Level and Determinants of Consumers' Perception of Packed Milk in Pakistan

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Abstract

Given the gradual rise in packed milk consumption in the country, the study examines the level and determinants of consumer perception of packed milk in Pakistan. In order to seek the objectives of the study, primary data were collected through intercept interviews[1] of 120 consumers of packed milk from three major cities of Pakistan i.e. Lahore, Faisalabad and Multan. Mean Attribute Scores (MAS) and Milk Quality Response Index (MQRI) were estimated to find out the level of consumers' perception about various milk quality attributes like food safety, nutrition, value, price and packaging. Ordered logistic regression analysis, using ordered categories of MQRI as the dependent variable, was employed to find out the determinants of packed milk consumption. The results of the study indicate that consumers mostly perceive packed milk relatively better due to its various quality attributes. The estimated ordered logistic regression model reveal that younger, married and male consumers irrespective of education level have greater preferences for packed milk. The study suggests that government should

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[1] The interviews that uses convenient or random sampling technique and usually takes form of one to one interviews rather than self administered questionnaires

encourage and promote investment in milk processing industry in Pakistan. The milk processing and marketing companies should further improve various milk quality attributes and offer packed milk at fair price in the markets.

Key Words: Consumer behaviour, consumer perception, determinants, packed milk, food safety, Pakistan.

1. Introduction

Modern day concept of marketing revolves around consumers who are considered as final authority for the product acceptance or rejection. This philosophy makes it obligatory for the businesses to understand the behaviour of consumers for product differentiation and competitive advantage (Etzel et al., 2004 and Grunert et al., 2000). Consumer behaviour is quite complex and encompasses both mental and physical exertion in product search, purchase and post purchase activities (Louden & Bitta, 1993; von-Alvensleben, & Padberg, 1997). Consumer choices and decisions depend on product attributes matching their socio-economic, physical and cultural needs. The demand for these attributes provide an opportunity to the business firms for product differentiation (Grunert, et al., 2000).

In case of dairy products, consumers are more conscious due to their frequent consumption and immediate impact on health. The consumers of dairy products are more quality conscious and look for health, convenience, hedonic and process related product attributes for fulfilling their purchase motives. Therefore, companies introducing new dairy products endeavour to incorporate most of these benefits in their product attributes (Grunert, et al., 2000).

The consumption of dairy products varies across different regions with liquid milk as the most important product by volume. However, processed dairy products become more important with increasing incomes and living standards (Fakhar, 2006). Pakistan is one of the leading milk producing

countries of the world with 34.36 million tonnes of milk production in 2009 (FAO, 2010). Milk is a major source of animal protein for the population of Pakistan and its per capita availability is around 94.81 kg per annum which stands second in food group after cereals (Government of Pakistan , 2010). It is mainly obtained from buffaloes (66 percent) and cows (31.4 percent) along with some minor contribution from sheep and goats (Burki et al., 2004).The rural areas produce around 85 percent of milk whereas peri-urban and urban areas contribute 15 and 5 percent of total milk production (Zia, 2009).

Although there is an increasing trend in milk production in Pakistan but the milk processed and marketed through formal channels constitute just 3-4 percent of total milk production in the country. The remaining 96 percent of the production reaches end users as fresh milk for immediate consumption through an extensive, multi-layered distribution system of middlemen (Ali, 2007; Rizvi, 2000). Milk processing takes place in formal private sector with pasteurized milk (loose and plastic packing) and UHT milk in tetra packing as the main types of processed milk (Garcia et al., 2003).

The consumption of processed milk in the form of pasteurized and UHT milk is growing in Pakistan. This shift in consumer behaviour can be attributed to overall cultural and behavioural changes due to globalisation, rise in per capita income, change in life style, health consciousness and increasing availability of substitutes. Furthermore, packed milk is considered safe for consumption in comparison to open milk which is considered contaminated, adulterated and carrier of several disease causing pathogens and elements (Moeezuddin, 2004).

This rising trend in packed consumption has attracted many firms to step into milk processing and marketing business. The growing presence of several national and multinational milk processing and marketing firms have developed competition for market share of packed milk in the country. Owing to consumer preferences towards packed and increasing competition among companies, this study is conducted to assess the level and socio-economic determinants of consumer's perception of packed milk in Pakistan.

2. Methodology

The study attempts to quantify consumers' perception which is mostly qualitative in nature. For this purpose, primary data was collected through survey from consumers of packed milk in three major cities (i.e. Lahore, Faisalabad and Multan) of Pakistan. These cities are highly urbanized and populated cities of Punjab province of Pakistan and there is increased tendency towards packed milk consumption in these cities. Although a larger number of sample size would have been better, a random sample of 120 packed milk consumers, comprising 40 respondents from each city, was considered appropriate due to the relatively less number of consumers of packed milk as compared to fresh milk consumers. Consumer intercept interviews at various departmental stores, bakeries and retail shops were conducted with the help of a pre-tested questionnaire. 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).

The classification framework for food quality attributes, as suggested by Hooker and Caswell (1996), with some changes in line with the understanding level of domestic consumers, was used for data collection purposes.

The collected data was tabulated and analysed with the help of Statistical Package for Social Scientist (SPSS). Descriptive statistics were used to explore socio-economic characteristics of the consumers. Mean Attribute Scores (MAS) and Milk Quality Response Index (MQRI) as used by Kariyawasam et al. (2006) were estimated to assess the perception of consumers towards packed milk.

Mean Attribute Score (MAS)

The scores given by the respondents to statements explaining consumers' agreement level with milk quality attributes may be used to indicate the importance of each of these attributes. For this purpose, Mean Attribute Scores (MAS) were calculated for all individual statements by aggregating

the scores assigned to individual attributes (X_i where $i = 1,2…n$) and dividing it by the number of respondents in the sample (N). The value of MAS ranged from 1 (strong disagreement) to 5 (strong agreement). MAS were calculated through the following formula:

$$MAS = \sum Xi \,/\, N$$

Milk Quality Response Index (MQRI)

An additive index named Milk Quality Response Index (MQRI) was constructed to describe the importance of individual attributes as a whole for an individual consumer. The formulation of the MQRI was based on the equation shown below;

$$MQRI = \sum A_{is}.X_s \,/\, AX$$

In this equation, A_{is} denotes the integer score given to an attribute (X_s) by the ith respondent ($i = 1, 2, 3…n$) on the Likert-scale and s represents the number of attributes ($s = 1, 2, 3…m$) used to calculate the index. The scores given by respondents to s where m = 21 for this analysis were used to estimate the MQRI. The term AX represents the maximum potential score that can be obtained by a respondent for normalising the value of the index. With this normalisation process, the index values range from 0 (minimum) to 1 (maximum) with a certain mean and standard deviation.

Ordered Regression Model Specification

Ordinal regression was employed to investigate various socio-economic determinants of consumer perception towards milk quality attributes. Ordered logistic models are considered appropriate where dependent variable is in the form of more than two ordered categories (Ashby et al., 1989 & Greene, 2003). MQRI of respondents was taken as a dependent variable and the following model was specified.

$$MQRI = \beta_0 + \beta_1\,AGE + \beta_2\,GEN + \beta_3\,INC + \beta_4\,MRS + \beta_5\,EDU + \mu_i$$

Where

The dependent variable is

MQRI   =   Milk Quality Responsive Index

The independent variables are

AGE: Age of the respondents (less than 25 years = 1, otherwise 0)

GEN: Gender (male = 1 and female = 0)

INC: Income (> Rs. 10000 = 1, otherwise 0)

MRS: Marital status (married = 1 and unmarried = 0)

EDU: Level of education (higher than matriculation= 1, otherwise 0).

3. Results and Discussion

3.1 Socio-Economic Characteristics of the Respondents

Socio-economic characteristics of the respondents are considered very important in consumer studies. These characteristics provide useful background information for in-depth understanding of the behaviour of consumers. Table 1 summarises important socio-economic characteristics of the sampled consumers of packed milk in the major cities of Pakistan.

In a sample of 120 consumers, more than 85 percent were male and around 14 percent were female. This is mainly due to the fact that usually males in Pakistan undertake shopping of grocery items. In respondents, more

Table 1
Socio-Economic Characteristics of the Sampled Packed Milk Consumers in Major
Cities of Pakistan

Characteristic	Categories	Respondents	Percentage
Gender	Male	103	85.83
	Female	17	14.17
Marital Status	Single	64	53.33
	Married	56	46.67
Age (years)	< 20 years	04	3.33
	21-25 year	31	25.83
	26-30 years	47	39.17
	> 30 years	38	31.67
Education	Primary or Less	01	0.83
	Matriculate	35	29.17
	Intermediate	19	15.83
	Graduate	32	26.67
	Post-graduate	33	27.50
Occupation	Govt. Employees	27	22.50
	Private Employees	41	34.17
	Self-Business	26	21.67
	Labourer	03	2.50
	Student	18	15.00
	Others	05	4.16
Income (Rupees)	< 10,000	12	10.00
	10,001-20,000	56	46.67
	> 20,000	52	43.33

than 53 were single and 46 percent were married. The respondents were
mostly more than 20 years of age and just 3 percent consumers were less
than 20 years. Majority of the respondents in the sample were educated as
more than half of the respondents were graduates and post-graduates. In
terms of occupation, respondents were mainly government employees,
private employees, self-business owners, labourers and students. In case of

income level, the respondents with income less than 10,000 Rupees were just 12 percent whereas respondents with income from Rs 10,000 to Rs 20,000 and greater than 20,000 Rupees were around 46 and 43 percent respectively.

3.2 Consumers' Perception of Packed Milk

Consumers' perception plays an important role in influencing the purchase of any particular product. It is basically an opinion forming process based on certain product attributes that a consumer attaches priority in product selection (Louden & Bitta, 1993). This section describes the level of consumer perception of packed milk in terms of estimated consumer Mean Attribute Scores (MAS) of various milk quality attributes measured on a scale (strongly disagree = 1 and strongly agree = 5). Milk quality attributes were grouped into categories of food safety, nutrition, value, price and package etc (Table 2).

3.2.1 Food Safety

Increased level of awareness about health and hygiene issues has made consumers more concerned about food safety. Consumers now demand products that are safe to consume and are produced and distributed through transparent procedures (Hooker & Caswel, 1998, & Ventura-Lucas, 2004). Mean Attribute Score of consumers for overall food safety subset comprising of various safety attributes of packed milk was 3.27 on the scale. This implied that consumers had low level of agreement with the statements that packaged milk was safe to consume. This is mainly due to the lack of awareness of food safety parameters. The individual attributes are stated as low in food borne pathogens, low in heavy metals, low in naturally occurring toxins and low in food additives in the food safety subset, had mean values of 3.02, 3.32, 3.25, and 3.47 respectively.

3.2.2 Nutrition

Milk is a highly nutritive product containing proteins, vitamins and minerals (Bus & Worsley, 2003). Regarding nutritional value of packed milk, the overall MAS of nutritional subset was 3.73. This shows that on average

consumers acknowledge the nutritional qualities of packed milk. In this subset, MAS of the consumers for various statements about nutritional attributes like high in protein, high in vitamins, high in calories and high in essential minerals was 4.02, 3.97, 3.72 and 3.86 respectively The other two statements in this subset describing packed milk as low in carbohydrates and low in fats and cholesterol had mean scores of 3.11 and 3.82 respectively.

3.2.3   Value

The concept of value refers to net perceived benefits a consumer receives from the purchase of a product. Consumers in the market weigh product benefits against costs incurred in the purchase and buy a product only when benefits exceed costs. Product benefits may be related to function, convenience and aesthetics (Christopher, 1996). According to the findings of the study, the value subset had 3.68 MAS on the scale reflecting positive perception of consumers about overall value bundle of packed milk. Consumer MAS of value related individual attributes was 4.02 for high in purity, 3.52 for high in compositional integrity, 3.52 for better in appearance, 3.57 for better taste, 3.74 for high in convenience and 3.52 for better size and style.

3.2.4   Price and Package

The price and packaging of a product plays an important role in a consumer's purchase decisions. Consumers purchase a particular product if he/she is satisfied that the product price is fair enough to acquire the value. Like price, packaging and labelling stimulates consumer purchase behaviour, by creating aesthetic value of the product and by providing useful information on quality and price (Bech-Larsen, 1996). The subset of price and package had 3.36 MAS for the sampled consumers. In this subset, the statement on fair price got 3.19 as MAS which implied that consumers had very low level of agreement with the statement that price of packed milk was fair. The other attributes in this subset describing better packing material, shape, labelling and other information got 3.56, 3.45, 3.41 and 3.21 respectively as MAS.

Table 2
Consumer Mean Attribute Scores (MAS) of Packed Milk Quality Attributes

Subset	Milk Quality Attribute	MAS
Food Safety	Low in food born pathogen	3.02
	Low in heavy metal	3.32
	Low in naturally occurring toxins	3.25
	Low in food additives	3.47
	Subset	3.27
Nutrition	High in protein	4.02
	High in vitamins	3.97
	High in calories	3.72
	High in essential minerals	3.86
	Low in fats and cholesterol	3.11
	Low in carbohydrates	3.82
	Subset	3.73
Value	High in purity	4.02
	High in compositional integrity	3.52
	Better appearance	3.52
	Better taste	3.57
	High convenience	3.74
	Better size and style	3.52
	Subset	3.68
Price and Package	Fair price	3.19
	Better packing material	3.56
	Better shape	3.45
	Better labelling	3.41
	Better other information	3.21
	Subset	3.36

Note: MAS is based on quality attribute classification framework suggested by Hooker & Caswell (1996)

3.3 *Socio-Economic Determinants of Consumer Perception*

The consumers' perception of packed milk also depends on socio-

economic characteristics of the consumers. Ordered regression analysis was employed to empirically find out these factors influencing consumer perception of packed milk in Pakistan. Milk Quality Response Index (MQRI) was estimated and used as a dependent variable in the ordered regression analysis.

3.3.1 Milk Quality Response Index (MQRI)

On the basis of scores given by consumers to milk quality attributes, a Milk Quality Response Index (MQRI) was estimated. Higher values of the index imply greater consumer agreement with the statements that packed milk is better in terms of various above-mentioned quality attributes. The value of index varied from 0.40 (the lowest) to 0.99 (the maximum) with a mean value of 0.69 for sampled respondents in the study areas. According to the findings of the study presented in Table 3, MQRI value for majority of the respondents i.e. 35 and 24.17 percent were in 3rd and 4th range respectively. In the 2nd, 5th and 6th MQRI ranges, there were 20, 12.5 and 7.5 percent respondents respectively. Less than one percent respondents had index value in the first range of 0.40 to 0.50.

Table 3
MQRI Based Ordered Dependent Variables

Dependent Variable	Range of Ordered Variable based on MQRI	No. of Respondents	Percentage
1	0.40 to 0.50	01	0.83
2	0.51 to 0.60	24	20.00
3	0.61 to 0.70	42	35.00
4	0.71 to 0.80	29	24.17
5	0.81 to 0.90	15	12.50
6	0.91 to 1.0	09	7.50

3.3.2   Estimates from Ordered Logistic Regression

The results of ordered logistic regression, explaining the impact of five

independent variables on MQRI of respondents, is summarised in Table 4. The estimated model indicates highly significant impact of gender on consumer perception towards packed milk in Pakistan. The value of coefficient for gender was 2.5614 which implied that male had greater probability of falling into higher ordered category of Milk Quality Responsive Index (MQRI). This is in line with the prevalent culture of Pakistan where mostly male shop food items, and generally milk consumption level of males is high as compared to females.

The coefficient value for age of respondents was -1.1451 and was highly significant. The negative value of coefficient means that people older than 25 years of age had greater tendency to lie in lower ordered MQRI index categories. These findings point out higher preference level of young people towards packed milk due to its various quality attributes. The observation from real life also supports this fact that generally older people are traditionally more inclined to fresh milk consumption as compared to young people who prefer packed milk.

The marital status was moderately significant with a coefficient value of 0.7069, indicating that married people have higher probability of falling into higher ordered MQRI categories. The results from ordered logistic regression indicate that education and income of respondents are non-significant. These results mean that education and income of the respondents do not have significant effect on the consumer behaviour. The consumers had liking for packed milk regardless of their education and income. The estimates of ordered MRQI are the threshold or cut off values between these ordered response variables from 1 to 5.

The outcome of ordered regression analysis depicts significant impact of gender, marital status and age of consumers on their preferences for packed milk due to its associated quality attributes. The results clearly imply that fairly younger, married and male consumers irrespective of income and education level prefer to purchase packed milk due to its relatively better quality attributes with respect to value, safety, nutritional value and packaging.

Table 4
Statistical Output of Ordered Logistic Regression

Variables	Estimate	Standard Error	Sig.	95 % Confidence Level	
				Lower Bound	Upper Bound
MRQI=1	-2.7625	1.8562	0.1366	-6.4008	0.8756
MRQI=2	0.7440	1.5909	0.6400	-2.3741	3.8623
MRQI=3	2.4962	1.5951	0.1176	-0.6304	5.6225
MRQI=4	3.9619	1.6265	0.0148	0.7740	7.1499
MRQI=5	5.4428	1.6848	0.0012	2.1406	8.7450
GEN	2.5614	0.5474	0.0000***	1.4884	3.6344
MRS	0.7069	0.3782	0.0615**	-0.0343	1.4482
AGE	-1.1451	0.4137	0.0056***	-1.9565	-0.3345
EDU	-0.4474	0.4919	0.3630[NS]	-1.4115	0.5167
INC	0.6165	0.5738	0.2826[NS]	-0.5081	1.7413

Note: ***, **, * represents statistical significance at 1, 5 and 10 percent respectively whereas [NS] indicates non-significance

4. Conclusion and Recommendations

This study assessed the consumers' perception of packed milk in Pakistan. The Mean Attribute Scores (MAS), that were derived from scores marked by the consumers for various milk quality attributes on a scale, indicate that consumers in the study areas perceived the quality of packed milk relatively better than open milk in terms of food safety, value, nutrition and packaging. Relatively higher values of Milk Quality Response Index (MQRI) depict that majority of the consumers agreed with overall quality attributes of packed milk. The statistical outcome of ordered logistic regression pointed out greater preference of younger, male and married consumers towards packed milk in Pakistan.

The findings of this study indicate liking of Pakistani consumers for packed milk. Currently, majority of the milk consumers do not have access to packed milk due to affordability and its limited availability. In this regard, following suggestions are extended to improve the situation.

1. Currently, less than 5 percent of the milk produced in the country is processed and milk processing industry is not well established. The government should encourage and promote private sector investment in dairy business for setting up plants for efficient milk production, collection, processing and marketing.

2. Majority of the surveyed consumers preferred packed milk for its good quality, hygiene, nutritive value and packing. The milk processing companies should further improve quality and nutritive value of the milk and should launch an awareness campaign to educate consumers about the utility of these quality attributes.

3. The consumer awareness level about food safety issues has considerably increased in Pakistan, particularly in case of milk hygiene and consumer's safety concerns are very serious. In this regard, government should improve and enforce existing food safety regulations and standards in line with international standards. Training on various aspects of food safety should be arranged to all participants of milk supply chains for ensuring availability of pure and hygienic milk to the consumers. Milk marketing companies should also ensure distribution of safe and pure milk to end consumers.

4. At present, milk marketing companies are not offering a wide variety of processed milk. These companies should offer differentiated processed milk varieties of various flavours and nutrient contents.

5. The price of packed milk is relatively very high in comparison to fresh milk. The packed milk marketing companies should undertake cost management measures to offer packed milk at reasonable price to the consumers in Pakistan.

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