



DETERMINANTS OF CONSUMERS PERCEPTIONS REGARDING FRESH AND TETRA PACK MILK IN FAISALABAD, PAKISTAN

M. A. Iqbal¹, A. Nazir^{*2}, T. Sadaf¹, A. Yousaf¹ and M. A. Shahwani

¹Institute of Agricultural and Resource Economics, University of Agriculture, Faisalabad, Pakistan

²Department of Economics, University College of Zhob, BUITEMS, Zhob, Balochistan, Pakistan

³Economist, Directorate Agribusiness Agriculture Research Institute, Sariab Quetta, Pakistan

ABSTRACT

Pakistan is the fourth largest producer of milk in the world. Milk is consumed in both fresh and tetra pack form in the country. This study explores the socioeconomic factors that affect the consumer's preferences towards tetra pack and fresh milk consumption. Primary data were collected from a number of 130 randomly selected consumers using a well-structure questionnaire from Faisalabad district of Punjab, Pakistan. For analytical purpose, binary probit regression model was used, where multiple factors were identified that influence the consumer decision of buying milk. Results revealed that income, education, milk price, age and gender of consumer, reason of milk preference and advertisement were significant determinants that affected the consumers' preferences towards milk. Income and price of milk were considered dominant factors that affected the consumer's preferences of milk type. The probit regression estimates indicated that the price was negatively related to tetra pack milk, where one PKR increase in price of milk decreased the probability of tetra pack milk consumption by 21.3 percent. The fresh milk is inferior goods in regarding to income level. For one PKR increase in income the likelihood of consumer buying decision towards tetra pack milk increased by 14 percent. The effect of education level of the household on the probability of buying milk has been found to be significant. Another important factor was 'health and hygienic consideration', the consumers who believe that the tetra pack milk is hygiene and healthy are 8.7 percent more likely to prefer tetra pack milk instead of fresh milk. The study suggests government to reduce price difference of fresh milk and tetra pack milk in order to enhance the assurance of quality milk to consumers. Milk processing and marketing stakeholders need to meet quality standards and provide milk at fair price to customers.

Keywords: binary probit model, consumer behavior, consumer preference, determinants, tetra pack milk

INTRODUCTION¹

Modern times demand revolution in marketing methods has occurred in order to appeal consumers, who are the eventual evaluators of products. It is essentially imperative to understand their psyche before implementing any product differentiation and advertisement (Etzel *et al.*, 2004 and Grunert *et al.*, 2000). Consumer behavior is pretty intricate, ranging from behavior related to product search to behavior related to purchase and post purchase activities (Louden and Bitta, 1993; Von-Alvensleben and Padberg, 1997). Consumer's preferences require products to have attributes that match with their socio-economic and ethnic needs. Such a demand for

specific product attributes offers prospects of quality improvement and product differentiation to the suppliers (Grunert, *et al.*, 2000). There is a range of many dairy products consumed in different parts of the world, where fresh milk is the primary product as per volume consumed. Nonetheless, processed dairy products have gained fame, particularly among economically well-off households (Fakhar, 2006). Pakistan is forth leading producer of milk internationally. Milk is a primary source of animal protein in Pakistan and its per capita availability is 172 kg per annum which is the highest among food groups (GoP, 2021). Buffaloes and cows are main resource animals of milk besides sheep, goats and camels being minor one. Milk production from buffaloes is 60%, the milk production obtained by cow is at 36% and 4% are goats, sheep and camel.

^{*}Corresponding author: adnannazir@gmail.com



Approximately 97% of milk is sold in raw form and the rest is processed (GoP, 2020-21).

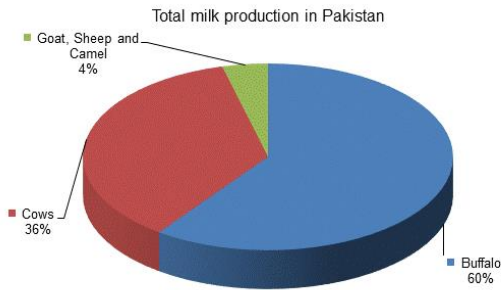


Figure 1. View of Total Milk Production in Pakistan Source: GoP (2020-21)

Approximately, in Pakistan 80 percent milk is produced in rural areas, 15 percent in peri-urban areas and 5 percent in urban areas (Tahir *et al.*, 2019). Despite being leading producer of milk, Pakistan produces, processes and markets milk mostly through informal channels, where more than 90 percent of produced milk reaches to consumer by means of a chain of middlemen (Ali, 2007; Rizvi, 2000, Tahir *et al.*, 2019). Remaining minor proportion of milk produced enters processing market, where milk is pasteurized, ultra-heat treated and packed in tetra packs (Garcia *et al.*, 2003).

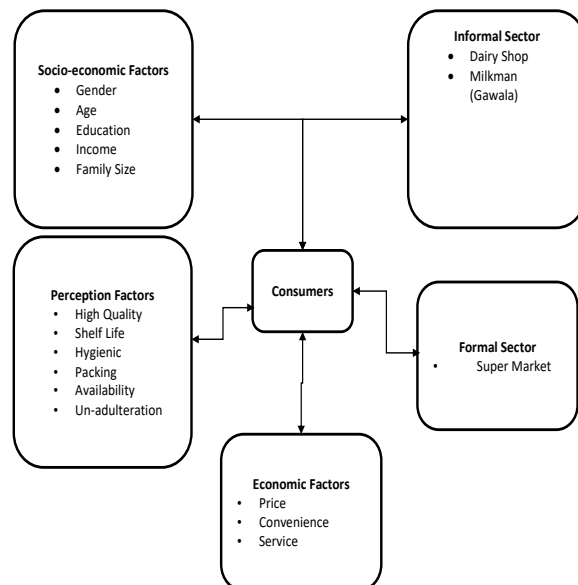
Pakistan's dairy industry is facing multiple issues like inefficient marketing systems, low productivity, animals' malnutrition, poor infrastructure, low profitability and lack of financial facilities (Tanvir, 2007; Tahir *et al.*, 2019). On consumption side, consumer behavior is dynamic, where demand for processed milk is dependent on multiple socio-economic factors, health and safety concerns, quality standards and price of packed milk and its alternatives (Foret and Procházka, 2006; Peng *et al.*, 2006; Stávková *et al.*, 2008; Akbay and Tiryaki, 2008; Moezuddin, 2004). Price of packed milk influences the consumers, particularly those having comparatively lower income (Uzunoz and Akcay, 2012). However, the demand for pasteurized and packed milk is growing in the country given the health benefits and comparatively higher shelf life it has. Consumer behavior is dynamic in this scenario where socio-economic and cultural variations, globalization, health considerations have changed consumer preferences. This growing tendency towards use of processed milk has captivated many manufacturers to evolve business of milk processing and its marketing. Competition developed among numerous national and

international firms related to milk processing and marketing to procure market share of processed milk in the country. Due to ever changing nature of consumer preferences, their tendency towards packed milk and rising competition among packed milk marketing and supply firm, this study is conducted to assess the socioeconomic factors that affect the consumer's preference towards tetra pack and fresh milk consumption and to formulate policy recommendations.

MATERIALS AND METHODS

The study attempts to analyze the consumer's preference towards tetra pack and fresh milk consumption and its determinants. For this purpose, data were collected from primary source through a well-structured questionnaire and face to face interviews in Faisalabad. Faisalabad is urbanized and populated city with growing tendency towards usage of tetra packed milk. Consumers were selected randomly to know their perception about usage of milk at various departmental stores, bakeries and retail shops. The questionnaire contained questions pertaining to various milk quality attributes on Likert Scale (on a continuum from 1 to 5 where 1= strongly disagree and 5=strongly agree). Since consumers of tetra packed milk are quite limited, therefore, only 130 respondents were randomly selected from different areas of Faisalabad including Ghulam Muhammad Abad, Jinnah Colony and Samanabad.

Factors influence the consumer buying decisions towards milk (Conceptual framework of the study)



The sample size ranged between 80-120 respondents is adequately enough to carry out the socioeconomic study (Hadebe and Msuya, 2016). Before starting proper data collection questionnaire was pre-tested by taking interview of 10 households. After pre-testing questionnaire was changed according to requirement. After interviews of consumer obtained data were analyzed through STATA and SPSS software. Probit model is used to describe the relationship between variables. The statistical model used for binomial distribution is expressed as in probability.

$$\text{Prob}(y = 1) = 1 - F[-\sum_{k=1}^k \beta_k b_k] = F[-\sum_{k=1}^k \beta_k b_k] = \varphi[-\sum_{k=1}^k \beta_k b_k]$$

The probability of non-event

$$\text{Prob}(y = 0) = 1 - \varphi[-\sum_{k=1}^k \beta_k b_k]$$

The consumer buying decisions towards milk

$$Y^* = \gamma Z_i + U_i$$

Where,

Y^* = consumer buying decisions towards milk

γ = vector parameter

Z = Exogenous Variables

U = Error term

The dependent variable (Y^*) is dichotomous (binary) and taken the value of '0' and '1'

$Y^* = 1$ if $Y_i > 0$ (consumer buying decisions towards pack milk) and

$Y^* = 0$ (consumer buying decisions towards fresh milk)

The probit regression model has been used in many applications due to its mathematical convenience. The general form of model is (Greene, 2018)

$$P_i = \text{prob} \left[Y_i = \frac{1}{x} \right] = \varphi(X\beta) = \int_{-\infty}^{x_i \beta} (2\pi)^{-1/2} \exp\left(-\frac{t^2}{2}\right) dt$$

Where,

P = Probability that consumer buying decisions towards pack milk

X = Explanatory variables

Z = Standard normal variable

$B = k$ by 1 vector of the coefficient estimated

The relationship between the outcome of a particular variable and the probability is explained by a marginal effect, which causes a partial change in probability. The continue variables are associated with marginal effects $p(Y_i = 1 | X)$ and other variables kept constant. The changes in dependent variable on changes in a particular regressor are best represented by the marginal effect. It can be drive as, (Greene, 2018).

$$\frac{\partial p_i}{\partial x_k} = \varphi(x_i, \beta) \beta_k$$

φ = Distribution function for the standard normal random variable

$B = k$ Coefficient of kth explanatory Variable

The Probit model specification in this analysis can be written as

$$Y^* = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \varepsilon_i$$

Y = Consumer buying decision towards milk

X_1 = Age of the respondents

X_2 = Gender of the respondents (years)

X_3 = Education of the respondents (years)

X_4 = Income of the respondents

X_5 = Price (packed milk price is expensive compared to unpacked milk price, agree= 1; not agree=0)

X_6 = reason of milk preference (packed milk is hygienic and healthy, agree= 1; not agree= 0)

The data were collected from the respondents depending upon their will. The regression coefficient was compared with the T test (Jonker and Pennink, 2010). This section describes the results and tabulates the data collected from the respondents.

RESULTS

Descriptive analysis

Descriptive analysis is the type of analysis of data that helps to describe, show or summarize data points in a constructive way such that patterns might emerge that fulfill every condition of the data. It is one of the most important steps for conducting statistical data analysis. It gives you a conclusion of the distribution of your data, helps you detect typos and outliers, and enables you to identify similarities among variables.

Table1. Socioeconomic characteristics of respondents

Variables	Mean	Std. Dev	Min	Max
Age	36.27	8.80	18	60
Gender	3.10	1.30	0	1
Education	9.07	5.11	0	18
Income	38666.92	17726.74	14,000	90,000
Price	0.9462	0.2265	0	1
Milk preference	3.93	0.99	0	1

Source: Authors own estimates

Several studies have shown that the socio-economic and demographic characteristics of the head of the household play an important role in the consumption of milk in the households of the consumers (Bus and Worsley, 2003). Socio-economic characteristics provide useful information for understanding of the behavior of consumers. These characteristics includes age, gender, education, income, and price and milk preference. According to (Table 1) described the socio-economic characteristics of study respondents the average age of respondent was 36 years. Whereas it ranged from minimum 18 years and maximum 60-year age, which shows

that all the consumers were adult. Moreover, the respondents had 9.07 years of average formal education, ranging from 0 showing that the consumer was illiterate and maximum 18 year indicating higher education of the consumers. Similarly, the mean value of income was 38666.92 rupees per month. The minimum income of the responded is 14,000 and maximum income 90,000. Similarly, dummy variable was used to judge the perception of respondents about the price of tetra pack and fresh milk. The value 1 represents that tetra pack milk is expensive and otherwise not. Survey results showed that 94 percent of the respondents were of the view that tetra pack milk is expensive that fresh milk as describe by the studies like Afzal and Faisal, (2018) and Paraffin *et al.* (2018). Mean value of milk preferences variable is 3.93 it means that 4% of the responded think that the pack milk is hygienic and healthy and remaining 96% showing their response that fresh milk is hygienic and healthy. Similar findings were also reported by (Gao *et al.*, 2020). The main reason that people think this product is not suitable for kids, or adults shouldn't consume it.

Table 2. Probit estimates for consumer buying decision towards milk

Variables	Coefficients	Standard error	z-statistics	Marginal effect
Constant	-0.499	1.735	-1.360	-
Gender	0.099	0.304	-2.380	0.046
Age	-0.005	0.019	-1.550	-0.006
Education	0.085**	0.036	4.830	-0.020
Income	0.000**	0.000	-3.830	0.000
Milk price	-0.900*	0.236	2.200	-0.213
Reason of milk preference	-3.679**	1.444	2.850	0.087
Model prediction success	59.64%	Log likelihood ratio	-54.046	
McFadden's Pseudo R ²	0.720	Significance level	0.000	

Source: Authors own estimates. Note: * Up to 1% level of significance, ** Up to 5% level of significance, *** Up to 10% level of significance.

Table 2 represents the results estimated by using the probit model. The model is estimated with the maximum likelihood method. Statistically significant variables are determined from the results of likelihood ratio statistics. The significant level of the model is 1%. Estimated coefficients and standard errors indicate which factors influence the consumer buying decision towards milk. A statistically significant coefficient suggests that the likelihood of consumer buying decision towards milk will increase/decrease as the response of the explanatory variable increases/decreases (Borooh, 2002).

McFadden's Pseudo R Square shows the variance in the dependent variable is explained by the variance due to the independent variables. The calculated value of McFadden's Pseudo R Square is 0.72. This value represents that the variables placed in the model indicates high level probability of consumer buying decision towards milk. Our model predicted success is 59.64%. This means that the Probit model predicts 60% of the cases correctly.

The variables significantly affecting the probability of consumer buying decision towards milk are education, income, price and milk preference which change the likelihood ratio. The level of education is related to the ability to make decisions on the basis of information. In our study we found that education is an important factor that effect consumer buying decision towards milk. We find that the education is statistically significantly related to the consumer buying decision towards milk. This result shows that the probability of consumer buying decision towards milk increases as the education level increases. So, more likelihood to purchase tetra pack milk as increase in respondents education level. Similar results were also reported by (Lanfranchi *et al.*, 2017).

Household income levels are one of the factors influencing their consumer's buying decision towards milk. The income is the largest effect on the consumption of milk because when the consumer income is low prefer fresh milk or when income is high their life style changes so respondents prefer the tetra pack milk. The fresh milk is inferior goods in regarding to income level. According to the marginal effect the income increases by one rupee the likelihood of consumer buying decision towards milk will increase by 13.8% with significant impact at 5% level of significant. These findings coincide with (Uzunoz and Akcay, 2012).

Milk pricing is another important factor influencing households' consumption towards milk. Price is one of the main reasons founded in the survey for not purchasing pack milk because the consumers are sensitive to price of milk. According to the result the consumer does not prefer tetra pack milk because it is expensive than raw milk. When the price of the milk increases one rupee the probability of tetra pack milk consumption is decrease by 21.29% with significant effect founded negative coefficients of price variable for tetra pack milk equation. Likewise, findings were also reported by (Mtimet *et al.*, 2015).

Health and hygiene are a significant estimator of the consumer buying decision towards milk.

According to the result these variables are significant, but negativity related to the consumption of tetra pack milk. This means that the consumers prefer fresh milk instead of tetra pack milk because the consumer has little or no awareness about benefits of tetra milk has. The marginal effect indicates the consumers who believe that the tetra pack milk is hygiene and healthy are 8.70% more likely to prefer tetra pack milk instead fresh milk. The results of our study are similar to previous studies (Uzunoz and Akcay, 2012).

The probability of consumer buying decision towards milk increase with gender according to the value of marginal effect is 4.63% but it is statistically insignificant. Sign with the gender variable is positive which show that gender is positively related to the decision making process regarding milk. These results also coincide with (Kurajdova and Tábořecká-Petrovicová, 2015)

Age is an important factor so the result shows there is a negative relation between age and consumer buying decision toward milk. This show that as age increases the likelihood of consumer buying decision toward milk decrease by 6.41% with insignificant effect. Moreover, similar findings were also reported by (Ahmadi Kaliji *et al.*, 2019).

CONCLUSIONS AND RECOMMENDATIONS

In this study, socio-economic factors affecting the consumer buying decision towards Milk were determined by using the primary survey data. The finding of this study revealed that consumer's demographic characteristics and their heads play an important role regarding decision making toward milk. The result from probit model showed that, the income, price, education and milk preference are significantly associated with the use of tetra pack and fresh milk. Result shows that large household likes to consume the fresh milk rather than tetra pack milk. While the households who have high level income level purchase tetra pack milk occasionally. In addition to this, buying decision towards milk is effect by hygiene and health probability. Most of the consumers believe that the tetra pack milk is not good for health. They think that this product is not suitable for kids, or adults so shouldn't consume it. This means that the consumers prefer fresh milk instead of tetra pack milk because the consumer's awareness for tetra milk may be low. Also, the price of milk was an effective factor in the behavior of consumption of tetra pack and fresh milk. Also, the price of milk was an effective factor in the behavior of consumption of tetra pack and fresh milk. The study finding that the

consumer who are sensitive to price prefer fresh milk. Moreover, the study has contributed in the existing literature related to the consumer buying decision towards milk. However, this study contribute in existing literature by adding the different factors that effects the consumer buying decision towards milk such as health and hygiene, habit, quality, gender and age. This study paves the way for new researchers. However, further work on this topic can be proceed to understand consumers' buying decisions deeply.

In the light of the results of the study it is recommended that consumers perceived that price of tetra pack milk is higher so it must be controlled to increase its usage among people. Various awareness programs should be organized for illiterate and less educated people to increase their awareness about Tetra Pack milk i.e. it is a healthy and more nutritious product. As population growth is increasing day by day so that the tetra pack milk industry must be developed to full fill the needs of the growing population ultimately industry development may increase GDP of the overall country. Further information about nutritional elements in tetra pack milk must be ensured written on the pack of milk so that more consumer can be attracted for the product.

AUTHOR'S CONTRIBUTION

M. A. Iqbal: Conceived idea, wrote abstract

Methodology, did review analysis and Result and discussion

A. Nazir: Technical input at every step and overall management of paper

T. Sadaf: Technical input at every step

A. Yousaf: Data collection, Data entry, Introduction and References

M. A. Shahwani: Technical input at every step

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