company is also a PSU which is headed by the state and having its head office in the degrading. The company is involved in the production, exploration and the refining of the oils and the gases in India. The gases here stand for the LPG gas mainly which is very highly used in India as cooking gas. It is the second largest gas agency in India. ONGC company limited ranks as the numerous Uno oil and gas exploration & production (E&P) in Asia. It contributes over 78% of India's oil and gas production. ONGC offers Liquid Petroleum Gas (LPG) for home usage. It offers LPG cylinders in various capacities. It provides easy access to the customer through various modes that includes telephone, SMS, online access etc., It provide home delivery of cylinders. It also offers LPG gas suppliers through pipe lines. ONGC has been ranked to in various international surveys. It also offers the anytime emergency services throughout the country.

II. REVIEW OF LITERATURE

Vinayagamoorthy et al., (2007) in their study entitled, "Study on Service Quality Perception of Domestic LPG", stated that the service marketers have really understood that competition can be well managed by differentiating through quality. Significance of service lies in customer service management. In this the completive environment, service quality has become the success mantra in all service sector. Keeping this in mind, this study has been conducted at Salem city to identify the service quality of Indane gas. The result indicates that customers are not highly satisfied with the service provided by the Indane gas. So the company took some serious action to improve the service quality.

William Young et al., (2009) in their study entitled, "Sustainable consumption: green consumer behavior when purchasing products", concluded that, the green consumers' decision-making processes when buying a technology-based product. The most common green criteria that our interviewees mentioned when they were deciding which consumer electronics products to purchase were mainly what could be classified as: 1. Product environmental performance (energy efficiency, durability, water consumption, LPG conversion, fuel type, fuel consumption and energy ratings); 2. Product manufacturing (recycled material content, chemical content, and reparability); 3. Second hand availability.

Peter Anyon (2009) in his report entitled, "LP Gas: healthy energy for a changing World", concluded that, "Making "clean fuel" choices can directly help to improve the wellbeing of whole communities. Improvements in public

health flowing from the use of cleaner fuels not only reduces the cost of providing health care and social services, but also contributes to the broader economy by helping to avoid the impacts of diminished productivity. Overall, LP Gas rates very highly and gives little or no ground to any others in the table, across all of the features considered to be of greatest importance in a general-purpose fuel. With its intrinsically clean burning characteristics, LP Gas offers a practical avenue towards cleaning up there we breathe. As well as outperforming most traditional fuels, from a health perspective, LP Gas is readily available, convenient and is frequently a lower cost alternative to other energy sources.

Saraf et al., (2009) in their study, “Comparative Emission Analysis of Gasoline/LPG Automotive Biofuel Engine” discussed about LPG Emission, “As LPG is stored under pressure, LPG tank is heavier and requires more space than gasoline tank”. There is reduction in power output for LPG operation than gasoline operation. LPG system requires more safety. In case of leakage LPG has tendency to accumulate near ground as it is heavier than air. This is hazardous as it may catch fire. LPG has lower carbon content than gasoline or diesel and produces less CO₂ which plays a major role in global warming during combustion.

Eric Johnson et al., (2010) in their article, “Clearing the air: black carbon, climate policy and LP gas”, concluded that, in the global debate about how to respond to climate change, BC emissions are just beginning to come to the attention of both energy stakeholders and policy makers and this study’s analysis points to an emerging understanding of BC as one of the key causes of global warming. Indeed, as is noted above, many scientists now rank BC second only to CO₂, as the world’s primary warming emission.

Eric Johnson & Atlantic (2010) in their study, “Substituting LP Gas for Wood: Carbon and Deforestation Impacts”, concluded that, by 2015, 445 million people will convert some of their biomass consumption for cooking to LP Gas, by 2030 another 730 million people will follow suit. But, rather than shifting all cooking to 180 kg LP Gas/household - year, they would shift part of it to LP Gas, 110 kg/household year. Using the same 50/50 split of product and residue, this would spare 440,000 hectares/year of forest by 2015.

Joydeep Mukherjee (2010) in his article entitled, “Distribution & Retailing of LPG in India”, concluded that, “We have seen the contrast between the different market segments prevailing in Indian LPG industry. To be more precise, we saw how the domestic segment is quite different from its counterpart industrial and bulk segment, be it the implications of subsidy, demands of users or the interference from the government. Further, we studied the supply and logistic involved in LPG distribution and how the number of agencies in a region are optimized to reduce the deadweight loss to the society. We had also focused on the marketing strategy which we found to be difficult or at least peculiar, due to the fact that customer couldn’t see the product which makes it by large homogenous. Lastly, we dealt with the

scope of growth for LPG in Indian market and threat from its close and worthy substitute.

Mônica Cavalcanti Sá De Abreu & Jonatan César Lins (2010) in their study titled, “A Demographic Analysis of Consumer Environmental Attitudes about Liquefied Petroleum Gas in Brazil”, concluded that, consumers think environmental and safety issues related to LPG are important but lack information on whether or not companies are taking action on these issues. LPG distributors have an opportunity to strengthen consumer relationships by disseminating practical information to the costumer on the handling of LPG. It is of importance for companies to provide positive feedback on a regular basis in Order to show costumers that they really are making a difference. Businesses which seriously consider environmental issues may create a sustainable competitive advantage.

Vimal Priyan & Karthihaiselvi (2010) in their study, “Customers’ opinion towards Indane gas dealers”, found that, most of the customers are of the opinion that there is a delay in providing cylinder. It is suggested that there should be one more dealer in Sivakasi so as to distribute gas cylinder quickly. Majority of the customers prefer indane gas for the reasons like economy, convenience, time saving and cleanliness. As LPG has been moved towards buyers market, the dealer should provide better customers service that his competitors in order to have repeated sales, increased clientele and eventually sustainable development.

Daniel Kweku Baah Inkoom & Beatrice Sakyibea Biney (2010), in their study, “The Potential of Liquefied Petroleum Gas (LPG) as a Viable Energy Option for the Industrial Sector in Ghana”, concluded that, the problems of LPG used are not confined to just one constraint, although the mixture of constraints that firms face varies from one industry to another. Some of the major factors hindering LPG use in the country are low level of awareness, supply constraints, cost of initial installation, volatile LPG prices, insufficient policy, and institutional framework. There are gains to be made in the industrial utilization of LPG. Some of the potential benefits include: that LPG can be stored, transported, and used virtually anywhere in the country, it does not require gridlines; LPG burns cleanly without smoke or residual particulate matter, thus avoiding the serious health hazards other fuel might cause to the health of the workers. Manufacturing plants running on LPG produces much less carbon dioxide than the other conventional fuels. The use of LPG would improve the country’s energy mix and minimize its dependence on RFO and other polluting fuels. What is not clear is whether environmental and safety benefits, alone, give the manufacturer enough incentive to use LPG. Government support for the use of the LPG as should be based on the beneficial environmental impact of LPG, as compared to alternative fuels.

According to the report, ARGUS LPG World, News, Prices and analysis (2011), stated that, India is making a renew attempt to curb the abuse of heavily subsidized fuel such as LPG. The LPG Industry finds itself as often happens with global political shocks, on the wrong side of the political

turmoil. International LPG prices look as they will bulk the normal spring trend and push sharply higher. They have little choice, given the surge in crude prices. LPG price has surge already begun. So the LPG does not appear to have been lost to the Mediterranean market. The LPG industry must brace itself for a period of extreme price volatility.

Chike Chikwendu (2011) in his study entitled, "Change-over from Kerosene to LPG use", concluded that, "Making LPG accessible to all through making it available across socioeconomic groups can be achieved by locating LPG depots strategically across the country to assure uninterrupted product availability and price stability.

Krishnan Kutty (2012) in his seminar presentation entitled, 'Oil & Gas for Sustainable Growth' "R&D Intervention in LPG", he concluded that, consequently, the domestic accident due to LPG has been minimized to an insignificant level 0.23 ppm making LPG the safest domestic fuel.

Ruangwud Jarurungsipong & Nopalak Rakthum (2012) in their study, Price Controls Support LPG Fuel Consumption argues that, LPG consumption will be significantly reduced if the government allows the retail prices of LPG in all segments to rise to market price levels.

Babasab Patil (2012), conducted a study titled, "Customer satisfaction on bharat gas agencies in Coimbatore", and he concluded that, the gas agency are well established in providing satisfactory after sales services to its customers. By seeing the observations most of the customers are having positive perception towards that particular gas agency and are satisfied with its services such as Availability of Timely and safe delivery, Staff support, Trained Mechanics etc.

Purvin & Gertz (2013) in his articles, "World LPG Market Outlook", stated that, over the past several years, the international LPG industry has seen a gradual shift in world trade patterns. Demand in the East of Suez market has risen faster than LPG supplies in the region.

III. STATEMENT OF THE PROBLEM

Humanity faces a unique and far-reaching challenge. Our energy needs are growing as a result of continued population increases, economic growth, and individual fuel/energy consumption. At the same time, emissions from fuel wood and fossil fuels, the main energy source for heating in homes and powering our economies, are contributing to climate change and affecting the local air quality (WEC, 2005). In this situation, there are many opportunities for LPG to contribute to improved living standards. LPG is known to be the most useful and effective energy alternative for domestic, as well as business, use. The fact that it offers versatile usage at lower costs than other energy sources, accompanied with its environmentally-friendly nature, greatly increases the demand among people. This can sometimes make some suppliers charge more than they should. LPG is subsidized by the government in India. Increase in LPG prices has been a politically sensitive matter in India as it potentially affects the

urban middle class voting pattern. Customer oriented market should make sure that there is healthy competition in the market between different companies. This is necessary because in a competitive business environment, not only the companies but also the customers obtain benefits in the form of competitive prices; along with quality services and facilities provided by the LPG gas company. Consumer satisfaction is the basic tenet (true) of modern concept of marketing. It is the basic philosophy of management, which forces the organization to align its actions with the market mandates.

IV. SCOPE OF THE STUDY

- The study helps the researcher to have a practical exposure in this specific field.
- The study helps the HP Gas Company to know the customer's attitude and satisfaction level among their product as well as service.
- The Study helps the respondents to disclose their opinion and views about the HP LPG services.
- The study results will be of a great help to the government in future price policy making.
- It would be useful the student and future research scholars for future studies.

V. OBJECTIVES OF THE STUDY

- To study the awareness and attitude towards HP LPG in households.
- To analyse the problems faced by the customer and service provided by the company
- To study the opinion and satisfaction level of the customer
- To offer valid suggestions to the HP Gas company based on the findings

VI. RESEARCH METHODOLOGY

Research in common parlance refers to search for knowledge. In short the search for knowledge through objective and systematic method of finding solution to a problem is 'research'. As such the term 'research' refers to the systematic method consisting of enunciating the problem formulating a hypothesis, collecting the facts or data, analyzing the facts and reaching certain conclusions either in the form of solution towards the concerned problem or in certain generalization for some theoretical formulation.

6.1. Research Design

A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with the economy in procedure. In view of deciding objectives of the study, the researcher feels that descriptive analysis is most suitable to determine the Attitude and satisfaction level of the consumer.

Descriptive analysis is concerned with describing the characteristics of a particular individual or a group.

6.2. Sample Design

The researcher has conducted a pilot study based on his/her judgment the samples are selected from the population for study based on the population's parameters. Hence the Judgment sampling method (Purposive sampling method) is applied.

6.3. Sample Methods

Researcher has derived the sample criteria from the total population, such as domestic single HP LPG customers, who are all using for last 3 years (from 2010 to 2013) The primary data are collected from the domestic HP LPG customers, who are having Single HP LPG connection.

6.4. Sample Size

In this study the sample size is 351, who are all using single HP LPG connection in Coimbatore central zone.

6.5. Source of Data

The present study depends on both primary and secondary data. Primary data are directly collected from the sample respondents. The secondary data is collected through the company agents, offices and company web site.

6.6. Statistical Tools

The tools used for the study are:

- Pearson's Correlation Coefficient
- Chi - Square Test
- ANOVA

VII. LIMITATIONS OF THE STUDY

- It is a micro level study and therefore the findings of the study are applicable only to the market segments possessing the characteristics of Coimbatore central zone.
- Only the single connection of HP LPG users was taken for the study.
- Due to the time constraint the sample size were restricted to 351 respondents only.
- The response received from consumer may not represent the views of the universe
- Since the study is based on the primary data collected through questionnaire, the results of the study is subject to all the limitations of the primary data.
- The analysis based on some statistical tools which has its own limitation.
- The findings and suggestions are based on the information given by the respondents.

VIII. DATA ANALYSIS AND INTERPRETATION

To complete this study properly, it is necessary to analyse the data collected in order to test the hypothesis and answer the research questions. This chapter comprises the analysis, presentation and interpretation of the findings resulting from this study. This section explains Customer's Attitude and Satisfaction towards HP LPG services in households. Various statistical tools are utilized to analyze and interpret the data collected.

8.1. Pearson's Correlation Coefficient

The Pearson Correlation Coefficient is denoted by the symbol r . Its formula is based on the standard deviations of the x-values and the y-values:

$$r = \frac{n \sum XY - \sum X \sum Y}{\sqrt{[n \sum X^2 - (\sum X)^2][n \sum Y^2 - (\sum Y)^2]}}$$

In this study researcher has used the Pearson correlation analysis to knowing that the relationship between:-

- There is a Relationship between the Family members and LPG Utilization hours per day
- There is a Relationship between the Family members and Refill gap between 2 cylinders
- There is a Relationship between Age group and reason for Purchasing LPG

8.1.1. Relationship between Family Members and LPG Utilization Hours per Day

Table 1: Relationship between Family Members and LPG Utilization Hours per Day

Family Members (X)	No. of Respondents	LPG Utilization Hours Per Day (Y)	No. of Respondents
Below 2 members	18	Below 1hour	22
2 -4 members	203	1 - 2 hours	197
4 -6 members	120	2 - 3 hours	95
Above 6 members	10	3 and above hours	37
TOTAL	351	TOTAL	351

Source: Questionnaire

A. Correlation Result

Groups	Calculated r Value	Relationship
Family members and LPG utilization hours per day	0.98	Strong Positive correlation

B. Inference

From the above table clearly indicate that there is a strong positive correlation between Family members and LPG utilization hours per day. It is concluded that the LPG utilization hours per day depends on the consumption of the

family, which states the increase in family members may eventually increase the consumption of LPG and Vice versa.

8.1.2. Relationship between Family Members and Refill Gap between Two Cylinders

Table 2: Relationship between Family Members and Refill Gap between Two Cylinders

Family Members (X)	No. of Respondents	Refill Gap Between Two Cylinders (Y)	No. of Respondents
Below 2 members	18	Below 31 days	57
2 -4 members	203	31-60 days	186
4 -6 members	120	61-90 days	87
Above 6 members	10	91 and above days	21
TOTAL	351	TOTAL	351

Source: Questionnaire

A. Correlation Result

Groups	Calculated r Value	Relationship
Family members and Refill Gap between two cylinders	0.956	Strong Positive correlation

B. Inference

From the above table, it is clearly shows that there is a strong positive correlation between Family members and Refill Gap between two cylinders. It is concluded that the Refill gap between two cylinders depends on family Member, which means, the increase in family members may eventually increase the Refill of cylinders and Vice versa.

8.1.3. Relationship between Age Group and Reason for Purchasing of LPG

Table 3: Relationship between Age Group and Reason for Purchasing of LPG

Age Group (X)	No. of Respondents	Reason For Purchasing LPG (Y)	No. of Respondents
21 – 30 years	60	Easier & Quicker to cook	202
31 – 40 years	169	Prestigious item	62
41 – 50 years	94	Increasing income	58
51 and above years	28	Others	29
TOTAL	351	TOTAL	351

Table 4: Satisfaction Level on Price of the LPG and reference to others to buy the HP LPG

Reference to Others to Buy the HP LPG	Satisfaction Level on Price of LPG Cylinders					
	Highly Satisfied	Satisfied	Neutral	Dissatisfied	Highly Dissatisfied	Total
Yes	58(56)	32(33)	35(31)	12(27)	46(36)	183
No	49(51)	31(30)	25(29)	40(25)	23(33)	168
Total	107	63	60	52	69	351

Source: Questionnaire

A. Correlation Result

Groups	Calculated r Value	Relationship
Age group and reason for Purchasing LPG	-0.138	Negative correlation

B. Inference

From the above table it is clear that there is negative correlation between Age group and Reason for purchasing LPG.

It is concluded that the Reason for purchasing LPG is not related with Age group, which state that the reason for purchasing LPG is not motivated by Age factor; it may be motivated by other personal factors like, family members, income, and education.

8.2. Chi-Square Analysis

The Chi Square (χ^2) test is undoubtedly the most important and most used member of the nonparametric family of statistical tests. Chi square is employed to test the difference between an actual sample and another hypothetical or previously established distribution such as that which may be expected due to changes of probability. Chi Square can also be used to test differences between two or more actual samples.

In this study, chi-square is applied to find out whether there is any association between the Customers reference to somebody to buy the HP LPG and below the satisfaction factors;

- Price of the LPG cylinder
- Quantity of the LPG
- Delivery time of LPG Gas after booking

8.2.1. Satisfaction Level on Price and Preference to Buy the HP LPG

Null Hypothesis (H_0): There is no significant relationship between satisfaction level on price of LPG cylinders and Customers reference to somebody to buy the HP LPG.

The following table shows the chi-square values and hypothesis testing.

A. Chi-Square Test Result

Factor	χ^2 Value	df	P Value at 5% Level	Remark
Price of LPG cylinders	24.59	4	9.49	Significant

B. Inference

From the above table the calculated value of χ^2 is 24.59, this is higher than the table value 9.49 at 5% level of significance. So, the null hypothesis is rejected.

Table 5: Satisfaction Level on Quantity of the LPG and reference to others to buy the HP LPG

Reference to others to buy the HP LPG	Satisfaction Level on Quantity of LPG Cylinders					
	Highly Satisfied	Satisfied	Neutral	Dissatisfied	Highly Dissatisfied	Total
Yes	32(31)	64(48)	52(48)	30(49)	15(16)	193
No	25(26)	23(39)	36(40)	60(41)	14(13)	158
Total	57	87	88	90	29	351

A. Chi-Square Test Result

Factor	χ^2 Value	df	P Value at 5% Level	Remark
Quantity of LPG Cylinders	29.93	4	9.49	Significant

B. Inference

From the above table calculated value of χ^2 is 29.93; this is higher than the table value 9.49 at 5% level of significance. So, the null hypothesis is rejected.

Table 6: Satisfaction Level on Delivery Time of LPG and reference to others to buy the HP LPG

Reference to others to buy the HP LPG	Satisfaction Level on Delivery Time of LPG					
	Highly Satisfied	Satisfied	Neutral	Dissatisfied	Highly Dissatisfied	Total
Yes	91(75)	52(48)	27(27)	18(31)	15(22)	203
No	39(55)	31(35)	19(19)	36(23)	23(16)	148
Total	130	83	46	54	38	351

A. Chi-Square Test Result

Factor	χ^2 Value	df	P Value at 5% Level	Remark
Delivery Time of LPG	27.24	4	9.49	Significant

B. Inference

From the above table calculated value of χ^2 is 27.24, this is higher than the table value of 9.49 at 5% level of significance. So, the null hypothesis is rejected.

Hence we conclude that there is a significant relationship between the satisfaction level on Delivery time of LPG and Customer preference on purchasing the product. Which

Hence we conclude that there is a significant relationship between the satisfaction level on price of LPG cylinders and Customer preference on purchasing the product. Which portrays the customers are more enticed and even recommend the product.

8.2.2. Satisfaction Level on Quantity and Preference to Buy the HP LPG

Null Hypothesis (H_0): There is no significant relationship between satisfaction level on Quantity of LPG cylinders and Customers reference to somebody to buy the HP LPG.

The following table shows the chi-square values and hypothesis testing.

Hence we conclude that there is a significant relationship between satisfaction level on Quantity of LPG cylinders and Customer preference on purchasing the product. Which portrays the customers are more enticed and even recommend the product.

8.2.3. Satisfaction Level on Delivery Time and Preference to Buy the HP LPG

Null Hypothesis (H_0): There is no significant relationship between the satisfaction level on Delivery time of LPG Gas after booking and Customers reference to somebody to buy the HP LPG.

The following table shows the chi-square values and hypothesis testing.

portrays the customers are more enticed and even recommend the product.

8.3. ANalysis Of Variance

The ANOVA used for studying the difference among the various categories of one independent variable on a dependent variable is called one-way ANOVA. In this analysis, the total variance in a set of data is divided into variable within groups and variable between groups. The analysis of variance technique is used when the independent variables are nominal scales and the dependent variable is metric or least interval scaled. In this study ANOVA has been used to study the opinion towards problems faced by the customer with the following personal profile;

- Gender
- Age

Null Hypothesis (H_0): There is no significant difference between Gender and Respondents opinion towards problem faced by the customers.

8.3.1. ANOVA between Gender and Respondents Opinion towards Problem Faced by the Customers

Table 7: ANOVA between Gender and Opinion of Respondents towards Problems Faced by the Respondents

Problems Faced by the Respondents	Source of Variation	Sum of Squares	df	Mean Square	F	Sig.	Result
Problem with gas booking	Between Groups	19404	1	19404	14.53	6.6	S
	Within Groups	6675	5	1335			
	Total	26079	6				
Irregularity of increasing price	Between Groups	19404	1	19404	10.37	6.6	S
	Within Groups	9347	5	1869			
	Total	28751	6				
Poor communication on Gas booking & delivery time	Between Groups	19404	1	19404	6.65	6.6	S
	Within Groups	14699	5	2939			
	Total	34103	6				
high Installation and additional cost	Between Groups	19404	1	19404	10.89	6.6	S
	Within Groups	8905	5	1781			
	Total	28305	6				
Delayed supply of refilled cylinders.	Between Groups	19404	1	19404	18.53	6.6	S
	Within Groups	5233	5	1046			
	Total	24637	6				
Waiting time to get the new LPG connection and additional	Between Groups	19404	1	19404	21.80	6.6	S
	Within Groups	4449	5	890			
	Total	23853	6				
	Within Groups	12259	5	2452			
	Total	31663	6				

Significant p -value ≤ 0.05 ; S-Significant; p -value ≥ 0.05 ; NS- Not Significant

A. Inference

The above one way ANOVA table describes that the calculated F value of problem faced by the customers such as 14.53, 10.37, 6.65, 10.89, 18.53 and 21.80 are greater than the table value 6.6 at 5% level of significance. Therefore, the null hypothesis is rejected in all the above cases.

It is concluded that there is a significant difference between Gender and Respondents opinion towards problem

faced by the customers in all the above ten cases. Hence the two group means are not same.

8.3.2. ANOVA between Age and Respondents Opinion towards Problem Faced by the Customers

Null Hypothesis (H_0): There is no significant difference between Age and Respondents opinion towards problem faced by the customers.

Table 8: ANOVA between Age and Opinion of Respondents towards Problems Faced by the Respondents

9	Source of Variation	Sum of Squares	df	Mean Square	F	Sig.	Result
Problem with gas booking	Between Groups	693	1	693	0.34	5.6	NS
	Within Groups	14043	7	2006			
	Total	14736	8				
Poor communication on Gas booking & delivery time	Between Groups	693	1	693	0.29	5.6	NS
	Within Groups	16715	7	2387			
	Total	17408	8				
Irregularity of increasing price	Between Groups	693	1	693	0.21	5.6	NS
	Within Groups	22067	7	3152			
	Total	22760	8				
High Installation and additional cost	Between Groups	693	1	693	0.30	5.6	NS
	Within Groups	16273	7	2324			
	Total	16966	8				
Delayed supply of refilled cylinders.	Between Groups	693	1	693	0.38	5.6	NS
	Within Groups	12601	7	1800			
	Total	13294	8				
Waiting time to get the new LPG connection and additional	Between Groups	693	1	693	0.41	5.6	NS
	Within Groups	11817	7	1688			
	Total	12510	8				

Significant $p\text{-value} \leq 0.05$; S-Significant; $p\text{-value} \geq 0.05$; NS- Not Significant

A. Inference

The above one way ANOVA table describes that the calculated F value of problem faced by the customers such as 0.34, 0.29, 0.21, 0.30, 0.38 and 0.41 are lesser than the table value 5.6 at 5% level of significance. Therefore, the null hypothesis is accepted in all the above cases.

It is concluded that there is no significant difference between Age and Respondents opinion towards problem faced by the customers in all the above ten cases. Hence the two group means are same.

IX. FINDINGS

9.1. Pearson's Correlation Coefficient

- There is a strong positive correlation between Family members and LPG utilization hours per day. It is concluded that the LPG utilization hours per day depends on the consumption of the family, which states the increase in family members may eventually increase the consumption of LPG and Vice versa.
- There is a strong positive correlation between Family members and Refill Gap between two cylinders. It is concluded that the Refill gap between two cylinders depends on family Member, which means, the increase in family members may eventually increase the Refill of cylinders and Vice versa.
- There is negative correlation between Age group and Reason for purchasing LPG.

It is concluded that the Reason for purchasing LPG is not related with Age group, which state that the reason for purchasing LPG is not motivated by Age factor; it may be motivated by other personal factors like, family members, income, and education.

9.2. Chi - Square Test

- There is a significant relationship between satisfaction level on Quantity of LPG cylinders and Customer preference on purchasing the product. Which portrays the customers are more enticed and even recommend the product.
- There is a significant relationship between the satisfaction level on price of LPG cylinders and Customer preference on purchasing the product. Which portrays the customers are more enticed and even recommend the product
- There is a significant relationship between the satisfaction level on Delivery time of LPG and Customer preference on purchasing the product. Which portrays the customers are more enticed and even recommend the product.

9.3. ANOVA

- There is a significant difference between Gender and Respondents opinion towards problem faced by the customers in all the above ten cases. Hence the two group means are not same.
- There is no significant difference between Age and Respondents opinion towards problem faced by the customers in all the above ten cases. Hence the two group means are same.

X. SUGGESTIONS

The following suggestions were given on the basis of the findings of the study.

- Most of the customers have an opinion that there is a delay in supplying the LPG cylinder, HP LPG godowns may be installed in few more places as the study area is vast. Hence they can reduce the time delay in distribution.
- There should be some more dealers in Coimbatore central area, this would help in increasing the sales and in turn, it would improve the service quality on distribution
- Most of the customers are facing the irregularity of increasing the price of the gas. So HP Agencies and Government should take the necessary action to rectify it or make the customer awareness on increasing price of the gas.
- It is the agency responsibility to create the awareness among the consumers on efficient handling (usage) on domestic LPG and safety measures. The agency should take the necessary steps to improve this service.
- HP agencies should improve their service in all aspects such as communication on Gas booking & delivery time, services in agency outlets, Behavior of counter staff/Deliverymen and Mechanic, Customer care response over landline, Service / Inspection after sales.

XI. CONCLUSION

"The customer is always right" is a famous business slogan. The underlying truth behind this statement is realizing that, customers are the life blood for any business. In this competitive environment, quality service has become the secret of success in all service sectors. Quality service means, it is absolutely to satisfy the customer needs. Keeping this in mind, this study has been conducted at Coimbatore city to identify the customers' attitude and satisfaction towards the domestic HP LPG services. The findings of the study depict that the customers has faced the irregularity of price increase

and delayed supply of LPG gas cylinders. It is suggested that the HP gas company should take some necessary action to improve their service quality by the way they can introduce some more dealers and provide constant service to the customers. By seeing the overall customer service and the performance of the company, the results indicate that the consumers have positive attitude towards referring others to buy the HP LPG. This study emphasizes that the company needs to improve in customer care area, proper communication while booking and delivery through short message service (SMS). HP Gas Company should understand the importance and needs of the customers. It is essential for a healthy business in creating new customers, keeping loyal customers, and developing referrals for future customers.

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