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Article

Uses of milk in sweetmeat shops and consumer preferences to milk products at Mymensingh municipality in Bangladesh

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Abstract: The work has been designed to investigate the utilization of milk for consumption of fluid milk and milk products, their distribution pattern, pricing, shelf life and consumer's preference of Mymensingh municipality in Bangladesh. The study was based on milk and milk products and data were collected from the selected sweetmeat shops by direct interview, of which 20 samples were collected from sweetmeat shops and 7 from goalas. Both tabular and statistical methods were used for collected data analysis. Shopkeepers of different sweetmeat shops received raw milk from farmers (52.6%) and goalas (47.4%) and the highest amount of whole milk was required in per unit production of rasomalai (21%) and ghee (18%) whereas the lowest amount in chomchom (9%). Milk products prices were not remained same throughout the year in this municipality due to fluctuation of raw milk availability and their price. Eid, Puja festivals and other educational activities results that may increase milk products selling especially rasogolla and kalojam. Research findings also showed non-significant difference in case of pricing, distribution pattern, shelf life and selling of milk and milk products following sweetmeats.

Keywords: milk; milk products; sweetmeat shops; goala; festivals

1. Introduction

Bangladesh is a densely populated country and the population is near about 158.5 million (UNFPA, 2014) out of which 76% lives in the rural areas and 51.69% of them being engaged in agriculture (Arthonoitik Somikkha, 2013). Bangladesh has 64 districts and among them Mymensingh is one of the district of Bangladesh which covers an area of around 4363 square kilometers. The population is around 2, 50, 819 and the literacy rate is about 65%. Milk consumption pattern is assessed based on different milk products like fluid milk, sweetmeat, curd, buttermilk, butter, cheese, skim milk powder, whole milk powder and ghee etc. Also, various types of sweetmeats like-dahi, rasogolla, rasomalai, malaikari, chomchom, kalojam, peda, chhanapolao, rajvog, kachhagolla, rosokadam, gursandesh are being produced from milk in this area. Indigenous sweetmeats are delicious, wholesome, pleasant, nutritious, charming and very popular dairy products in Bangladesh. In this era of industrialization, food habit of common people is changing day by day and increases consumption pattern of milk products demand due to rapid growing of population as well as income. That's why a good number of entrepreneurs have already come forward to deal with sweetmeat business by involving sweetmeat production and marketing. Akanda (2000) and Roy *et al.* (2002) also carried out a research work based on processing and marketing of sweetmeats in some selected areas of Bangladesh. Again, there is no specific and systematic study in this municipality based on uses, consumer preferences and marketing of milk products. So, objective of this study was to get an idea about fluid milk and the proportion of milk used for manufacturing of different milk products as well as shelf life and price of milk products.

2. Materials and Methods

2.1. Study area and duration

The present study was conducted at the municipal area of Mymensingh district in Bangladesh and data were collected by the researcher himself from September to October, 2014.

2.2. Selection of milk and milk products

Different types of milk and milk products were selected based on consumption patterns by the consumers of Mymensingh municipal areas. Fluid milk, dahi, rasogolla, butter, ghee, cheese, malaikari, rasomalai, chomchom, kalojam, chhanapolao, peda sandesh and danadarmisti were selected for this study purposes.

2.3. Selection of sample and sampling technique

In this study, 20 sweetmeat shops for milk products and 7 goalas for fluid milk were selected as a sampling unit. Sweetmeat shops were selected based on milk used and consumer's acceptability at different locations of Mymensingh municipality in Mymensingh district. For determining the amount of fluid milk consumption, 7 goalas were selected who sell their milk in an area named Dudhmohol which is located at Mymensingh municipality.

2.4. Preparation of survey schedule

The survey schedule was designed in accordance with the objectives of the research work. A preliminary schedule was developed for recording data to be obtained from the selected milk and milk products sellers. The contents and appropriateness of the interview schedule were judged by the advisory committee. A draft interview schedule was prepared by keeping in mind the following things such as i) to test suitability of the selected sweetmeat shops ii) to test and verify coverage of all items of the questionnaire iii) to identify the questions which respondents found difficult to answer iv) to assess the respondents willingness and co-operation. After necessary modification, the schedules were improved, modified and rearranged in a simple manner to avoid misunderstanding and to get accurate answer. The schedule was then finalized and questions were listed in a logical sequence so that respondents could easily answer.

The schedule contained the following broad items of information such as i) name of the owner/manager/fluid milk sellers ii) location of the shop/market iii) address with cell phone number iv) production amount of different milk products v) amount of raw milk used for different sweetmeat production vi) source and unit price of the raw milk vii) Shelf life and price of the products viii) consumer preferences to different milk products ix) influence of occasion on selling x) problem and possible solution in sweetmeat business.

2.5. Collection of data

The whole survey was conducted by the researcher after the preparation of the final questionnaire. The study was based on milk and milk products and data were collected from the selected sweetmeat shops by direct interview. Before making actual interview, the aims and objectives of the study were explained to the respondent so that they could be convinced as to the purpose of the study and talked freely. Then the questions were asked in a very simple manner with explanation of questions whenever necessary. Reaching to every respondent several questions were asked in a logical sequence so that the respondents could recollect facts easily. To attain accuracy and reliability of data, care and caution were taken during data collection. Attention was paid to the mood of the respondents and a congenial relationship was maintained between the respondents and the researcher. After completion of each interview the schedule was checked to be sure that all the answers of the questionnaire were collected or not. In order to minimize errors data were collected in local units and these were subsequently converted into appropriate standard units. So, data collection was completed having direct interview followed by detail briefing and discussion about the purpose of the study to the respondents.

2.6. Statistical analysis

Data were analyzed with the help of SPSS (Statistical Package for Social Science, IBM-17 Corporation, 2014) software and MS excel 2007 were also used for data analysis. Data on milk requirement for different products, selling amount of the different products, shelf life of the products and price of the products were analyzed in Completely Randomized Design (CRD). Also, means were compared by using Duncan's Multiple Range Test (DMRT) in Web Agri. Stat Package (WASP) as described by Gomez and Gomez (1984).

3. Results and Discussion

3.1. Distribution patterns of milk and milk products

3.1.1. Information about the obtained milk for making various milk products

From this study, it was observed that the shopkeepers of different sweetmeat shops received their raw milk from farmers (52.6%) and goalas (47.4%) and all of the raw milk was derived from cow milk (Table 1). There was no preservation technique was followed by the sweetmeat shopkeepers due to regular milk receiving are shown in Table 1. Most of the milk was coming from Shombhugonj, Char area, Trishal, Churkhai and other places near Mymensingh municipal area.

3.1.2. Information about fluid whole milk

Daily fluid raw milk price/litre, their daily sales are shown in Table 2, sources of milk are shown in Table 3 and other information also shown in Table 4. An impact on season was found in the fluctuation of milk price and the variation ranges from BDT 10 to 15 TK. Milk was came from Dudhmohol via different goalas who was collecting their milk from the nearest villages and char of the municipal area. Most of the liquid milk seller (71.4%) collected their milk from the village households. Some of them (28.6%) mixed morning milk with afternoon milk and then sold in the evening at Dudhmohol bazaar (Table 4). They were preserved their milk temporarily by means of banana leaves. They usually used a 250 mL measuring tin cup for measuring the amount of milk and after selling got payments on volume basis.

3.1.3. Uses of whole milk in Mymensingh municipal area

Figure 1 indicates that the amount of milk used for different milk products preparation and fluid milk consumption every day in Mymensingh municipal area. It was observed that 1.56% milk was used as fluid milk in households for direct consumption in this municipal area. Total amount of milk purchased by the sweetmeat shops every day at the Mymensingh municipal area was about 48.44% whereas milk products selling was about 50% at everyday (Figure 1). Data showed that the amount of milk in selling products were higher than the everyday purchase amounts of milk. It seems that the extra amounts of milk which required in milk products preparation that might be fulfilled from the utilization of powder milk or the actual data has concealed by the shopkeepers of different sweetmeat shops. These increasing demands of whole milk to prepare various sweetmeats are in agreement with Islam and Basak (2013) who carried out a study on sweetmeat processing in Bangladesh and reported that peoples were very much fond of chomchom, rosogolla, black berry and yogurt.

3.1.4. Whole milk requirement for individual milk product

Milk was utilized in various amounts to prepare different milk products which were usually depends upon the preparing nature of the products. Some of the milk products required more milk for preparation than the other products due to less utilization of sugar, flour, oil, sugar syrup, powder milk etc. Total amount of milk received in the sweetmeat shops and milk requirement in making individual product are shown in Figure 2. It shows that 21, 18, 12 and 11% milk required for production of rasomalai, kalojam, ghee and danadarmisti, respectively. It also revealed that 9% milk required for chomchom, rasogolla and 10% milk used for malaikari and pedasondesh production. It was found that the highest amount of milk (21%) was used for the production of rasomalai and the lowest amount (9%) for chomchom and rasogolla in Mymensingh municipality which are contradicts with the findings of Islam and Basak (2013).

3.2. Production status and selling amount of different sweetmeat shops in Mymensingh municipality

Quantity of sweetmeat produced by a shop directly depends on the daily milk used by the shops and types of sweetmeat produced depending upon the preferences of the consumers, profit margin, methods of production and degree of demand against season etc.

3.2.1. Availability of different types of sweetmeats at Mymensingh municipality

Availability status of different types of sweetmeats at the sweetmeat shops in Mymensingh municipality are shown in Table 5. Results revealed that rasogolla and sweet dahi were available in 100% sweetmeat shops whereas chhanapolao remained 15.79% in sweetmeat shops. Duitschaever (1978) reported his study that about 32% consumers gave preference for goat milk Dahi and 68% preferred cow milk Dahi.

Table 1. Source, types and collection of milk for sweetmeat production.

Parameters	Categories	Frequency	Percent (%)
Milk types	Cow	19	100
	Buffalo/ Goat	0	0
	Total	19	100
Source of milk	Farmers	10	52.6
	Goala	9	47.4
	Total	19	100
Preservation of raw milk	No	19	100
	Yes	0	0
	Total	19	100
Frequency of milk receiving	Regular	18	94.7
	One day pausing	1	5.3
	Total	19	100

Table 2. Daily fluid milk selling with their amount and price.

Sl. No.	Selling amount (litres/day)	Milk price/litre	No. of own dairy animal
1	75	60	3
2	40	60	2
3	60	60	3
4	7	60	3
5	120	60	0
6	30	65	4
7	20	60	0
Mean	50.28	60.71	2.14
SD	38.45	1.88	1.57

Table 3. Sources of raw milk at Dudhmohol bazaar in Mymensingh municipality.

Sl. No.	Source of milk	Frequency	Percent (%)
1	Beltoli	1	14.3
2	Farmer mohylakanda	1	14.3
3	Kalibari	1	14.3
4	Kashir char	1	14.3
5	Own	2	28.6
6	Pardonikhoda	1	14.3
Total		7	100.0

Table 4. Pattern of fluid raw milk selling at Dudhmohol bazaar in Mymensingh municipality.

Parameters	Categories	Frequency	Percent (%)
Owner of a dairy farm	No	5	71.4
	Yes	2	28.6
	Total	7	100
Mixing morning and evening milk together	No	5	71.4
	Yes	2	28.6
	Total	7	100
Milk preserve or not	Yes	1	14.3
	No	6	85.7
	Total	7	100
Preservation technique	Banana leaf	7	100
Transport system	Auto	2	28.6
	Rickshaw/ van	5	71.4
	Total	7	100
Basis of payment	Volumetric	7	100

Table 5. Availability of different types of sweetmeats at Mymensingh municipality.

Sl. No.	Name of sweetmeat	Available in shops (No.)	Total shops (No.)	Availability (%)
1	Sour dahi	03	19	15.79
2	Sweet dahi	19	19	100.00
3	Rasogolla	19	19	100.00
4	Rasomalai	14	19	73.68
5	Kalojam	14	19	73.68
6	Malaikari	12	19	63.15
7	Chomchom	13	19	68.42
8	Danadarmisti	11	19	57.89
9	Monda	07	19	36.84
10	Pedasandesh	07	19	36.84
11	Chhanapolao	03	19	15.79
12	Ghee	07	19	36.84

Table 6. Distribution pattern of milk for the preparation of different sweetmeats.

Name of sweetmeat	Milk required/day (Litre)	Minimum (Litre)	Maximum (Litre)
Dahi	29.84±7.68	15	45
Rasogolla	72.16±9.74	25	120
Pedasandesh	25.00±12.82	10	40
Rasomalai	30.32±12.57	10	50
Kalojam	32.63±17.00	15	50
Chomchom	30.00±16.70	15	45
Danadarmisti	31.74±13.09	12	60
Malaikari	32.89±13.75	15	50
Ghee	29.00±18.07	15	43
p value	0.759		

Table 7. Daily production of different milk products in different sweetmeat shops.

Name of Sweetmeats	Amount produced (Kg)	Minimum (Kg)	Maximum (Kg)
Dahi	16.79±7.28	8	30
Rasogolla	21.84±7.68	10	40
Pedasandesh	10.00±12.82	5	15
Rasomalai	14.54±13.29	4	25
Kalojam	13.95±11.18	8	25
Chomchom	15.95±17.55	7	23
Danadarmisti	16.00±12.86	8	35
Malaikari	14.32±11.43	5	20
Ghee	3.16±1.20	2	5
p value	0.839		

Table 8. Prices of the purchased milk and manufactured milk products in BDT.

Name of Sweetmeats	Price (Tk/Kg)	Minimum (Tk/Kg)	Maximum (Tk/Kg)
Dahi	130.00±2.06	120	140
Rasogolla	140.37±8.06	130	150
peda	155.79±10.31	145	170
Rasomalai	321.05±17.61	300	350
Kalojam	264.74±20.38	250	300
Chomchom	140.00±15.99	120	160
Danadarmisti	168.42±12.14	150	180
Malaikari	200.21±15.39	180	220
Ghee	809.26±15.04	800	860
Raw milk cost/litre	51.16±4.88	47	60

Table 9. Consumers impact on milk products.

Parameters	Categories	Frequency	Percent (%)
Milk products preferred by customer most	Dahi	10	52.6
	Rasogolla	9	47.4
	Total	19	100
Impact of occasion on sale	Eid	9	47.4
	SSC exam result	1	5.3
	Puja	9	47.4
	Total	19	100

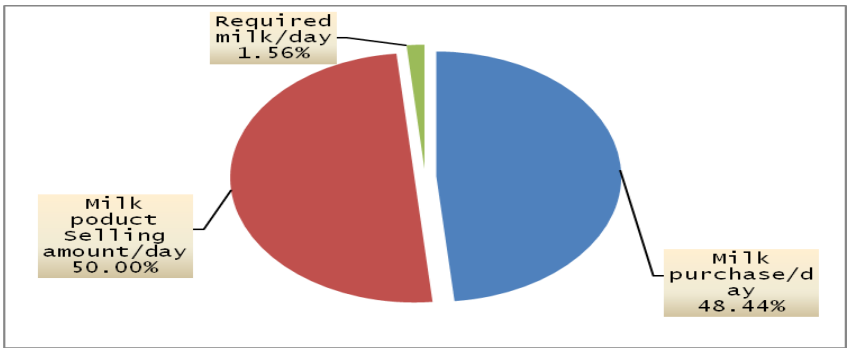

Figure 1. Uses of milk in Mymensingh municipality area.

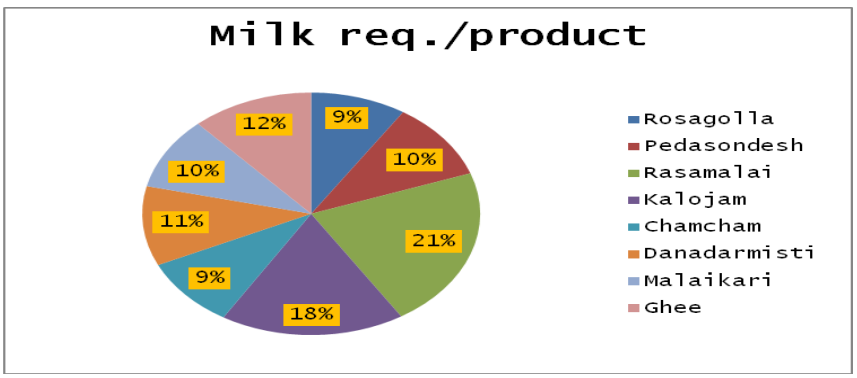

Figure 2. Requirement of whole milk for individual product.

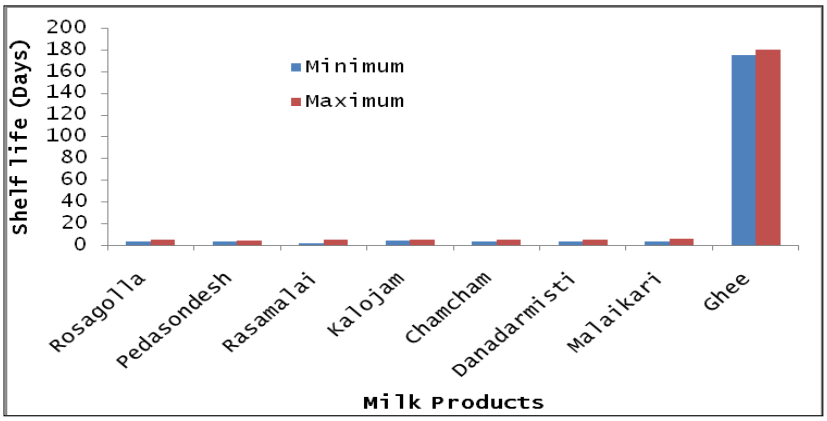

Figure 3. Shelf life for different milk products in this experiment.

3.2.2. Distribution of milk for different sweetmeats at Mymensingh municipality

Data generated during survey on daily input of whole milk (Kg) required in different sweetmeat and their distributions for different sweetmeat production are shown in Table 6. It was observed that there was non-significant ($p>0.05$) difference present in distribution of milk (litres) for preparing different milk products in sweetmeat shops at Mymensingh municipality areas. Dahi or yoghurt is generally considered as a safer product and its unique flavour appeals to so many that consideration is being, given by nutritionists to incorporate inexpensive source of nutrients to make it an almost complete food (Boghra and Mathur, 2000). On the other hand, sweets are the common foods overall in Bangladesh and people from rural village to urban were habituated with sweetmeat products (Islam and Basak, 2013).

3.2.3. Daily production of different milk products at Mymensingh municipality area

Daily production status of different milk products are shown in Table 7. It was evident that rasogolla produced in maximum amount whereas minimum in ghee with compare to different sweetmeats in Mymensingh municipality areas. Tse *et al.* (1989) reported that production status of different milk products largely depends upon the consumer preferences and attitude.

3.2.4. Shelf life variation in different milk products at Mymensingh municipality area

Shelf life for any food products indicates the keeping quality of that individual product and milk and milk products are very much unstable regarding the shelf life. Shelf life variation of different milk products are shown in Figure 3 and it indicates that the shelf life of rasogolla, malaikari, chomchom, pedasandesh and danadarmisti was minimum 3 days and maximum 5 days. This finding was similar to Das *et al.* (2010) who reported that the shelf life of market rasogolla's lasted for 2-3 days. The shelf life of rasomalai and kalojam were maximum 5 and minimum 2 and 4 days, respectively. The highest shelf life was found in ghee which was minimum 175 days and maximum 180 days.

3.2.5. Selling of milk and milk products at Mymensingh municipality area

Price of individual milk and milk products, their minimum and maximum price per kg product and mean for various milk and milk products in different sweetmeat shops are given in Table 8. Cost of milk for producing different milk products vary from 47 to 60 BDT in various sweetmeat shops at Mymensingh municipality (Table 8) where raw fluid milk price for public consumption was 60 BDT/litre (Table 2). Price was given after cutting chhana in almost all sweetmeat shops which was one day later of milk receiving. About 4.5-6 litres milk was required for 1 kg chhana preparation. Every sweetmeat shop used whey water from previously chhana cutting for separation chhana from milk. In most cases, sweetmeat seller told that the prices were not remained same for all the year round due to fluctuation of raw milk price. This fluctuation of price for individual milk products ranges from BDT 10-15 Tk. Selling of milk and milk products largely depends upon price of products, place and personal values of the seller. Personal values have been found to be the underlying determinants of various aspects of selling products to consumer (Homer and Kahle, 1988). Thus, values are one of the most important influential factors that affect the type of needs consumer tries to satisfy through purchase and consumption behaviors (Tse *et al.*, 1989) and ultimately enhances milk and milk products selling.

3.3. Consumers attitude towards milk and milk products

About 52.5% consumers of Mymensingh municipal area liked dahi and 47.4% rasogolla which were sold much more than any other type of milk products (Table 9). Occasions such as Eid, Puja, SSC or HSC exam results enhances milk products selling abundantly. It is believed that people from different cultural backgrounds have different perceptions and experiences related to food (Lennernas *et al.*, 1997). Hence, it can be noticed that some consumers are more oriented towards food quality, whereas for others food safety is a primary concern. Consumer behavior is also affected by the socioeconomic conditions of the markets namely income, mobility and media access (Tse *et al*., 1989). As more resources become available, consumers may desire more emotional image attributes in products or brand (Kim *et al*., 2002). Brand of a particular product plays a fundamental function in consumer's perception of a product. In fact, perceptions of food quality and safety are likely to be influenced by psychological and cultural factors rather than physiological product experiences alone. Many quantitative and qualitative researches have addressed issues associated with cultural determinants of food choice (Shepherd and Raats, 2007). It is quite evident from such studies that while analyzing factors that influence food choice, it is important to consider consumer's cultural background (Overby *et al*., 2004; and Hoogland *et al*., 2005).

4. Conclusions

The obtained finding indicates that the shopkeepers of different sweetmeat shops received their raw milk from farmers (52.6%) and goalas (47.4%) for manufacturing of various indigenous dairy products. About 11-13% whole milk was required for per unit production of pedasandesh, danadarmisti, malaikari. Results also evidence that whole milk required for per unit production of ghee (18%), rasomalai (21%), kalojam (18%), chomchom (9%) and rasogolla (9%) in Mymensingh municipality. However, in this study area producers sold their products in different percentages followed by 68.42% chomchom, 73.68% rasomalai and kalojam, 63.15% Malaikari, 57.89% danadarmisti, 15% sour dahi and chhanapolao and 36.84% monda, peda and ghee. It was also observed that the shelf life of rasogolla, malaikari, chomchom, pedasandesh and danadarmisti were minimum 3 days and maximum 5 days. The shelf life of rasomalai and kalojam were maximum 5 and minimum 2-4 days, respectively. The highest shelf life found in ghee and which was 180 days. The prices of the milk products were not fixed throughout the year in this study area due to fluctuation of raw milk price. Various occasions enhances some milk products selling abundantly in Mymensingh municipality especially dahi (52.5%) and rasogolla (47.4%). The results obtained in this study might be taken as indicative and provide some valuable information's to the sellers, consumers and policy makers regarding the milk and milk products in Mymensingh municipality of Bangladesh.

Conflict of interest

None to declare.

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