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Consumption Pattern of Milk and Milk Products among Different Income Levels in Some Selected Areas of Bangladesh

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Abstract: The present study examines the consumption pattern of milk and milk products among different income groups in some selected areas in Bangladesh. Family budget data were collected through household survey during September' 01 to May 2002 for 179 selected households from the three different areas of Bangladesh, comprising 44 from Rural, 61 from Municipality town and 74 from Metropolitan city households formed the basis. The sample households were post classified into 5 income groups based on monthly household income as follows: (I) < Tk. 3000; (II) Tk. 3001-6000; (III) Tk. 6001-9000; (IV) Tk. 9001-12000 and (V) > Tk. 12000. Among milk and milk products, the major allocation of expenditure was devoted to liquid milk followed by sweetmeats and powder milk and 'other milk products'. The municipality town households consume more milk, sweetmeats and dahi than Rural and Metropolitan city. On the other hand, Metropolitan households consume more powder milk, condensed milk, ghee and ice cream. Milk and some milk products consumption and expenditure on it increased substantially, with the increase of income in all the areas.

Key words: Consumption pattern, milk, milk products, income level

Introduction

Consumption plays the key role in guiding an economy to the production of goods and service that they demand. Per capita fresh milk and milk products consumption is one of the most important point of basis to measure the living standard of a nation. The situation of milk production and consumption in Bangladesh is far below the normal level when compared to the requirement. It is estimated that daily per capita availability of milk in Bangladesh is only 34 ml. against the requirement of 250 ml. and the annual production is estimated at 1.6 million metric tons where as the requirement stands at about 9.9 million metric tons (DLS, 1998). This situation indicates the depth of the requirement for raising milk production in the country for a healthy nation. In developing economy like Bangladesh, the consumption pattern of household is expected to undergo a change with the rising aggregate income. The basis unit of demand theory is primary consumer who attempts to maximize utility by spending his income. Therefore, consumer demand for a particular commodity or commodity group necessitates the under standing of the consumption behavior of the aggregate consumers or households in the consumption area. Consumption behavior of dairy consumers depends upon income, prices and availability of the milk and dairy products (Sweetmeats, Dahi, Ghee, Powder milk, Ice-cream etc.). The products consumption depend in turn on interaction of among many other factors; on their socio-economic, physical environment, its composition, cultural background (Mukherjee, 1938; Crotty, 1980), preferences (Baker, 1959), economic needs and orientation of the products to the consumers (Reberte *et al.*, 1996). So, obviously, a large number of factors directly affect the consumption expenditure such as income, prices of individual commodities, size and composition of household etc. However this study will help to measure the present level of consumption pattern of rural and urban (Municipality town and Metropolitan city) people as well as will help the government to formulate policy for the welfare of the people of Bangladesh.

Materials and methods

The study was based on the income group or family budget and data were collected from the three selected different areas of Bangladesh namely Rural, Municipality town and Metropolitan city. This three areas were generally considered the main representative units of whole Bangladesh consumption pattern situation. Six villages namely Maniknagar, Shaylapara (Ishurdi, Pabna), Garidha (Sherpur, Bogra), Rasombari, (Ullahpara, Sirajgonj), Garaikhuti (Muktaghacca, Mymensingh) and Shahapur madhapara (Matihar, Rajshahi) were selected as rural area, the different households of four Municipality town namely Ishurdi (Pabna), Bagerhat, Comilla, and Lakshmipur, and as well as four Metropolitan city namely Khulna (Altapur, Ray para), Barishal (Shikdarpara), Sylhet (Tilaghar) and Rajshahi (Kumerpara) were selected for this purpose. The data were randomly collected through personal interviewing during September' 01 to May 2002 by the Principal investigator using a pre-tested questionnaire. In this study, a total of 179 primary sampling units, 44 from Rural, 61 from Municipality town and 74 from Metropolitan city, were selected. The selected sample households were post classified into 5

Table 1: Distribution of samples among different income groups in rural, Municipality town and Metropolitan city areas

Category	Income groups (Tk.)	Number of observations			Total
		Rural	Municipality town	Metropolitan city	
I	Below 3000	13	13	9	35
II	3001-6000	7	13	17	37
III	6001-9000	11	6	16	33
IV	9001-12000	6	14	16	36
V	12000 & above	7	15	16	38
Total		44	61	74	179

Table 2: Distribution of average income and number of family member among different income groups of household in rural, Municipality town and Metropolitan city areas

Category	Income group	Average income (Tk.)			Average	Average family member (no.)			Average
		Rural	Municipal	Metropolitan		Rural	Municipal	Metropolitan	
I	Below 3000	1769	2183	2664	2153	5.23	4.84	3.88	4.74
II	3001-6000	4420	4603	4672	4600	7.7	5.15	4.82	5.48
III	6001-9000	7306	7464	7667	7510	7.72	5.16	3.87	5.39
IV	9001-12000	10845	10679	10621	10681	8.83	5.28	4.75	5.64
V	12000 & above	15125	35125	20016	25076	8	6.46	4.62	5.97
Average		6935	13268	9679		7.18	4.44	4.44	

Table 3. Average monthly consumption of milk and milk products at different areas of Bangladesh (litre or kg or g/month)

Parameters	Areas						Level of significance
	Rural		Municipality town		Metropolitan cities		
	Mean	SE	Mean	SE	Mean	SE	
Liquid milk (litre)	21.58	2.8	23.52	2.4	17.71	2.13	NS
Condensed milk (g)	0.00^{b}	0.00	$88.^{ab}$	44.14	154.64^{a}	38.97	*
Powder milk (g)	74.89^{a}	64.08	204.24^{b}	55.10	363.81^{c}	48.65	**
Sweetmeats (kg)	1.14	0.21	1.34	0.18	1.25	0.16	NS
Dahi (kg)	0.86	0.18	0.91	0.16	0.85	0.14	NS
Ghee (g)	69.19^{b}	31.25	137.43^{ab}	26.87	163^{a}	23.73	*
Ice-cream (g)	0.00^{b}	0.00	243.95^{a}	92.04	204.40^{ab}	81.25	*

Means with different superscript (s) in the same row differ significantly, ($p < 0.05$) or ($P < 0.01$)
NS = Non significant, * = Significant at 5% level ($p < 0.05$), ** = Significant at 1% level ($p < 0.01$)

income categories based on monthly household income such as (I) < Tk. 3000 (II) Tk. 3001-6000 (III) Tk. 6001-9000 (IV) Tk. 9001-12000 and (V) > Tk. 12000. The samples drawn from different categories of people in Rural, Municipality town and Metropolitan city is shown in Table 1. and distribution of average income and number of family member among different income groups are also shown in Table 2. Various types of milk and milk products were selected for the study which were thought to be commonly consumed by different types of consumers in Bangladesh. The selected milk and milk products are liquid milk, powder milk, condensed milk, sweetmeats, dahi, ghee and ice cream.

Statistical analysis: After data collection the data were analyzed by single variate General Linear Model of SPSS (Snedecor and Cochran, 1989) 7.5 for windows (SPSS) statistical package. The main effects were the effects of different areas and different income groups on liquid milk, condensed milk, sweetmeats, dahi, ghee etc. The model used was as follows:

$Yij = \mu + \alpha i + \beta j + \alpha\beta ij + eij$

Here, μ is the general mean, αi is the ith, area αj is the jth income group, $\alpha\beta ij$ is the observed variable at ith area in jth income group, eij is the random error and Yij is the observed variable in question.

Results and Discussion

Liquid Milk: Average monthly consumption of liquid milk for all income groups of Rural, Municipality and Metropolitan areas were estimated 21.58, 23.52 and 17.71 litre (Table 3) and its cost was Tk. 277.26, 460.78 and

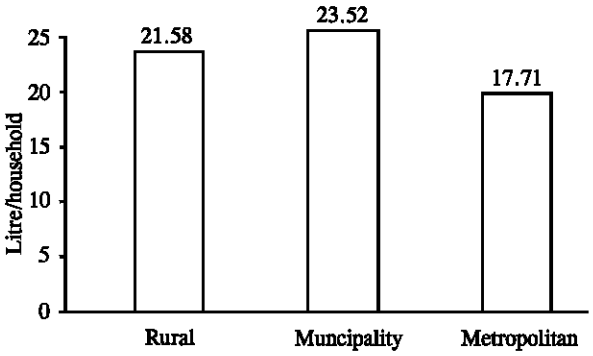

Fig. 1: Monthly consumption of milk per household at different areas of Bangladesh

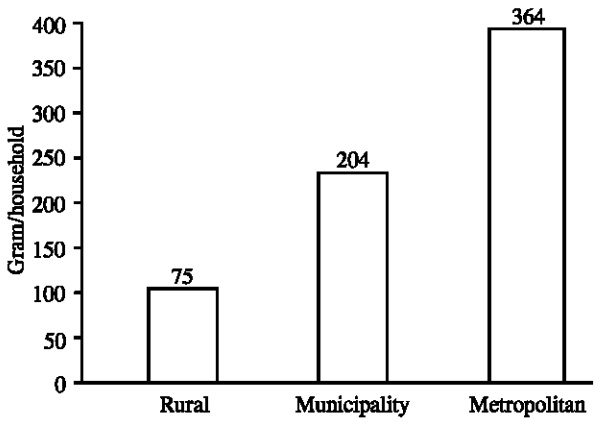

Fig. 2: Monthly powder milk consumption per household at different areas of Bangladesh

409.85 (Table 6) respectively. The percentage of total expenditure spent on liquid milk were 3.99 for Rural, 3.47 for Municipality town and 4.23 for Metropolitan households. The lowest milk consumption was Metropolitan city because they consume more powder milk in comparison to other two areas (Fig.1 and 2). The analysis of variance showed different areas had no significant effect on liquid milk consumption for all income groups. On the other hand, monthly liquid milk consumption for all three areas of various income (Tk/months) levels (below 3000, 3001-6000, 6001-9000, 9001-12000 and above 12000) were estimated 10.09, 11.49, 17.33, 24.37 and 41.41 litre (Table 4) respectively. The analysis of variance showed that different income levels had a highly significant effect on liquid milk consumption ($p < 0.01$) for all areas (Table 4). Quantity consumed as well as expenditure on milk was the highest for V income groups and the lowest for (I) income groups for all areas. Table 5 shows the positive correlation of consumption with income i.e. of income rises in different areas the quantity of milk consumption increases. Table 6 reflects that as income increases the price paid for milk by different income groups of different areas increases.

Powder and condensed milk.

The average monthly consumption of condensed milk and powder milk for all income groups were estimated at 0.00; 74.89, 88; 204.24 and 44.14; 55.10 g for Rural, municipality town and metropolitan city area, respectively (Table 3) and its cost was Tk. 0.00; 13.98, 8.37; 71.85 and 9.95; 109.28 (Table 6) respectively. All income groups of rural area did not consume condensed milk, but in Metropolitan city the household consume higher than Municipality town. Both two area condensed milk used by households as a tea whitener. The analysis of variance showed that both area and income groups had significant effect ($p < 0.05$) on condensed milk consumption. Incase of income groups LSD test indicates that the mean (I) income groups differ significantly ($p < 0.05$) with (III) income group (Table 4). Incase of powder milk consumption, the analysis of variance showed both areas and income groups had a highly significant effect ($p < 0.01$). Quantity consumed as well as expenditure on powder milk was the highest for highest income group except Rural area. (Table 5)

Sweetmeats: The monthly consumption of sweetmeats for all income groups of Rural, Municipality town and Metropolitan city areas were estimated 1.14, 1.34 and 1.25 kg and its expenditure was Tk. 61.35, 107.37 and 105.98 respectively. The analysis of variance showed that different income levels had a highly significant effect on sweetmeat consumption ($p < 0.01$) for all areas (Table 4) i.e. whenever income rise the level of consumption of sweetmeats obviously increased. Quantity consumed as well as expenditure on sweetmeats was the highest for the highest income group and the lowest for the lowest income group (Table 4, 5).

Dahi: The average quantity consumed and money spent on dahi were 0.86, 0.91 and 0.85 kg and Tk. 31.69, 53.04 and 58.78 respectively for Rural, Municipality town and Metropolitan city areas. The ANOVA showed that different income levels had a significant effect on dahi consumption ($p < 0.01$) for all areas. The (II) income class people of rural area consumed more dahi than other income class people. In Municipality town area income groups of (V) and (IV) consumed more dahi than others and in Metropolitan city area, income groups of (V) and (II) consumed more dahi than the rest in terms of quantity and expenditure. Table 5 and 6 shows that dahi consumption and expenditure had no regular sequence in all three areas.

Ghee: The monthly consumption and money spent on ghee were 69.19, 137.43 and 163g and Tk. 18.22, 38.08 and 61.65 respectively for Rural, Municipality and Metropolitan city areas. Analysis of variance showed that both areas and different income levels had a significant effect on ghee consumption (Table 4). Incase of areas,

Table 4: Average monthly consumption of milk and milk products at various income levels (litre or kg/month)

Parameters	Income levels (Taka)										Level of Significance
	Below 3000 (I)		30001-6000 (II)		6001-9000 (III)		9001-12000 (IV)		Above 12000 (V)		
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	
Liquid milk (litre)	10.09^{a}	3.0	11.49^{a}	3.1	17.33^{a}	3.3	24.37^{b}	3.3	41.41^{c}	3.1	**
Condensed milk (g)	1.71^{a}	55.9	81.70^{ac}	57.3	146.87^{bc}	61.4	76.00^{ac}	59.5	98.52^{ac}	56.6	*
Powder milk (g)	58.95^{a}	69.8	159.24^{ac}	71.5	198.59^{cde}	76.7	240.67^{ae}	74.3	414.12^{b}	70.7	**
Sweetmeats (kg)	0.48^{a}	0.2	1.09^{ac}	0.2	1.11^{bc}	0.2	1.26^{bc}	0.2	2.27^{ed}	0.23	**
Dahi (kg)	0.33^{a}	0.20	0.89^{a}	0.2	0.70^{a}	0.2	0.70^{a}	0.2	1.74^{b}	0.2	**
Ghee (g)	57.63^{a}	34.0	59.45^{a}	34.9	149.55^{a}	37.4	116.19^{a}	36.2	233^{b}	34.5	**
Ice-cream (g)	40.60^{a}	116.6	66.49^{a}	119	135.59^{ac}	128	111.4^{a}	124	393^{bc}	118	*

Means with different superscript (s) in the same row differ significantly ($p < 0.05$) or ($p < 0.01$)
* = Significant at 5% level ($p < 0.05$), ** = Significant at 1% level ($p < 0.01$)

Table 5 : Average monthly consumption of milk and milk products at various income levels in different areas (litre or kg or g /month)

Category	Income group (Tk.)	Liquid milk (l)	Powder milk (g)	Condensed milk (g)	Sweetmeat (kg)	Dahi (kg)	Ghee (g)	Ice-cream (g)
Rural areal								
	< 3000	7.22 ± 4.9	3 ± 112	-	0.51 ± 0.37	0.19 ± 0.3	6.4 ± 55	-
II	3001-6000	6.84 ± 6.7	-	-	1.25 ± 0.5	1.33 ± 0.4	77 ± 75	-
III	6001-9000	19.94 ± 5.4	28.4 ± 123	-	1.07 ± 0.4	0.86 ± 0.36	98 ± 60	-
IV	9001-12000	25.00 ± 7.3	333 ± 166	-	1.110 ± 0.5	0.69 ± 0.48	63 ± 81	-
V	> 12000	48.93 ± 6.7	9.5 ± 154	-	1.78 ± 0.5	1.2 ± 0.45	101 ± 75	-
Municipality town								
I	< 3000	15.61 ± 4.9	38.5 ± 113	5 ± 90	0.49 ± 0.37	0.56 ± 0.3	120 ± 55	38 ± 188
II	3001-6000	11.93 ± 4.9	311 ± 113	20 ± 70	0.84 ± 0.37	0.47 ± 0.33	25 ± 55	77 ± 188
III	6001-9000	22.44 ± 7.3	11 ± 166	133 ± 133	0.78 ± 0.5	0.42 ± 0.48	165 ± 81	50 ± 227
IV	9001-12000	23.09 ± 4.7	101 ± 109	157 ± 87	1.49 ± 0.36	0.74 ± 0.31	80 ± 53	215 ± 181
V	> 12000	44.51 ± 4.6	559 ± 105	146 ± 84	3.09 ± 0.34	2.37 ± 0.3	296 ± 51	839 ± 175
Metropolitan city								
I	< 3000	7.45 ± 5.9	135 ± 135	-	0.44 ± 0.44	0.22 ± 0.39	46 ± 66	83 ± 226
II	3001-6000	15.71 ± 4.3	166 ± 99	245 ± 79	1.20 ± 0.32	0.87 ± 0.28	76 ± 48	122 ± 165
III	6001-9000	9.60 ± 4.4	556 ± 102	307 ± 81	1.48 ± 0.33	0.83 ± 0.29	185 ± 49	357 ± 170
IV	9001-12000	25.00 ± 4.4	287 ± 102	71 ± 81	1.19 ± 0.33	0.67 ± 0.29	206 ± 49	119 ± 170
V	> 12000	30.79 ± 4.4	674 ± 102	150 ± 81	1.93 ± 0.33	1.63 ± 0.3	302 ± 49	341 ± 170

Table 6. Average monthly expenditure on milk and milk products at various income levels in different areas (Taka/month)

Category	Income group (Tk.)	Liquid milk	Powder milk	Condensed milk	Sweet meat	Curd/Dahi	Ghee	ice cream	Total expenditure(Tk.)
Rural area									
I	< 3000	103	0.64	-	29.61	7.51	1.86	-	142.6
II	3001-6000	100	-	-	76	51	26.43	-	253.4
III	6001-9000	289	6	-	61.59	40.83	26.81	-	424.2
IV	9001-12000	373	87	-	59.48	28.05	16.94	-	564.4
V	> 12000	677	2.62	-	106.43	46.40	27.97	-	860.4
All income groups		277.26	13.98	-	61.35	31.69	18.22	-	402.5
Municipality town									
I	< 3000	317	9.61	2.31	36.95	30.76	30.13	3.46	430.2
II	3001-6000	245	85.43	9.5	50.32	23.88	8.39	7.69	430.19
III	6001-9000	394	3.27	9.66	47.78	20.07	53.75	8.77	537.27
IV	9001-12000	439	29	11.00	107	38	30	31	685
V	> 12000	820	181	9	242	125	72	90	1539
All income groups		460.78	71.85	8.37	107.37	53.04	38.08	32.52	772.01
Metropolitan city									
I	< 3000	121	39	-	30.92	14.07	12.03	10.18	207.82
II	3001-6000	335	43.73	11.40	93.38	50.83	26.29	52.26	612.85
III	6001-9000	225	160	17.62	113.09	58.43	68.80	125.40	768.32
IV	9001-12000	545	89.06	10.67	96.79	40	81.20	24.25	886.99
V	> 12000	701	188	5.62	163.70	111.51	100.42	54.68	1325.32
All income groups		409.85	109.28	9.95	105.98	58.78	61.65	57.40	812.89

LSD test indicates that the mean ghee consumption of Metropolitan cities differ significantly ($p < 0.05$) with the consumption of Rural and Municipality town (Table 3). But incase of income levels, LSD test indicates, the mean consumption of (V) income groups differ significantly ($p < 0.01$) with (I), (II), (III) and (IV) income groups (Table 4). It indicates that as income increased consumption of ghee increased positively. As the price paid by the different consumer groups was not same, the variation of expenditure on ghee was not similar to the variation in quantity. It may be said that, as the rich people are more conscious about nutrition, they purchase more ghee.

Ice-cream: Average consumer in Municipality and Metropolitan city areas consumed 243.95 and 204.40 g of ice-cream per month, in Rural area no one found to take milk prepared ice-cream. Both areas and income levels had significant effect ($p < 0.05$) on ice-cream consumption (Table 3 and 4). Ice-cream consumed and expenditure on it was the highest for income group (V) and the lowest for income group (I) in municipality town.

All these results are more or less similar with the findings of Goswami (1994). He concluded expenditure on milk increased with income group and maximum expenditure was on liquid milk in all groups. Another experiments carried out by Gupta *et al.* (1995) on consumption pattern of milk and milk products. He concluded that consumption of milk and milk products increased with income; in all groups.

Assessment of the factors influencing consumption pattern of milk and milk products: The consumers of Rural, Municipality town and Metropolitan city areas were asked to report their opinions about the factors related to consumption problems that they had to face in purchasing or consuming milk and milk products. In Rural areas those factors which affects consumption pattern included less income, non-availability of milk product, not available of sweet shop, high cost, not habituated with the products, indigestion, and allergic reaction. In

Municipality town, factors included crisis of pure milk, not available of quality sweets and other milk products and allergic reaction. In Metropolitan city, the constraining factors included crisis of pure milk, high cost, and adulteration of milk and milk products.

Conclusion: The study has shown the consumption and expenditure level of milk and different milk products with respect to different income classes. The study shows that the Municipality town households consume more milk, sweetmeats and dahi than Rural and Metropolitan city. On the other hand, Metropolitan households consume more powder milk, condensed milk, ghee and ice cream. Milk and some milk products consumption and expenditure on it increased substantially, with the increase of income in all the areas.

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