Dynamics of Consumer Behaviour and Consumer Perception on Fresh Milk Consumption: Case in Kandy District Sri Lanka

W.M.T.C. LAKMALI and N.R. ABEYNAYAKE

Department of Agribusiness Management, Faculty of Agriculture and Plantation Management, Wayamba University of Sri Lanka, Makandura, Gonawila (NWP), 60170, Sri Lanka

ABSTRACT

The objective of this study was to investigate the dynamics of consumer behavior and consumer perception on fresh milk consumption using the data collected from consumer survey, in Kandy District in Sri Lanka. The survey was carried out on consumers using face to face questionnaire, selecting hundred households from Kandy district. The survey results illustrate that 5% of respondents consume only fresh milk while the majority (64%) consume milk powder and rest consume both. Five socio economic and demographic factors (price, availability, advertising, product differentiation, attitude and perception) were used to appraise the consumer behavior on fresh milk consumption. Kruskal Wallis test was performed to find out primary domains impact on fresh milk consumption. Ordinal Logistic Regression was employed to determine the factors affecting to degree of consumers' willingness to purchase fresh milk. Empirical results indicate that quality of fresh milk, knowledge, availability, and advertising has significantly effect to the degree of consumer willingness to buy fresh milk. Then Multiple Linear Regression was employed to analyze the factors' effecting monthly milk expenditure. Significant factors were product differentiation, number of family members, brand names, milk consumption frequency per day, fresh milk awareness have positive relationship with monthly milk expenditure. This study provide some new information about the consumer perception and consumer behaviour on fresh milk consumption which obliging to make marketing strategies that need to be taken by the government, stakeholders and the authorities for establishing fresh milk consumption culture in Sri Lanka.

KEYWORDS: Consumer perception, Consumer behaviour, Ordinal Logistic Regression, Milk powder.

INTRODUCTION

Sri Lanka is largely self-contained in most animal products apart from dairy. Milk is the most essential food to humans and contains nearly all nutrients. Milk and milk products are an important source of many nutrients as protein, calcium, phosphorus, vitamin B_2 and vitamin B_{12}. Dairy product consumption in Sri Lanka has been increased during past decade. Average house hold expenditure share on milk and milk products in 2013 was 7.8 percent, ranking third in food expenditure. Sri Lankans consumed 120 mL of milk daily, whereas developed countries average per capita consumption was 200 mL a day, (Department of Census and Statistics, 2013). According to the statistics 63 percent of milk consumers are used to milk powder over fresh milk in Sri Lanka and fresh milk consumption is about one percent of the overall milk consumption of the country (Central Bank of Sri Lanka, 2013).

It is vital to counter negative public perceptions on dairy products amidst world consumers, according to the International Dairy Federation's scientific chair (Bouckley, 2011). Sri Lanka import 66031 metric tons of milk powder per year and spent around 17 billion rupees (Department of Census and Statistics, 2013). Further it says Sri Lanka is highly vulnerable to fluctuations in world prices for milk powder because the country is heavily dependent on imported milk powder. The local production meets only around 20 percent of the demand, while the rest is imported. Researchers have scientifically proved that milk powder contain "oxidized cholesterol" which is supposedly the most unsafe type of cholesterol in milk get oxidized. There's a theory says that the process of breaking the fat globules into such small pieces that they remain suspended in the milk. Homogenization, is a leading cause of arteriosclerosis and heart diseases it listed as one of the top three causes of heart disease, along with *trans* fats and chlorinated water (Katie Kimball, 2010). Recent medical researchers have found out that there are positive correlations between fresh milk consumption and the reduction of risk for coronary heart diseases and strokes (Margaret, 2002).

Some nutrients (riboflavin, vitamin A, B_{12}, and B_1) are thermo liable substances which easily get destroyed while raw milk heated up to 160 centigrade during the process of raw milk turning into powdered milk. Therefore, the best milk from the nutritional stand point is fresh milk. On other hand 77.4 percent of the population considered rural and agriculture provides employment to 27.5 percent of the population (Central Bank of Sri Lanka, 2013). Improving fresh milk

consumption will have lot of socio economic benefits like uplifting the living standard of rural farmers by making another income source for them. So this research is to determine the socio demographic, attitudinal and behavioral factors that influence the consumption of fresh milk in Kandy district.

METHODOLOGY
Data Collection
Primary data were collected by using a pre-tested questionnaire, from face to face interview. One hundred families were selected from Kandy district using the cluster sampling technique. Questionnaire was pretested prior to the proper survey with a small sample of potential consumers (n = 20) and minor modifications were done to the preliminary questionnaire.

Data Analysis
The questionnaire was developed to mirror the four main themes of consumer interests in fresh milk, which are sensory factors, health and nutrition, cost and availability to obtain the attitudinal and behavioral information of consumer apart from major socio and demographic factors. Several indicators were considered to measure the consumer attitudes and behaviour on consumption of fresh milk and there were assessed by using five point Likert scale. Through the Kruskull Wallis results identified the key domains which leads to make factors for the regression.

Two empirical models were developed to determine the socio economic factors effect on degrees of willingness to buy fresh milk and monthly expenditure. As the degrees of willingness to buy fresh milk were obtained in the Likert scale, Ordinary Logistic Regression (OLR) model was employed.

Multiple Linear Regression (MLR) model was developed to determine the relationship between the monthly milk expenditure with the socio economic factors. Factors were screen out statistically whether they are significant with the response variable or not using chi square independence test before incorporate the factors to the regressions. Minitab 17.0 version was used to analyze the data.

Empirical model,

$$Y = \beta_0 + \sum_{i=1}^{n} \beta_i X_i + \varepsilon$$

Where,
Y= Degree of willingness to pay in OLR and monthly income in MLR
β_0 = Constant
β_i = Regression Coefficients
X_i = Variables Considered in the models
ε = error term

Table 1. Variable definition

X -Variable	Variable definitions
AOR	Age of respondent
NFM	Number of Family members
AVA	Availability of Fresh milk (Yes/No)
NAF	Nutritional Awareness of fresh milk (Aware/Not aware)
MCFPD	Milk consumption frequency per day
INC	Monthly income (Income categories)
AU5	Number of children under 5 years old
TMP	Type of Milk purchasing
FMHI	Fresh milk makes health Issues or not
PD	Consideration of product differentiations (Yes/No)
PHPB	purchasing high price brands (Yes/No)
PQ	Considering of packing quality (Yes/No)
BT	Brand type
LB	Local brand users
FB	Foreign brand users
BOTH	Both brands users
CBN	Considering brand names (Yes/No)
CP	Consumer perception on fresh milk
QF	Consideration of quality of fresh (Yes/No)
ADV	Effect of advertise for purchase (Yes/No)
MEOM	Monthly expenditure on milk

RESULTS AND DISCUSSION
Table 2 explains the basic indicators obtained from the descriptive analysis on milk consumption pattern of consumers.

Table 2. Consumer buying behaviour of milk powder and fresh milk

| Consumer choice	Percentage (%)
Only milk powder	64
Only fresh milk	5
Both milk powder and fresh milk	31

The results of (Table 2) revealed that majority (64%) of the people consume milk powder while only 5% of the consumers consume fresh milk.

To assess the reasons not to buy fresh milk, with respect to given five reasons high cost (HC), lack of availability (LA), advertising effect (AE), lack of product differentiations (LPD), perception and attitude on fresh milk (PA) Kruskul-Wallis test was employed. Table 3 and Figure 1 represents the average ranks received by each reason. Kruskul-Wallis test indicated that ranks obtained for each reason significantly different (P = 0.0001).

Table 3. Results of Kruskul-Wallis test for why people reluctant to buy fresh milk

Factors	Avg. rank	Z values	Percentage (%)
HC	337.1	6.7	27
LA	290.4	3.09	23
AE	136.6	-8.81	11
LPD	90.2	-12.41	7
PA	398.3	11.44	32

HC- high cost, LA- lack of availability, AE-advertising effect, LPD- lack of product differentiations, PA-perception and attitude on fresh milk
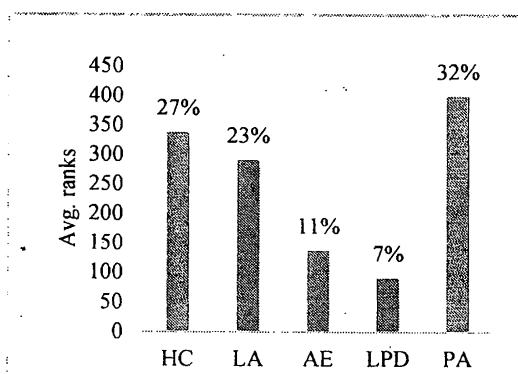
Figure 1. Percentage of each reason given by the respondent. *HC- high cost, LA- lack of availability, AE-advertising effect, LPD- lack of product differentiations, PA-perception and attitude on fresh milk*

According to the (Table 3) finding implies that consumer attitude (32%) is the major influential factor towards decision of reluctant to purchase fresh milk. According to the consumers' rationale for not buying fresh milk was associated with negative attitude and consumer perception mainly personal or family health issues including phlegmatic and rheum condition. High cost was the second vital factor of consumer rationale. According to the current market prices (Table 4) average price range of one liter of fresh milk packet is Rs.120-200. Highland brand has comparatively low price with other brands.

Table 4. Monthly fresh milk and powdered milk expenditure per person

Milk type	Quantity	Price (Rs.)	Monthly expenditure (Rs.)
Milk powder	400 g	300	300
UHT Fresh milk packet	200 mL	40	1200

UHT- Ultra High Temperature

When comparing the monthly fresh milk expenditure with the milk powder expenditure per person (Table 4) there is a significant difference. According to current market prices monthly expenditure of Fresh milk, is around Rs.1200 while milk powder monthly expenditure around Rs. 300 per person. This huge price gap has become another obstruction for fresh milk consumption.

To assess the association between household income and consumption of fresh milk and milk powder chi-square test was implemented. The results (Table 5) indicated that household income and purchasing of milk type having significant association (p= 0.01).

Table 5. Association between fresh and milk powder consumption with their income

Binary choice	Income categories (Rs.)		
	<15000	(15000-50000)	>50000
0	77.78%	64.00%	36.11%
1	22.22%	36.00%	63.89%

0=only milk powder users, 1=fresh milk packet users

According to the analysis of (Table 5) fresh milk and powdered milk consumers with the income categories they belong (<15000, 15000-50000, >50000) it's statistically proved that people belong to (<15000) low income category and (15000-50000) average income category, are reluctant to buy fresh milk with compared to high income category. There is a significant improvement in consuming fresh milk with the people who belong to the high income category. In percentage wise 63.89 people purchase fresh milk in (>50000) income category. This implies that higher-income consumers tended to consume fresh milk. In contrast, lower to middle income consumers consumed powdered milk. Heat treated packaged fresh milk remains a product catering to the middle to upper income segment of consumers. High prices keeping liquid milk out of reach of Sri Lanka mass. Cursory checks on online prices show that Sri Lanka has some of the highest prices in the world for milk and other dairy products.

The third highest influential factor is availability (23%). It has become a major barrier to shift the consumer from milk powder to fresh milk. There was a home delivery fresh milk network system in Ulpatha Kumbura GN division. Within this system the price of one liter of fresh milk is laid in between Rs.70 to Rs.80, but it is not a well-developed system to cater to the total demand prevailing in the region. Eleven percent of the consumers stated that advertising enhanced the purchasing of powdered milk. Product promotion programs carry out in order to prevail the market with their product differentiations like full cream milk powder, skimmed milk powder *etc.* The milk powder companies which coming under big brands have more product differentiations

for each and every age categories according to the consumer needs, lack of product differentiations in fresh milk though. Lack of product differentiations in fresh milk also has bad impact on consumer choice.

Descriptive statistic given in the (Table 6) shows that 47% of the respondents are either like or strongly like while 53% of the respondents either dislike or strongly dislike to fresh milk consumption. Consumer negative perception and attitude retract them to consume fresh milk. Awareness of health benefits in the fresh milk consumption is in a discontented level. Further the Ordinal Logistic Regression analysis (Table 7) shows that socio demographic and economic factors effect with degree of consumer willingness to buy fresh milk.

Table 6. Consumer degree of willingness to buy fresh milk (DWBF)

Variable	Value	Count
DWBF	1=strongly like	16
	2=like	31
	3=dislike	33
	4=strongly dislike	20
	Total	100

Table 7. Results of Ordinal Logistic Regression

Predictor	Coefficient	P-value	Odd ratios
Const(1)	-6.16	0.008***	-
Const(2)	-1.63	0.427	-
Const(3)	1.26	0.540	-
AOR	0.006	0.648	1.01
NFM	0.296	0.286	1.31
AVA	-1.030	0.067	0.36
NAF	0.075	0.050***	1.08
FDMPD	0.515	0.384	1.67
MEOM	-0.001	0.001***	1.00
AU5	0.855	0.233	2.35
FMHP	0.052	0.961	1.05
PD	0.476	0.748	1.61
ADVE	0.723	0.020***	2.06
CP	-0.717	0.001***	0.49
TMP	8.342	0.000***	3.45
QF	8.280	0.000***	2.30

*** = Significance at 5% level, P-Value = 0.000, (Refer table 1 for abbreviations)

According to the results of (Table 7) quality of the fresh milk, type of milk purchasing, consumer perception on fresh milk, advertising effect on consumer choice, nutrition awareness of fresh milk and availability have significant effect on degree of willingness to buy fresh milk. It reveals QF positive and statistically significant coefficient imply that quality is one major factor when people tended to consume fresh milk. According to the odd ratios of QF, 2.30 implies that when improving the quality of fresh milk, consumer inclination to purchase fresh milk increases by 130%. Consumer

choice of brands also has positive relationship. Fresh milk easily can get contaminated while the processing and distributing milk farmer to consumer. That has become another reason for people have a propensity to buy branded products.

Advertising has 2.06 odd ratio means people think that advertising can promote the fresh milk consumption by 106%, making more awareness among the mass. Odd ratio of NAF is 1.08, means nutrition awareness of fresh milk manipulate people to purchase fresh milk by 8%. It discloses PD has 1.60 odd ratio, emphasized that there is a 60% of manipulation on fresh milk consumption when make more product differentiation. But the respondents' attitude and the fresh milk has negative co-relation with the response variable as the majority of the respondents suppose that fresh milk consuming causes health issues. Lack of availability in fresh milk, keeping liquid milk out of reach of Sri Lanka mass. Further the Multiple Linear Regression analysis (Table 8) shows that socio demographic and economic factors effect with monthly milk expenditure.

Table 8. Estimated results of factors effect with the milk expenditure with using MLR

Predictor	Coefficient	P-value
Constant	-277.20	0.618
AOR	2.21	0.547
NFM	231.23	0.000***
AVA	48.30	0.715
NAF	280.80	0.058
FDMPD	581.20	0.000***
INC <15,000	-242.70	0.211
15000-50000	54.40	0.705
AU5	681.40	0.000***
PHPB	-1106.30	0.000***
TMP	913.60	0.001***
HP	-241.50	0.392
LB-0	-190.30	0.474
FB-1	-261.50	0.100
PD	524.10	0.01***
QOP	-307.70	0.408
CPF	-102.10	0.539
CBN	439.80	0.007***

*** = Significance at 5% level, (MLR) Multiple Linear Regression, (Refer table 1 for abbreviations)

Factors explained the 66.7% of the monthly expenditure on milk in this regression (Table 8). These estimated results convince that considering brand names when buying milk product has significant relationship with the response variable with high co-efficient value. According to the statistical analysis product differentiations also has positive relationship with the money that they spent on milk. More product differentiation make consumer to consume more milk according to their needs. Analysis reveals that local and

foreign brands have no significant effect on monthly milk expenditure.

Purchasing high price brands has significant relationship, minus coefficient with the response variable though. It is hypothesized that people reluctant to go for high priced brands. Also the families with the children who are age under five has spent more money on milk with compared to other families. Number of family members and frequency of fresh milk consuming per day has positive correlation with the milk expenditure.

CONCLUSIONS

In this study, examined the impact of various factors affecting consumer behaviour on fresh milk consumption. The findings of this study suggest that the socioeconomic and demographic characteristics of the household and their heads play an important role in consumer behaviour on fresh milk consumption. Results emphasized that high price and the negative perception on fresh milk, keeping liquid milk out of reach of Sri Lanka mass. According to the analysis it emphasized that income also playing major role in fresh milk consumption. Heat treated packaged fresh milk remains a product catering to the upper income segment of consumers. Low income and lack of awareness in fresh milk were primary reasons for purchasing powdered milk, as it was perceived to be quite cheap compared with fresh milk. When substantial increases in income and awareness of fresh milk consumption of consumers take place, a marked shift in preference from powdered milk to fresh milk could probably occur.

These respondents rationale for not buying fresh milk was associated with narrow focus of the perceived nutritional benefits of fresh milk. By making aware the people through advertising, promotion programs intercession with health ministry could be a reason for significant improvement in number of fresh milk consumers in Sri Lanka. Empirical findings of our study have important implications and strategies for milk producers and companies to win the market. Research findings are quite consistent with the expected behavior of Sri Lankan consumers and provide a clear picture of the fluid milk consumption behavior. It is hoped that the findings of this study help to both domestic and foreign companies in Sri Lanka to design pricing and promotion strategies and other marketing strategies for fluid milk consumption. In order to improve fluid milk marketing system, Sri Lankan government needs to establish some quality and standards in the fresh milk market. Lack of availability in fresh milk have become another root cause for keeping liquid milk out of reach of Sri Lanka mass. Establishing more milk collecting centers and encouraging milk farmers by implementing fixed price for milk could be a better solution for supply increment. The governments together with the milk companies of milk processing sector in the country have taken various initiatives to endorse the consumption of fresh milk through the development of various milk products, although promotion of fresh milk amongst the consumers is associated with a number of difficulties. Tariff policies would have a relatively mild effect on reduction in imports when compared to domestic pricing policies of fresh milk production. Technological advancements would increase milk supply and reduce imports markedly. Identifying the consumer behaviour on fresh consumption and implementing new marketing strategies can lead to establish new fresh milk consumption culture in Sri Lanka.

REFERENCES

Central Bank of Sri Lanka. (2013). Sri Lanka Socio-Economic Data Available from: http://www.cbsl.gov.lk (Accessed on 2nd May 2016).

Department of Census and Statistics. (2013). Colombo, Sri Lanka.

Bouckley, B. (2011). Negative perceptions on dairy products. IDF summit, 17 October 2011. Available from: http://www.dairyreporter.com/Markets/IDF-summit-targets-negative-perceptions-of-dairyproducts?utm_source=copyright&utm_medium=OnSite&utm_campaign=copyright (Accessed 22 May 2016).

Kimball, K. (2010). Can you tell me more about homogenization. Available from: http://www.whfoods.com/genpage.php?tname=george&dbid=150 (Accessed on 25th April 2016).

Margaret, M. (2002). Does milk cause coronary heart disease. Available from: http://milk.procon.org/view.answers.php?questionID=000826 (Accessed on 2nd May 2016).