

**FACTORS INFLUENCING CONSUMER PREFERENCE FOR LOOSE AND
PACKAGED MILK CONSUMPTION IN EGYPT:
CASE STUDY ON CAIRO GOVERNORATE
BY**

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(Accepted, 21/4/2019)

SUMMARY

The present study aimed to explore the effect of social and economic factors on the family preference for packaged milk and loose milk. A total of 150 families were randomly chosen from Cairo Governorate. They responded to the submitted questionnaire. The collected data were subjected to descriptive and questionnaire analysis. The preferences of loose milk was positively ($P < 0.01$) determined by the income. The preferences of packaged milk was less affected by income for low income earners ($P < 0.05$) than the high income to loose milk earners ($P < 0.01$). A clear preference for packaged milk compared to loose milk by high education members. A significant relative between household income and expenditure on milk was established. The study prevents relatively new information on milk consumption in Egypt.

Key words: loose milk; packaged milk; consumer preference; household survey data.

INTRODUCTION

Milk is often regarded as being nature's most complete food. It is an excellent source of protein, vitamins, minerals and essential amino acids and lactose (Nebedum and Obiakor, 2007). Milk provides calcium necessary for bone health, proteins needed for normal growth and brain development, vitamin A for normal vision, and vitamin D for absorption of calcium (Black *et al.*, 2002, Lonnerdal, 2003). People are advised to consume two cups of milk a day.

Liquid milk is now processed by pasteurization or high heat treatment (UHT) and marketed packaged in special carton or plastic containers. This allows for direct consumption of milk without the need for heat treatments at home and increase its shelf life during marketing. Pasteurization and UHT treatments ensure the safety of the product by killing pathogenic bacteria.

It is reported that a child who drinks a glass of milk every day meets 35 %, 52% and 98% of protein, calcium and vitamin B12 requirements respectively (Unal & Besler, 2006; Setbir, 2009). The National report (Capmas, 2017) estimated the total row milk production in Egypt to be 5 million tons, and the per

capita consumption of about 23 kg, while the global per capita milk consumption is about 100 kg.

Individual per capita income in Egypt varies widely. The expenditure and pattern of consumption vary with food commodities, which lead to different consumption patterns from one commodity to another and from one place to another depending on the importance and preference of each commodity. There is a significant difference between per capita monthly expenditure on milk products in the report. The average individual expenditure for the high income group was about 9% of the total income and about 5% and 4% for the middle and low income category, respectively.

Ruel *et al.* (2005) observed that factors such as income, prices and availability affected what consumers can purchase or consume. Consumer preferences can also shape the consumer decisions regarding the choice to purchase or consume. They (Ruel *et al.*, 2005) noted that only when the consumers have satisfied their basic energy needs, the role of consumer preference becomes more important in shaping food consumption patterns.

Thus the characteristics of the consumer that affect his consumption preference for milk products is one of the most important indicators prevailing economic situation and the level of individual income. Individual expenditure is also affected by many factors such as the number of family members, level of education, economic activity.

In Egypt, liquid milk is marketed into two competing forms, the loose and packaged milk. Traditionally, the loose milk was the main channel for marketing liquid milk which is considered as raw or fresh milk which should be boiled before consumption. With the development of the modern dairy industry, liquid milk began to be marketed as packaged heat processed (pasteurized or UHT treated) which offer the convenience for handling and insure safety and eliminate the need to be boiled at home before consumption. Both channel of marketing of liquid milk i.e. Loose

and packaged are now prevalent in Cairo markets.

Knowledge about the preference and demand for dairy products are important determinants to the dairy sector as well as sending signals to the manufactures to provide the required type and quantities to satisfy the demand from dairy products. The present study, therefore, aimed to identify the social and economic factors for the family preferences for packaged or loose milk, the study sets out the following objectives.

- a. Identify the socioeconomic characteristics of the head of household.
- b. Estimation of the relative importance of milk expenditure for food.
- c. Determined of preferences for fresh milk or packaged consumers in Egypt.
- d. Estimation of demand functions for different levels of income.

MATERIALS AND METHODS

Sources of data:

The study was based on a questionnaire prepared for this purpose. A random sample of 150 families from Cairo Governorate was collected in November 2018 to study some important social and economic characteristics related to loose and package milk consumption in Egypt.

Analysis of data:

The research was based on descriptive and quantitative analysis of collected data. The mean and relative expenditure on food and milk products were determined. Demand for loose and packaged milk was estimated in relative to the different levels of income.

Consumers were grouped into low (<3000 EL.), moderate (3000- 5000 EL.), and high (> 5000 EL.) income earners. These values were transformed in to the double logarithmic image, because it conforms to various economic criteria and for easy access.

The used method is considered as a comprehensive application model for estimating the demand for the goods studied. Also it

reflects the impact of price and income on consumer behaviour. The introduction of the demand functions that were adopted by the economic theory. This gave the measured parameter a meaning and reflects the significance of the actual economic conditions and reality to the explanation of the consumer behaviour. The demand dial must have a set of characteristics that are considered as a set of constraints:

Added

Total expenditure on goods equals the right one.

Homogeneity

Is the sense that when increasing prices and income by the same ratio, the quantity of the required commodity remains constant without change because the demand function is homogenous to the zero degree in prices and income.

Parity

This reflects the extent to which the required quantity of the commodity is affected by the change in the price of that commodity and

the prices of other commodities, which is known as the substitution effect and the internal effect.

Negative

Is the sense of an inverse relationship between the quantity required and the price of the commodity.

The demand function formula used was in the following double logarithmic image:

$$\ln Y = \alpha + \beta_1 \ln X_1 + \beta_2 \ln X_2 - \beta_3 \ln X_3 + \beta_4 \ln X_4 + \beta_5 \ln X_5 + E t$$

Where:

Y: The dependent variable is expressed by the amount of demand for milk. α : Fixed function β : Flexibility of demand (marginal inclination for consumption). X1: Price of loose or packaged milk. X2: The spending volume on food. X3: Price of powder milk as an alternative primary commodity. X4: Price of loose or packaged milk as a second alternative commodity. X5: Average monthly income of the family.

RESULTS AND DISCUSSION

Personal Characteristics:

Table 1 shows the personal characteristics of the household head (Age, number of household members, level of education and economic status). A large percentage of respondents families were headed by individuals with higher education.

The higher educational level of the family was linked to health awareness, which in turn increased the consumption of milk products. These results indicate that the percentage of milk consumption by the high education levels were about 50%, while the percentage of milk consumption for the high and low education levels were about 33.6% and 16.4% respectively.

The consumer's economic situation affected greatly his purchasing behaviour. Thus, the consumption of high income earners is expected to be higher than for middle- and low-income earners. The proportion of respondents to the milk consumption was 34.6% of high incomes earners, and 43.4% and 22% for middle and low income earners, respectively. This confirmed by Erhabor and Ojogho, (2011) who obtained similar result and those obtained by previous finding (Rehan *et al.*, 2007).

As for the variable age, the results indicated that the percentages of milk consumption among children and the elderly was 30% and 36.7%, respectively, and low consumption rates among the age groups (18-35), (36- 55), being 13.3% and 20%, respectively. This can be attributed to two main factors: mothers' interest in feeding children, especially in the

basic developmental stage, and the interest of the elderly to maintain health and food awareness.

The relative expenditure on milk compared to food expenditure

Table 2, shows that the relative importance of expenditure food compared to the total income was high for the low income earners, being 32.5% decreased to 28.36% and 23.53%, for high income earners respectively. The relative expenditures on milk of total food expenditure for low, middle and high income, were 7.33%, 5.6% and 5.2%, respectively. The decline in the relative spending on food and milk indicated an increase in their purchasing power for non-food items, with a significant increase in their relative importance. Mahrous (2016) showed a decline in the relative importance of individual expenditure on food from one year to another, and from place to place resulting in a decrease in the proportion of expenditure on food, offset by an increase in expenditure on non-food items.

An inverse relation was found between the size of the household and expenditure on food (Table 2). For household of three members, expenditure on food represented 30.17% of the total income, and 25.1 and 27.35% for households of 3-5 and >5 members, respectively. The percentage caped on milk of total found expenditure was 5.8, 5.1, 4.4% for household 3, 3-5 and >5 members, respectively. The results were almost similar to the respected CAPMAS (2015), where the relative importance of milk and dairy products being 5.5%, 4.7% for the size of the low and large-sized households, respectively.

Table (1): Personal characteristics of the household head

	Frequency	Percentage %
Age		
< 18	45	30
18-35	20	13.3
36- 55	30	20
> 55	55	36.7
Total	150	
Household size		
-3	35	23.3
3-5	69	46.0
>5	46	30.6
Total	150	
level of education		
Uneducated and average education	25	16.4
High Education	50	33.6
Higher Education and above	75	50
Total	150	
Economic status		
Low	33	22
Medium	65	43.4
High	52	34.6
Total	150	

Table (2): The relative expenditure on milk compared to food expenditure

	Average income	Average expenditure on food	% To spend on food for income	Average expenditure on milk	% Spending on milk for spending on food
Economic status					
Low	2325.79	756.06	32.5	55.42	7.33
Medium	4133.85	1172.31	28.36	65.93	5.6
High	8278.85	1948.08	23.53	101.64	5.2
level of education					
Uneducated and average education	2298	750	32.63	55.32	7.4
Higher Education	4574	12229.33	26.8	70.31	5.7
Higher Education and above	6969.2	1744.2	25.03	89.22	5.1
Household size					
-3	3783.3	1141.67	30.17	66.77	5.8
3-5	5989.33	1501.33	25.1	77.92	5.1
>5	4135.5	1130.9	27.35	65.5	4.4

Abd El-latif (2014) reported that the relative expenditure on different food commodities depended on the size of the family, educational status of the head of household in rural and urban Egypt.

The study of Nakhal, (2013) showed that the dairy products reached 14.8% in terms of the relative spending importance. El- Begawy (2013) reported highly significant ($p < 0.01$) expenditure on food commodities according to

family size in agreement with the present results.

Consumer preferences for loose or packaged milk

Table 3 shows that consumer's preference for loose and packaged milk as affected by the studied factors was categorized into those who prefer loose milk and those who prefer packaged milk. Consumers preferences for packaged milk was significantly ($p < 0.01$) affected by the family income. Thus house-holds of high income showed 76.9% preference for packaged milk, while those of low and medium income showed 36.4 and 75.4, respectively.

While education and income level of the household heads were negatively significant at the 5% and 1% levels respectively. Meanwhile, the preferences for packaged milk products was negatively influenced by the marital status of the household heads (at the

5% level), while the location of the household heads were positively significant at the 1% level respectively.

As for the preference for the consumption of loose and packaged milk in the category of low income, the results indicate the high consumption rate for loose milk, which amounted to 63.6%. This was attributed to the high quality of loose milk vs. packaged milk, based on its taste. They also believe that it is high in nutritional value because it contains more vitamins and minerals.

It indicates, some of the reasons for the preference for high-income consumption of packaged milk are due to the lack of access to raw milk, especially in high-end areas. A study report (Ruvini V. *et al.*, 2017) confirmed that the lack of fresh milk is a major reason for consumers to buy more imported milk powder and other dairy products.

Table (3): Consumer preferences for loose or packaged milk

	loose and packaged Milk		loose Milk		packaged Milk	
	Fre-quency	%	Fre-quency	%	Fre-quency	%
Age						
< 18	20	44.4	10	22.2	15	33.3
18-35	10	50	0	0	10	50
36- 55	20	75	0	0	10	25
> 55	30	54.5	10	18.18	15	27.27
Total	80	53.3	20	13.3	50	33.3
Household size						
<3	15	42.86	0	0	20	57.14
3-5	15	15.62	30	43.48	24	34.78
>5	0	0	19	41.30	27	58.70
Total	30	20	49	32.66	71	47.33
Education						
Higher Education and above	15	20	0	0	60	80
Higher Education	35	75	5	25	10	0
Uneducated and average education	0	0	25	100	0	0
Total	50	33.33	30	20	70	46.66
Income						
High	12.0	23.07	0	0	40.0	76.92
Medium	0	0	16.0	24.61	49.0	75.38
Low	0	0	21.0	63.63	12.0	36.36
Total	12	8	37	24.66	101	67.33

The results of the study also indicated a higher rate of higher education and higher for consumers who preferred more packaged milk (about 80%). Also, (Yayar, 2012) reported that better educated consumers tend to have higher preferences for packaged milk than less educated consumers. This is due to the fact that the higher educated household head is more concerned about safety and hygienic conditions of milk.

Finally, the consumption preference is influenced by the milk packaged in the study sample, according to shelf life of milk, where some respondents think that packaged milk has better shelf life. This is confirmed by Ahmed (2017) who reached to a similar conclusion.

Demand functions for loose milk and packaged milk

1. Demand functions for low-income groups:

The equation 1 of Table 4 refers to the demand function of loose milk for low income earners, the relationship between the volume of demand for loose milk, raw milk price and the monthly expenditure of households on food. The results showed a significant ($P < 0.01$) negative relationship between the price of loose milk and the quantity of demand, which is consistent with economic logic, because the increase of one EL of the price of one kg of loose milk led to a decrease in the monthly demand by 1.34 Kg.

The equation indicated a positive relationship between the volume of expenditure on food and income on the one hand and the demand for loose milk on the other. Also, the results showed a positive relationship between the price of imported powdered milk and the consumed quantity of loose milk. The estimated elasticity of the demand for loose milk and milk powder were found to be 0.3 and 0.58 respectively. In other words, the increase in the prices of powdered milk and processed milk by 1% led to an increase in the consumption of loose milk by 0.3%, 0.58%, respectively.

The current relationship illustrates the great impact between powdered milk and loose milk for the low-income. This category was responsive to changing milk products more than other groups and more inclined to the consumption of loose milk due to insufficient health awareness of the importance of the use of processed milk.

Equation 2 in Table 4 indicates significant ($p < 0.01$) inverse relationship between the price of packaged milk and the quantity of demand, which is consistent with economic logic, where an increase of one EL of the price 1 kg milk decreased the required quantity by 2.62 kg per month.

Table (4): Estimation of the demand functions for groups income

Equation number	The dependent variable	α	X1	X2	X3	X4	X5	R ²	F
low-income groups									
1	RawMilk	1.47	-1.34	0.181	0.3	0.58	0.182	0.66	(4.42)**
		(0.8)	(4.3)**	(1.03)**	(0.24)	(1.29)	(2.36)*		
2	Packaged Milk	10.9	-2.62	0.16	0.09	0.69	0.47	0.75	(4.84)**
		(2.6)**	(2.1)*	(0.5)	(0.4)	(2.2)	(2.25)*		
middle-income groups									
3	RawMilk	-0.81	-0.17	0.366	0.11	0.22	-0.214	0.66	(4.17)**
		(7.8)**	(2.1)*	(2.8)**	-0.6	-0.64	(-2.2)*		
4	Packaged Milk	-0.67	0.17	0.354	0.165	0.175	-0.207	0.75	(5.27)**
		(2.6)**	(2.56)*	(2.7)**	(1.9)*	(2.12)*	(-1.45)*		
high-income groups									
5	RawMilk	A statistically insignificant model						0.23	0.2
6	Packaged Milk	0.81	-0.22	0.1	0.49	0.59	0.1	0.73	(10.01)**
		(1.7)*	(1.4)*	(1.6)*	(4.5)**	(1.7)*	(1.69)*		

* = $P < 0.05$

** = $P < 0.01$

*** compiled and calculated from the research questionnaire.

There has also been a direct correlation between spending on food and income on the one hand and demand for packaged milk on the other. The estimated elasticity of demand for packaged milk both milk powder and loose milk were found to be about 0.1, 0.69 respectively. This confirms the significant correlation between packaged milk and loose milk in the low-income group, which corresponds to the results of equation 1.

2. Estimation of the demand functions for middle-income groups:

The demand function for raw milk for middle income holders is expressed in equation 3 in Table 4. A statistically significant ($p < 0.01$) inverse relationship between the price of loose milk and demand. An increase of one EL in the price of one kg of loose milk led to a decrease in the required quantity of milk by 0.17 kg/ month. A positive correlation was found between the expenditure on food and the demand for loose milk. Also, there is a statistically significant ($p < 0.05$) inverse relationship between the average income and the demand for loose milk. This indicates that the amount of raw milk decreased by about 0.214 kg/ month.

The elasticity of the demand for loose milk and milk powder and packaged milk was estimated to be 0.11 and 0.22 respectively. An increase of 1% in the prices of powdered milk and packaged milk, resulted in a monthly decrease in the quantity of loose milk by 0.11% and 0.22%, respectively.

Equation 4 in Table 4 shows the demand function for the packaged milk in the average income category. There was a statistically significant ($p < 0.01$) inverse relationship between the price of the packaged milk and the quantity of demand. The results also indicate a

positive relationship between the volume of expenditure on food and income on the one hand and the demand for packaged milk on the other. It also indicated a positive relationship between the price of milk powder and loose milk and the quantity consumed of packaged milk. The elasticity of the demand for packaged milk; both milk powder and loose milk were found to be about 0.165% and 0.17% respectively.

3. The demand functions for high-income groups:

The demand function for loose milk by the high-income category was statistically significant. This may result from the health concerns with regard to loose milk. Also, this category can buy the more expensive packaged milk. This finding is consistent with previous studies on the consumption of milk products (Akinyosoye, 2006; Njarui *et al.*, 2011).

The demand function for packaged milk by the high-income category is given in Equation 6 in Table 4. There was a statistically significant ($p < 0.01$) inverse relationship between the price of the packaged milk and the quantity of demand. An increase in the price of one kg of packaged milk by one EL decreased the required quantity by 0.22 kg. The results also showed a positive relationship between the price of milk powder and loose milk and the quantity consumed of packaged milk.

The elasticity of demand for packaged milk products and milk powder and loose milk were found to be 0.49 and 0.59 respectively.

This finding is consistent with a previous study (Heena & Rajni 2013) which showed a positive regression relationship between household income and consumption expenditure.

CONCLUSIONS

The preference of packaged milk was positively determined by the income and education variable. Low level of education and limited household income were significant determinants for preference of loose milk. Changes the consumption patterns and con-

sumption trends are very important and applicable for policy modeling purposes. A good analysis and assessment of the demand for dairy products helps predict the future development of the Egyptian dairy sector.

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العوامل المؤثرة على تفضيل المستهلك لاستهلاك الحليب السائب والمعبأ في مصر:
دراسة حالة على محافظة القاهرة

تهدف هذه الدراسة إلى استكشاف تأثير العوامل الإجتماعية والإقتصادية على تفضيل الأسرة لاستهلاك كل من اللبن المعبأ واللبن الخام. وتم اختيار ١٥٠ أسرة بشكل عشوائي من محافظة القاهرة للدراسة. وقد أشارت بيانات الاستبيان معنوية استهلاك اللبن السائل بالنسبة للدخل ($P < 0.01$) وأن استهلاك اللبن المعبأ كان أقل تأثيراً لأصحاب الدخل المنخفض ($P < 0.05$) وكذلك كان استهلاك اللبن السائل أقل تأثيراً للأسرة ذات الدخل المرتفع والتعليم العالي وكانت الأفضلية لاستهلاك الحليب المعبأ. ومن خلال النتائج تظهر الدراسة معلومات جديدة نسبياً في استهلاك الحليب في مصر، بما قد يساعد الدولة والمنتجين على تطوير إنتاج الألبان في مصر.