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Fluid Milk Choices in Pakistan: Do Consumers Care?

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ABSTRACT

This study is conducted to recognized elements and factors which affecting packed and unpacked milk consumption preferences of household in Pakistan. 240 sampled fluid milk consumer households were studied by using semi-structured questionnaire. Descriptive statistics indicate that 35% of the households consume both packed and unpacked milk. While 10% households consume packed milk and 55% of the households consume only unpacked milk. Empirical analysis was carried out through multinomial Logit model. Results revealed as the income goes up, people are intended to purchase less of unpacked milk. Moreover, households with high education and with children age below 6years consumed both packed and unpacked milk. Where household who believe that packed milk is good for their children health preferred to consume packed milk. Other than these, there is significant number of those households with larger family size who only consume unpacked milk without worrying about quality of milk. This state of affairs is critical and warrant government to introduce new policies for low price and good quality milk products.
KEYWORDS: Fluid milk preferences, Pakistan, Multi nominal logit, Consumption behavior, Milk prices

INTRODUCTION

Milk is an important and vital food for human beings. Milk and all milk foods which have just about all nutrients should consume by everyone every day (Unal & Basler, 2006). Many research reports advised to consume at least 2 glasses of milk by every person per day. Milk provides essential nutrients and is an important source of energy, essential proteins and fats. It is also significant contributor for calcium and vitamins (Black *et al.,* 2002; Lonnerdal, 2003). Even consumption of satisfactory volume fluid milk or other milk products is suggested for better and healthy lifestyle. Yet consumption patterns of fluid milk differ from developed countries to under-developing countries (Yayar, 2012).

The dairy milk sector is vital and necessary element of Pakistan's socio-economic infrastructure and economy. The market value of milk is alone greater than combined value of sugarcane, maize, rice and wheat in the country (Alam*et.al*, 2016). In 2013-14 milk production was 50.99 million tons which makes Pakistan 4th largest milk producing country (GOP, 2014). Out of which 3 to 4 % is promoted by proper and formal networks and other 97% is consumed in the villages and sold in the cities through informal channels (Jalil *et al.,* 2009).

Due to increase in private investment changes occurred in market organizational structure of fluid milk. This upward shift of private entrepreneurship is resultant of foreign direct investment and other promotional activities. Despite of unfavorable conditions of country for new investments the livestock sector showed 3 to 4 percent growth (Shahid,2012). So this persistent increase of private dairy enterprise reveals consumers could make consumption choices between packed (branded) and unpacked (non-branded)milk depends on the availability.

However, Household milk consumption choices could influence or changed by different social, economic, cultural, demographic characteristics and consumer attitudes. Specifically household monthly income, family size, gender and age of household head, children age, education of household head and also availability of packed and unpacked milk can affect household's decision for consumption of either packed or unpacked milk (Kuma *et al.,*2012).

Studies revealed many reasons for why households preferred unpacked milk for consumption. Unpacked milk is easily available on low-price and at door steps without any extra cost than packed milk. The milk man supplies fluid milk from forms to the door steps of Households. This market organization supports milk suppliers to avoid paying taxes and packing cost. Other than price, melting out fluid milk into other dairy products like yogurt are also significant factors of purchasing unpacked milk (Hatirli *et al.,* 2004).

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Meanwhile, desire to purchase safe, healthy and good quality food product is main reason for preferring packed fluid milk. Demographic factors such as education, income, age of household head, children size and many others play their main role to influence consumers for packed milk. Moreover, households with children's under-five have more concern about quality of milk .Family head especially mothers are more aware and conscious about quality as milk consumption directly effects their nutritional and body needs of their children (Nurwijiayanti *et al*., 2105). Additionally, other than consumers concerns about food safety, health advertisements also paly dominant role for changing consumers' preferences towards packed milk. (Akbay *et al.,*2008).

Now a day, consumption pattern of fluid milk of developed countries has improved. An increase in educational level and income leads to upward shift of per-capita low fat milk consumption. Yet preference and consumption of full-fat milk is declined (Jensen, 1995). But in developing and under developing countries consumption of unpacked milk is still a major contributor of households' milk consumption (Hatirli *et al*., 2014)

In general this paper aims to analyze the consumers' preferences in purchasing fluid milk in Pakistan. The specifically objectives of the study are the following:

- To identify socio-economic and demographic factors effecting milk choices
- To examine the role of social believes and attributes on milk choices.

DATA AND METHODOLOGY

Data was collected through proportional sampling method from a total of 250households through questioners. Families mentioned their fluid milk choices, preferences and given their social, economic and demographic details. The research was carried out to find out the major explanatory factor which determines the consumer's preferences and choices between packed and unpacked fluid milk. An experimental survey was firstly conducted on randomly selected group of household to check the suitability of designed questionnaire on socioeconomic and cultural setup. Data on household's socioeconomic, demographic characteristics such as: age, sex, education, family size, sex of household head, Monthly income, and profession was collected. However only 4 respondents were found to be consuming neither branded nor non-branded milk as a result of which they were dropped out of the sample. Then a data set of remaining 246 respondents was used for further analysis.

Results of the survey revealed that families had more than two preferences for fluid milk. As if there exists more than two categories of dependent variable multinomial logit model is the best technique for estimating the effects of independent variables like income, family size and child age on fluid milk choices. As this technique is widely used by researchers and economists such as (Kuma *et al*., 2012; Ferto & Szabo, 2002).

The multinomial Logit model is the modification of linear Logit model and it is widely used where there are more than two choices of dependent or reliant variable (Kuma *et al.*, 2012). Accordingly dependent variable was shaped from survey data which specified the consumption of fluid milk into three categories: (1) Both packed and unpacked milk, (2) Packed milk, (3) Unpacked milk.

The generalized form for the multinomial logit model is defined and specified by (MC Fadden, 1973 ; Long 1997) :

$$Pki = \frac{\exp(x_i'\beta_k)}{\sum_{K=1}^{J}\exp(xi'\beta j)}$$

$$i = 1,2,3,4,---N; K = 1,2,3,---J \quad \ldots\ldots\ldots\ldots (1)$$

In equation (1) P_K is the possibility that household i is select from one of the k replacements, where X is the explanatory variable which have set of socio-economic, demographic factors and features about consumption patterns of consumers. The expected probabilities and marginal effects are founded through logistic regression by equation (2):

$$\frac{\partial P_{ji}}{\partial X_{ji}} = P_{ji}(\beta_j - \sum P_{ki}\beta_k) \quad \ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Where probability and parameter are respectively represent by β and P of milk choices. Because models are estimated under maximum likelihood procedure therefore they give reliable, consistent and efficient estimates.

The descriptive statistics and proper definitions of explanatory variables are given in Table1.Generally believed that the choices of fluid milk depends on different social, cultural, economic and

demographic factors such as family size and income, education, household head gender and age and age and number of children in household (yayar, 2012). By hypothesizing that the households where education of heads is more thanor equal to 10 schooling years have greater possibility to prefer packed fluid milk. Families who have larger family size more likely to prefer unpacked fluid milkbecause ofhigh expenditures of packed fluid milk. It was hypothesized that if household have at least one child under 6 years they consume packed milk. As the household income increase the preferences of the household shifted to brands and they are more concerned about quality of the products.

Further, it is hypothesized that families with higher level of income more probability to prefer packed fluid milk. The families who have faith that packed fluid milk is healthy for their children and it fattens them are preferred packed fluid milk. Those household who admit that unpacked fluid milk is not healthy as compare to packed milk more likely to consume packed milk. Lastly hypothesis is advertisements influenced packed milk consumption of the household.

RESULTS AND DISCUSSIONS

An average of 84% of the household heads attain more than 10 years of schooling. Averageof household incomes groups were 23, 49 and 27 respectively. Family size or household family member groups average were 41%, 51%and 7% respectively. Almost 66% of the Household have children below the age of 6 which shows greater demand for fluid milk.

Importance of social believes and attributes are also given in table1. About 52% are those who believe that packed milk is healthy for children as it fattens them. Almost 64% households are those who believe advertisements and social campaigns have influence on consumption choices. Lastly 56% households are those who have believe unpacked milk is not healthy and had concern with health and hygienic of their family (see table 1).

The results of table 2 indicated that 55% of households used only unpacked milk and only 10% consumed packed milk where 35% of households were those who consumed both packed and unpacked milk.

Overall model is good fit as shown by pseudo R^2 of 0.384 and log pseudo likelihood is 300.32 which is good fit for the cross sectional data. (Agged *et al*., 2010). Table 3 reveals the final results of multinomial logit model of families choices for fluid milk. The odd ratio gives better illustration for how change in predicators affected the choice of households for fluid milk. Education level of the household has positive effect on consumption of packed fluid milk. The odd ratio shows those households who have education level more than 10 years of schooling 86.5% less probability to consume only unpacked milk and shows their preferences for both unpacked and packed milk. This result indicates that household heads with high educationuse both unpacked milk and packed milk. (Kuma *et al*, 2012)

The income of the household is another major determinant of household consumption preference for fluid milk. As expected income have negative with the consumption of unpacked milk. As the income increases demand for unpacked milk decreases. Household who have income less or equal to 15,000 have 37% more probability to consume unpacked milk rather than the households who have income greater than 30,000. But the household who have income 15,000 to 30,000 consume 70% more packed milk rather than unpacked milk. This is consistent with the findings of Yayar (2012), who reported that income have consumption of packed milk have positive relation (see table 3).

Household size has negative relation with packed fluid milk. The results significantly prove the hypothesis that larger family households have probability to prefer unpacked fluid milk. As families who have less than or equal to 4 persons in the house have 7% greater probability to prefer packed fluid milkrather than unpacked milk with reference to the households who have more than 6 persons. Where, households who have family size among5to 6 persons 53% less probability to consume packed milk (see table 3).

Households who have child under or equal the age of 6 years have 25% less probability to consume packed milk with reference to both packed and unpacked milk. Unfortunately households prefer both packed and unpacked which is opposite to our hypothesis. But these findings are consistent with Koma*et al.,* (2012), who also finds that households who have child less or equal to 6 years consumes both packed and unpacked milk (see table 3).

Households with the believe that packed milk fattens their children decrease the consumption unpacked milk and have 44%more probability to consume packed milk with reference to unpacked milk. This is consistent with koma *et al.,* (2012) also reported that households who have believe packed milk fatten their children consumed packed milk (see table 3).

The households who have the believe that unpacked milk is not healthy have 6% more probability to consume packed milk which is same to our hypothesis that households who believe unpacked milk is unhealthy prefer packed milk (see table 3).

Lastly the households who believe that advertisements' have great influence on households demand for packed fluid milk have 59% more probability to prefer packed milk with reference to both packed and unpacked milk which is exactly the same to our hypothesis that advertisement influence households to buy more packed milk. As kuma *et al.,* (2012), reported that the households who admit that advertisements have influence on consumption patterns consumed both packed and unpacked milk with reference unpacked milk (see table 3).

CONCLUSION

In brief, factors which effect packed and unpacked milk consumption of households were analyzed by Multinomial Logistic Model. Household who have higher education and children under age of 6 consume both packed and unpacked milk. The households who agree that packed milk is good for health of their children ,and supported the statement that advertisement influence to consume packed milk are consumed packed milk. Results also showed household income and consumption of unpacked milk have negative relation as income increases households shifts their demand towards packed milk It is also revealed that high protein packed milk is mare demanded as compared to Skimmed milk and flavored milk by households which is the major characteristics of developing world consumption. The results also shows significant portion of households only consume unpacked milk who have larger family size. This reveals that thosehouseholds are more traditional and they are not worrying about hygiene and healthof family because of expenditures of packed milk.

As revealed that unpacked milk has significant role in households' consumption. So government should announce and introduce policy tools like monetary funding at lower interest rate and taxes rate to encourage the investors for quality dairy products marketing and production. This will attract consumers to buy better daily milk products at low prices.

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APPENDIX

Table1: Descriptive statistics and Definitions of variables.

Variables descriptions	Variable code	Mean (Std.Dev.)
If household education greater than or equal10=1, otherwise=0	**EDU**	0.84 (0.364)
Household income less than or equal to 15,000=1 otherwise=0	**INC1**	0.23 (0.426)
Household income between 15,001-30,000=1 otherwise=0	**INC2**	0.49 (0.500)
Household income greater than 30,000=1 , otherwise=0	**INC3**	0.27 (0.445)
Family size is equal or less than 4=1 Otherwise=0	**HSIZE1**	0.41 (0.500)
Family size between 5 to 6 members=1 otherwise=0	**HSIZE2**	0.51 (0.493)
Family size is greater than 6 =1 otherwise=0	**HSIZE3**	0.072 (0.529)
In household at least one child less or equal age6 (yes =1 , No=0)	**CHILD**	0.66 (0.474)
Packed milk high in protein=1, otherwise=0	**FAT**	0.52 (0.501)
Unpacked milk is not healthy=1, otherwise=0	**HEALTH**	0.56 (0.498)
Advertisement influence to buy packed milk=1, otherwise=0	**ADVERT**	0.63 (0.483)

Source: own calculation

Table2: Households' preferences for fluid milk.

Milk Preferences and consumption	N	Marginal Percentages
Both packed and unpacked fluid milk	85	35
packed Milk	27	10
Unpacked milk	134	55
Total number of consumers	246	100

Source: own calculations

Table3: Household fluid milk choices and preferences (Multinomial logit results)

Variables	Unpacked milk vs. both unpacked and packed milk		Packed milk vs. both packed and unpacked milk		Packed vs. unpacked milk	
	Coefficient (Std. Error)	Odd ratio	Coefficient (Std. Error)	Odd ratio	Coefficient (Std. Error)	Odd ratio
Intercept	2.012 (0.74)		-1.012 (-1.062)		3.024 (0.918)	
EDU	-1.999* (0.531)	0.135	-0.821 (0.621)	0.44	-1.178 (0.63)	0.308
INC1	0.865*** (0.538)	1.374	1.038 (0.685)	0.823	-0.173 (0.629)	0.841
INC2	0.275 (0.393)	1.316	-0.26 (0.595)	0.771	0.534** (0.565)	1.706
HSIZE1	-0.736 (0.745)	0.479	-0.811 (1.04)	0.444	0.075*** (0.892)	1.078
HSIZE2	0.747 (0.714)	0.474	0.746** (1.003)	0.474	0.001 (0.853)	0.98
CHILD	-1.02 (0.365)	0.361	-0.286** (0.49)	0.752	-0.735 (0.467)	0.48
FAT	-1.236 (0.333)	0.291	-0.416 (0.467)	0.66	0.82** (0.439)	1.441
HEALTH	-0.216 (0.333)	0.806	1.12* (0.469)	1.065	-1.336 (0.445)	0.263
ADVERT	0.5 (0.351)	1.648	1.281* (0.463)	1.599	-0.781 (0.428)	0.458

Source: own calculations

Prob.> chi square: (0.000), Pseudo R-square: 0.279, Log pseudo likelihood: 300.313, chi square (22): 61.432.

Where *, ** and *** shows 1%, 5% and 10% significance level respectively.