



Milk processing, product diversity and consumer preference for dairy products in some selected districts of Bangladesh

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ABSTRACT

The survey was conducted based on structured questionnaires in four districts viz. Dhaka, Bogura, Mymensingh, and Panchagarh) from 9 May to 8 June, 2024 to assess different milk and dairy products produced in selected sweetmeat shops, quantity of milk utilized in production, and the consumer preferences regarding sweetmeats in those districts. The study was conducted to depict Bangladesh's traditional and modern sweetmeat, milk and dairy products to a wider audience by emphasizing their local names. Survey data were analyzed using Microsoft Excel to determine milk requirements per product, production of sweetmeats and *doi*, and sweetmeat sales per day in those selected districts. Milk sourcing trends revealed that all surveyed shops in Dhaka, Bogura, Mymensingh, and Panchagarh relied entirely on other dairy farms. The trend of regular milk consumption was found highest in the Dhaka which was more than double of the Mymensingh district. We found only cow milk in the consumer's drinking glass. Only 57% of the respondents in Panchagarh made some dairy products at home which was 83 – 100% in three other districts. There were no digestion issues related to milk and dairy products in Dhaka and Bogura. In total we have identified 68 dairy products in sweetmeat shops of those four districts and majority of the products are *chhana* based. Some products were found very similar, varied only by a tiny modification in the manufacturing process. The expensive milk and/or dairy products were *Creamjam*, *Lengcha*, *Japanibhog* and *Kheersha* found in Bogura and each of the item priced BDT 700/Kg. The expensive dairy products found in Dhaka was *Madraji Golla* priced BDT 680/Kg. The manufacturers in Bogura obtained more regulatory certificates and least was in Dhaka and Panchagarh. The findings in the present study indicates the importance of similar studies in the other districts to make complete national data domain on diversity of traditional dairy products, consumer preferences for them and their price variation.

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Introduction

Milk is a versatile and nutrient-rich food with several health benefits for all age groups. It is consumed in both liquid and solid forms, with a wide variety of milk products available. Different milk products have been intentionally or accidentally developed throughout the world to

save milk from putrefactions and get several benefits from milk (Jahan et al. 2020). In India, half of the total milk production is transformed into various traditional milk products (Rao & Raju, 2003; Bhasin, 2010) viz. Chhana-based sweetmeat (*Rosogolla*, *sandesh*, *pantoa*, *rasomalai*, *chomchom*, *chhana murki*, *rajbhog* etc.), Khoa-based sweets and sweetmeats (*Kulfi*, *rabri*, *basundi*, *burfi*, *peda*, *gulabjamun*, *kalakand*,

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khurchan, *dharwad peda*, *kunda* etc.), Paneer (Indian cottage cheese), Fat-rich products (Ghee and *makhan*), Fermented dairy products (Dahi, misti dahi, lassi, chhach/mattha, shrikhand, etc.) (Aggarwal et al., 2018). In Pakistan, approximately 50% of the milk produced is consumed as it is, one-sixth as fermented (yoghurt or curd) and the remaining is utilized for the manufacturing of indigenous varieties of milk products such as ice cream, butter, khoa, paneer, rabri, kheer, barfi, and gulabjamun (Khan et al. 2007).

In Bangladesh, the demand for milk and milk products, particularly sweetmeats as an alternative, rises significantly, especially during the festive seasons. Though several forms of milk and milk products are produced in Bangladesh, sweetmeat plays an important role among all of them. People prefer to consume sweetmeats over raw milk due to their appealing color, unique flavor, and delightful texture. Sellers also like to offer dairy products instead of raw milk because of the high revenue and longer shelf life. Therefore, in Bangladesh, this tradition of transforming milk into delicious and long-lasting milk products continues to play an important role in holding the cultural practices and contributing in the economy. A snap of sweetmeat diversity is presented in Table 1.

Bangladesh is one of the most densely populated countries. According to the Population and Housing census 2022, the population size was 165,158,616 (BBS, 2022). A major portion of them lives in rural areas, where agricultural and livestock farming is the primary means of livelihood. About 20% of people are directly involved in the livestock sector (DLS, 2021). Total milk production was approximately 15.044 million tons (DLS, 2024) in Bangladesh. However, the production of sweetmeats varies throughout the year due to the milk availability, season and milk price. The differences in daily sales varied in these municipalities due to different festivals like Eid, Puja, and other ceremonial activities. The sourcing, production, sales distribution, shelf life, and seasonal demand variations of dairy products in Mymensingh were analyzed by Ahmed et al. (2016). Chanda et al. (2019) revealed that sweetmeat shops sourced their raw milk from middlemen (42.85%) and *goalas* (57.15%), with 100% cow's milk used for the production of sweetmeat in Babuganj, Barishal. They also noted that the fluctuating raw milk prices and competition with the Barisal city sweetmeat shops as key challenges. Additionally, a price list from several sweetmeat shops highlighted the

variations in the pricing of available products (Islam et al., 2013). Although several studies have been conducted previously on specific districts including some sweetmeat shops, there is no existing evidence of research encompassing multiple districts along with their consumer preferences. In this study, researchers collected data on sweetmeat shop operations and personal consumption preferences across four distinct districts of Bangladesh. These districts were chosen for their significant contributions to the regional and national economy through their diverse and unique sweetmeat production. Here, Milk consumption patterns were assessed based on several factors. The sweetmeat sector in these four districts plays an important role in preserving cultural heritage and driving economic activity. Various types of sweetmeats produced in these areas highlight the richness and diversity of Bangladesh's culinary traditions. The primary objectives of this study were to analyze the development and diversity of milk products in these four districts, examine price variations, and understand consumer preferences for milk and milk-based products.

Materials and Methods

Survey area and duration

The current study was conducted in four districts of Bangladesh, namely - Dhaka (24° 2' 0" North and 90° 38' 0" East), Mymensingh (24° 45' North and 90° 24' 0" East), Bogura (24° 51' 0" North and 89° 22' 0" East) and Panchagarh (26°00' to 26°38' North 88°19' to 88°49'). The researchers gathered data over one month from 9 May to 8 June 2024.

Selection of samples and sampling techniques

In this study, 48 sweetmeat shops (20 in Dhaka, 07 in Mymensingh, 09 in Bogura, and 12 in Panchagarh) and a random sampling technique was used to select 78 consumers from four districts: 30 from Panchagarh, 20 from Dhaka, 17 from Bogura, and 11 from Mymensingh. The interviews were done face-to-face at respondents' homes and shopkeepers' places. The survey consisted of a direct questionnaire. The study only included respondents who fulfilled the recruitment requirements, namely those who reported consuming dairy products and made their individual or cooperative food purchases. Data including consumers' age, gender identity, and education were recorded. However, data collection was restricted by the selected

sweetmeat shops and by selected personal preferences.

Preparation of survey schedule

This survey was conducted solely to serve the purpose of the research objectives. The survey module and interview content were meticulously reviewed and refined by an advisory committee. To form an appropriate survey schedule, multiple factors, including i) the suitability of questionnaires according to the difficulties of answering, ii) the willingness of respondents, and co-cooperativeness. After the correction and necessary modification of the questionnaires, two survey schedules were then finalized.

- a) The first schedule based on personal preferences about milk and milk products which contain information such as i) demographic details such as name, age, educational qualification, mobile number, gender, ii) amount of milk consumption, iii) source of liquid milk, iv) milk products consumption preferences, v) the five most preferred milk products, vi) any problem encountered in milk and milk products consumption, vii) whether individuals prepare milk products at home and their types and viii) the frequency of homemade milk product preparation.
- b) The second schedule was based on sweetmeat shop information that included i) shop name, owner's name, and organization name, ii) the types of milk products offered along with their price, iii) how much milk is needed for the product preparation, iv) the source of liquid milk, v) quantity of liquid milk required for each product, vi) certification status of government regulations and their list, and vii) daily sales volume of sweetmeats.

Collection of data

The study was structured to evaluate consumer preferences about milk and milk products and assess the availability and production of milk-based products in various sweetmeat shops. The entire survey was conducted after the preparation of the final questionnaire. Then, three observers collected data according to the final questionnaires. To conduct the personal interview, the researchers explained the study's objectives, methodology, and expected outcomes. The interviews were conducted in a friendly and

interactive manner and they explained the point whenever they didn't get the question. All questionnaires were answered carefully by the respondents and finally written on paper with their consent. During data collection, responses were carefully recorded, and the researchers were attentive to the respondents' engagement and willingness to participate. After each interview, all data were systematically documented. Then, the schedule was checked to verify that the answers were obtained adequately; in cases of missing responses, follow-up interviews were conducted to obtain relevant information.

Statistical analysis

The data obtained from different sweetmeat shops was subjected to statistical analysis to derive meaningful insights. The analysis primarily involved calculating mean and standard deviation with the help of MS Excel (Microsoft Corporation, 2021). Collected data were processed, tabulated, and graphically presented.

Results and Discussion

This study is divided into two major parts: (1) personal preferences for milk and milk products, (2) information about sweetmeat shops, including their product pricing, milk requirements, and sales. The findings highlight insights into the differences in product prices, milk consumption patterns, and sales across four districts in Bangladesh.

Respondents' background

Following the data collection from sweetmeat shops, personal preference data on milk and dairy products were gathered to understand consumption patterns and preferences. Researchers collected demographic information like respondents' age and education data to ensure accurate analysis. The survey reflects that milk consumption rates varied significantly across districts: 100% in Dhaka, 83.33% in Mymensingh, 76.47% in Bogura, and 56.67% in Panchagarh. These variations reflect differences in the educational and demographic profiles of the respondents rather than the overall population of the cities. The majority of respondents were adults aged between 17 and above 45 years (Figure 1). A significant portion of the respondents were educated, with 33.33% to 75% holding graduation degrees, while the smallest proportion (5% to 16.67%) had education levels below S.S.C. (Figure 2). This suggests that milk and dairy product consumption is more prevalent

among educated individuals, possibly due to greater awareness of nutritional benefits.

Table 1: List of diversified dairy products in Bangladesh with their explanation

SL. NO.	Sweetmeat	Description
1.	<i>Chhana</i>	Milk curd obtained from heat-acid coagulation of milk followed by whey drainage.
2.	<i>Kheer</i>	<i>Kheer</i> is a much thicker concentration of milk (volume reduced by 70-80%; almost semi-solid), which is obtained by boiling the milk for long time on a gentle fire.
3.	<i>Malai</i>	<i>Malai</i> is obtained from milk by boiling and letting the milk simmer on low heat until the volume reduced by 50-60%.
4	<i>Sada Golla</i>	A product made from <i>chhana</i> , kneaded in ball of desirable size and boiled in sugar syrup for 10-15 minutes, eventually kept in sugar syrup.
5	<i>Kalojam/Jambhog</i>	A sweetmeat made from <i>chhana</i> (round or elongated in shape) and fried in ghee or oil until it reaches a delectable dark brown color followed by boiling shortly in sugar syrup and kept in diluted sugar syrup.
6	<i>Creamjam/Kheerbhog</i>	A variety of <i>kalojam</i> in which <i>kalojam</i> is ripped off halfway at the mid-line and then stuffed with cream/ <i>kheer</i> .
7	<i>Golapjam</i>	Small likeable light brown sweetmeat made from <i>chhana</i> and soaked in sugar syrup. The cooking process is the same as <i>kalojam</i> .
8	<i>Lalmohon</i>	Sweetmeat made from <i>chhana</i> and/or <i>khoa</i> and fried in ghee or oil for 20 minutes until it reaches pleasant light brown color (food color may be used). After that it is soaked in sugar syrup.
9	<i>Dudhmohon/Dudhmalai/Dudhbhog</i>	Sweetmeat made from <i>chhana</i> (flat, rectangular shape of variable size) and boiled in sugar syrup for 20-30 minutes. After that sugar syrup is snatched from sweetmeat and soaked in boiled milk.
10	<i>Rosogolla/Rosbhog/Rajbhog</i>	Sweetmeat made from soft and spongy <i>chhana</i> ball cooked in sugar syrup and kept in sugar syrup. When saffron infused sugar syrup is used in boiling, then it is called <i>roshbhog</i> . In the case of <i>rajbhog</i> , <i>chhana</i> balls are comparatively larger and may contain pieces of cardamom.
11	<i>Kheermohon</i>	A thin layer of <i>kheer</i> is given in the middle portion of <i>rajbhog</i> and the sweetmeat is called <i>kheermohon</i> .
12	<i>Komla/Komlabhog/Danadar</i>	A product made from <i>chhana</i> and boiled in sugar syrup until it reached light brown color. Granular <i>khoa/maowa</i> is spread on it.
13	<i>Gopalbhog, Dagorbhog, Nobabibhog, Badshahbhog, Katthalibhog,</i>	All products are made from large <i>chhana</i> balls cooked in sugar

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	<i>Japanibhog, Indranibhog, Pestabhog, Kataribhog</i>	syrup and cut in two part and varied in color, size, garnishing.
14	<i>Iranibhog</i>	Sweetmeat made from <i>chhana</i> (cooked in sugar syrup (thinner than that used in <i>Rosogolla</i> making)) having a richer and creamier texture with saffron induced flavor. The sweetmeat is partially soaked in <i>malai</i> and <i>maowa</i> is spread over it.
15	<i>Malaipetis/Malaichop/Jafranbhog</i>	Firstly, the <i>chhana</i> based sweetmeat is cooked in <i>ross</i> (thin sugar syrup) for 10 minutes and after that it is soaked in for <i>ross</i> 1 day. On the next day the <i>malai</i> is prepared and squeeze out the <i>ross</i> from the sweetmeat and is soaked in <i>malai</i> .
16	<i>Chomchom</i>	Sweetmeat is made from <i>chhana</i> balls and boiled in sugar syrup for 40 minutes until a pleasant light brown color appeared.
17	<i>Porabarir Chomchom</i>	The cooking process of this sweetmeat is the same as <i>chomchom</i> but here the boiling is more intense than <i>chomchom</i> . After boiling it is submerged in sugar syrup until it is dispensed.
18	<i>Maowa Chomchom</i>	A variety of <i>chomchom</i> where cooking process is same as <i>chomchom</i> and <i>maowa</i> is spread over it.
19	<i>Mouchak</i>	<i>Chomchom</i> cut into two halves transversely and forms U-shape. A milk base product made from <i>chhana</i> , all-purpose flour and sugar.
20	<i>Malaichomchom/Kheerchomchom</i>	The cooking process of this sweetmeat is the same as the <i>mouchak</i> , and <i>malai</i> is used to cover the cut surface.
21	<i>Malaikari</i>	Sweetmeat made from <i>chhana</i> (like <i>komlabhog</i> but elongated in shape) which is cut longitudinally in equal two halves. Thicker <i>malai</i> (but not <i>kheer</i>) is applied on the cut surface.
22	<i>Lengcha</i>	Like <i>chomchom</i> , <i>lengcha</i> is boiled in thin sugar syrup. But it is softer than <i>chomchom</i> . <i>Maowa</i> is sometimes spread over it, but it is not mandatory.
23	<i>Dudh balushai</i>	Sweetmeat made from <i>chhana</i> ball and fried in ghee or oil like <i>kalojam</i> . Soaked in thin sugar syrup and eventually take out of the syrup and <i>Maowa</i> is spread over it.
24	<i>Raghobshahi</i>	Sweetmeat made using evaporated milk. Evaporated milk is poured in tray and wait until it turns into semi solid form. When it cools down, the <i>kheer</i> is spread over it and waits for 10-15 minutes to cool down. After 10-15 minutes, it is cut into pieces.
25	<i>Dry Balisha</i>	<i>Chhana</i> based sweetmeat, golden brown in color obtained by cooking in sugar syrup and not soaked in sugar syrup. <i>Maowa</i> is spread over it.
26	<i>Hashikhushi/Baby sweets</i>	Small delight sweetmeat made from <i>chhana</i> in different color. Sometimes, food color is used.

27	<i>Rasomalai / Roshmunjuri</i>	Sweetmeat made from small <i>chhana</i> balls. <i>Chhana</i> balls are boiled in sugar syrup and soaked in premade <i>malai</i> .
28	<i>Channamurki/ Shornomukhi</i>	Sweetmeat made from small <i>chhana</i> balls and boiled in thin sugar syrup. After that, soaked in sugar syrup overnight.
29	<i>Shor Roll</i>	Long sponge sweetmeat where its middle portion is cut into thin pieces. After that cream is given in one portion and rolled.
30	<i>Shormalai</i>	Spongy sweetmeat made from <i>chhana</i> and dipped in <i>malai</i> .
31	<i>Rice Pudding</i>	Firstly, the milk is boiled with cardamom and cinnamon until it gives a pleasant flavor. After that rice (frequently the variety used for <i>polao</i>) is given in the boiling milk in adequate amount (proportion to the amount of milk) and boiled until a thickened concentration appears. When the rice boiled adequately, sugar is added.
32	<i>Chhanarpolao</i>	Soda and flour are mixed with <i>chhana</i> and flakes are made, fried in ghee or oil for 30 minutes. After boiling it is kept in sugar syrup for several hours. Then it is taken out from sugar syrup and <i>Hashikhushi</i> sweetmeats are added (not mixed) with it.
33	<i>Peda Sandesh</i>	Milk is evaporated until solid form appeared and molded in round but flattened in shape.
34	<i>Sandesh</i>	Made from heat-acid curd of milk followed by cooking with added sugar and/or jaggery.
35	<i>Dudhiya/ Barfi sandesh</i>	A variety of <i>sandesh</i> where soft <i>chhana</i> is cut. Sugar is mixed with <i>chhana</i> and simmered in ghee or oil for 20-30 minutes. The sweetmeat is white in color.
36	<i>Roshkodom/ Krisnokodom/ Kodomdana</i>	Cooked <i>chhana</i> (with sugar) i.e. a kind of <i>sandesh</i> which is round having sugar granules on exterior and <i>hashikhushi/mawa</i> in the interior.
37	<i>Kacha Sandesh/Kacha golla</i>	<i>Chhana</i> is mixed with sugar and cooked. But it experienced less intense heating than the <i>barfi sandesh</i> .
38	<i>Ilishpeti</i>	Made by <i>khoa</i> and shaped like a piece from Hilsa fish.
39	<i>Maowa Laddu/Cream Laddu</i>	A variety of <i>laddu</i> made of <i>Bundia</i> (batter of <i>Lathyrus sativus</i> deep fried in oil in pearl shape, soaked in sugar syrup and then taken off the syrup) where <i>maowa</i> is mixed with it at the final steps of processing.
40	<i>Madraji golla</i>	Soft and delicious sweetmeat made from <i>chhana</i> balls by boiling in the sugar syrup and after that <i>kheer</i> and <i>maowa</i> are mixed and applied on the exterior.
41	<i>Monda</i>	Generally made from a mixture of <i>chhana</i> and sugar and flattening are done by throwing the round dough into the hot and soft state on a cloth laid on a clean hard surface.

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42	<i>Gur Monda</i>	The cooking process of this sweetmeat is the same as <i>monda</i> but in this case <i>gur/Jaggery</i> instead of sugar is mixed with <i>monda</i> .
43	<i>Badam Toast</i>	Toast soaked into concentrated milk and topped with different types of nuts.
44	<i>Doi/Special Doi(650gm)</i>	<i>Doi</i> is prepared from the fermentation of milk by adding bacterial cultures to the milk and incubated until it gets the desired thickness. Sugar is added for enhanced sweetness.
45	<i>Shahi doi (650gm)</i>	The cooking process is same as <i>doi/special doi</i> . But here milk is boiled comparatively less time than <i>doi/special doi</i> , so that milk color remains the same. It is less sweet than <i>doi/special doi</i> as the added sugar is less.
46	<i>Sugar free Shahi doi</i>	The cooking process is the same as <i>shahi doi</i> . But it is much thicker than <i>doi/special doi</i> . Having a thick layer on the top and no added sugar.
47	<i>Tok doi(500gm)</i>	<i>Tok doi</i> is prepared by the fermentation of milk. But here, the fermentation process is longer than any other kind of <i>doi</i> . And due to longer fermentation and no added sugar, it gets soured.
48	<i>Sada doi (650gm)</i>	The cooking process is the same as <i>tok doi</i> . But here the fermentation duration is comparatively less than the <i>tok doi</i> . Its sourness is less than <i>tok doi</i> .
49	<i>Cup doi (50gm)</i>	When <i>doi/special doi</i> or <i>shahi doi</i> or <i>sugar free shahi doi</i> or <i>tokdoi</i> or <i>sada doi</i> is set and served in a cup then it is called <i>cup doi</i> .
50	<i>Kheersha (650gm)</i>	Milk boiled with sugar until it gets a solid-like material that looks like <i>Doi</i> but is thicker than that.

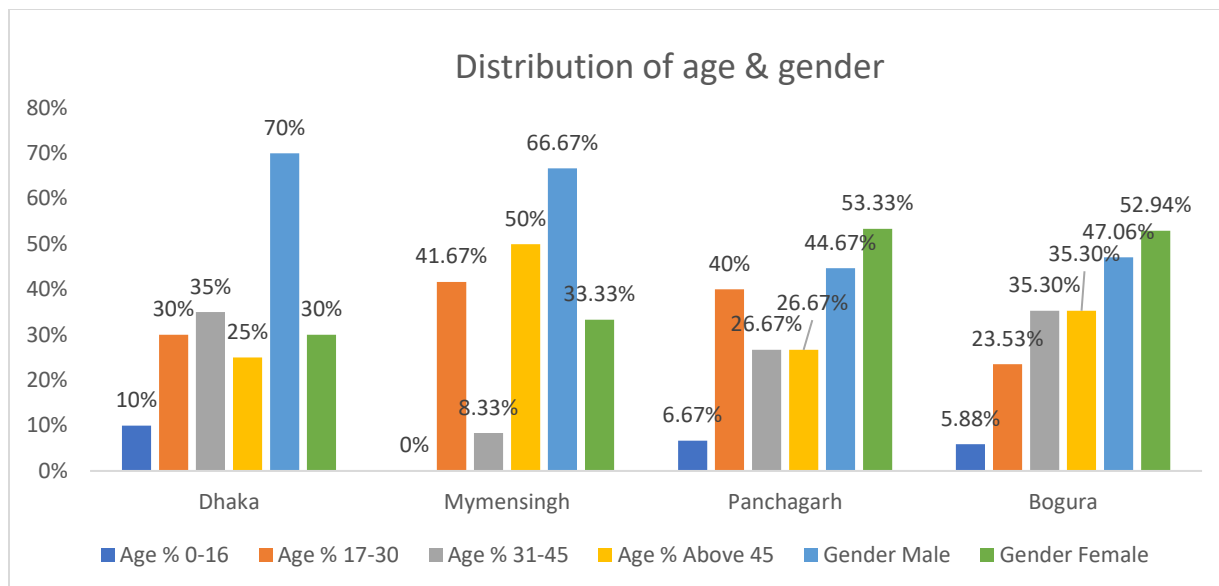


Fig 1: Distribution of age and gender

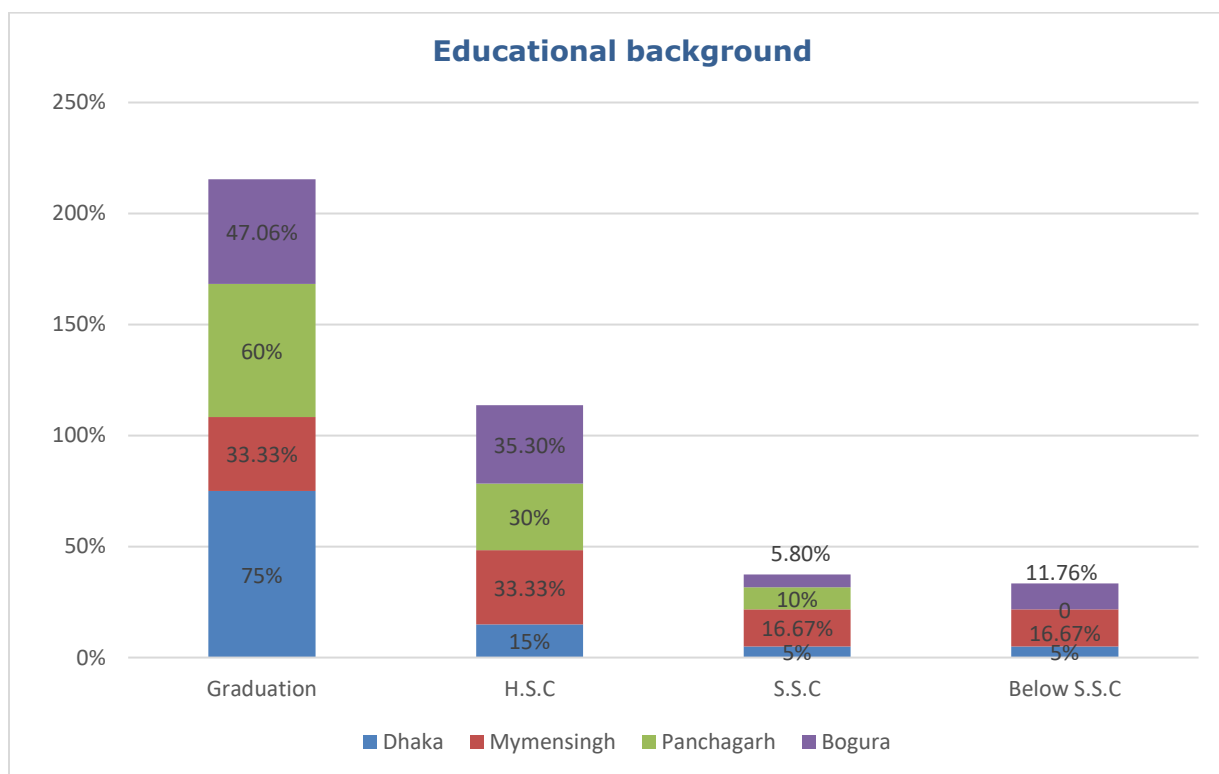


Fig 2: Educational background

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Table 2: Percentage of regular cow milk and milk product consumer

District name	Regular milk consumer%	Milk Source	Daily milk product consumer
Dhaka	100%	Cow Milk	100%
Mymensingh	41.67%	Cow Milk	83.33%
Bogura	76.47%	Cow Milk	94.12%
Panchagarh	70%	Cow Milk	56.67%

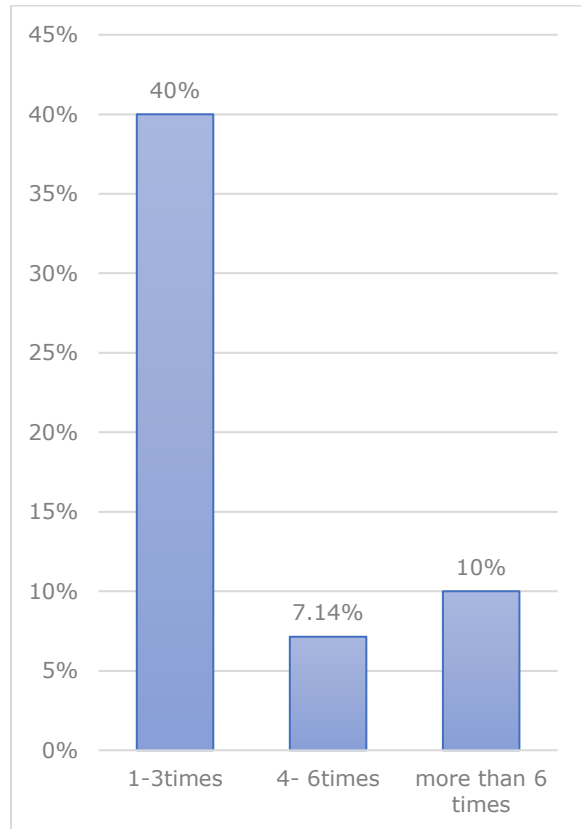


Fig 3: Milk products making per month

Milk and dairy products consumption and home making products

The survey indicates 100% of people in Dhaka, 83.33% in Mymensingh, 56.67% in Panchagarh, and 94.12% in Bogura, consumed milk and dairy products almost regular basis (Table 2). About 57.14% of people made different milk and dairy products according to their preferences at home. About 40% make various products for 1 to 3 times per month, 7.14% for 4 to 6 times and 10% for more than 6% per month (Figure 3). The rest of them are unwilling or have no time to spend time in product making for home consumption. They prefer to buy it rather than cook it. According to (Figure 4) about 21% person like to have *doi* which is the highest among the chart.

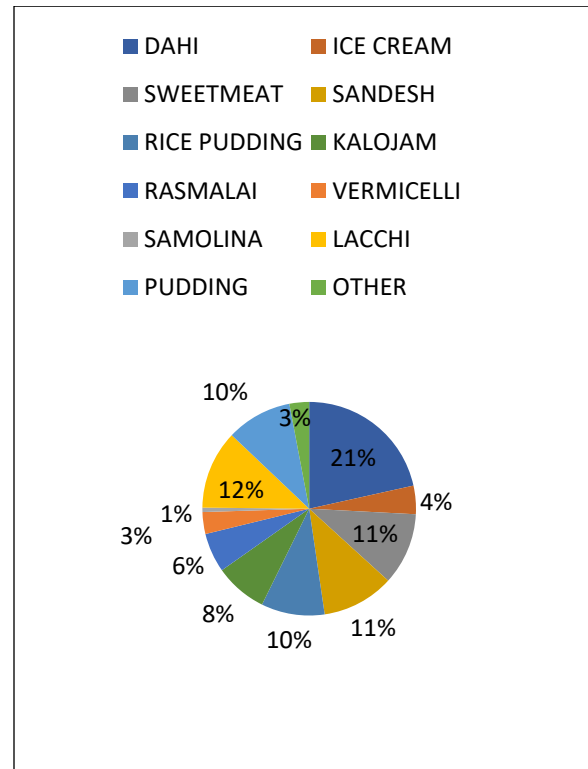


Fig 4: Consumers liking of milk and/or dairy products.

Milk, milk and dairy products consumption

Cow milk is the primary source of milk consumed across all districts (Table 3). In Dhaka, 100% of people consume milk regularly with no reported digestion problems. Whereas 70%, in Bogura with 3.33% digestion problem, & 70.47% in Panchagarh with 3.33% digestion problem, and the lowest consumption percentage in Mymensingh which is

44.67% but no respondents reported digestion problems.

Table 3: Milk and milk products digestion problem percentage

District name	Milk or milk products digestion problem percentage
Dhaka	0%
Mymensingh	25%
Bogura	0%
Panchagarh	3.33%

Products price in different districts

The study highlights substantial differences in the prices of sweetmeat products (Table 4) across the four districts. Popular sweetmeat products prices

such as *white golla*, *kalojam*, *roshogolla*, *mouchak*, *chomchom*, *sandesh*, *lalmohon*, *roshomalai*, *channa sandesh*, and *barfi* were collected and analyzed. The price ranges for these products differ considerably: Dhaka: 280–680 BDT, Mymensingh: 180–660 BDT, Bogura: 280–660 BDT, Panchagarh: 280–520 BDT. Bogura distinguishes for its wide variety of *doi* (yogurt), including special *doi*, *shahi doi*, *sada oi*, *tok doi*, *cup doi*, and *sugar-free doi*. Other districts primarily produce only two varieties: Special *doi* and *tok doi*. The price of *doi* also varies significantly: Dhaka: 300–400 BDT, Mymensingh: 30–230 BDT, Panchagarh: 260–280 BDT, Bogura: 35–350 BDT. The study identified several uncommon sweetmeat varieties, such as *gopalbhog*, *nobabibhog*, *badshahbhog*, *maowa chomchom*, and *kheer toast*, where milk is used as a primary ingredient. These products are made through diverse cooking processes, reflecting the rich culinary traditions of the regions.

Table 4: Product prices among the four districts

Sl No	Product name	District name											
		Dhaka			Bogura			Panchagarh			Mymensingh		
		Min price	Max price	Mean $\pm$ SD	Min price	Max price	Mean $\pm$ SD	Min price	Max price	Mean $\pm$ SD	Min price	Max price	Mean $\pm$ SD
1	<i>Kalojam/Jambhog</i>	300	500	400 $\pm$ 14.42	300	600	450 $\pm$ 12.13	300	320	310 $\pm$ 14.14	280	320	300 $\pm$ 8.28
2	<i>Rajbhog/Roshogolla/Roshbhog</i>	600	620	610 $\pm$ 14.14	320	400	360 $\pm$ 56.57	450	480	465 $\pm$ 21.21	330	350	340 $\pm$ 4.14
3	<i>Creamjam</i>	500	550	525 $\pm$ 35.36	400	700	550 $\pm$ 12.13	-	-	-	-	-	-
4	<i>Komla/Komlabhog/Danadar</i>	-	-	-	300	320	310 $\pm$ 14.14	-	-	-	280	280	280
5	<i>Mouchak</i>	360	400	380 $\pm$ 28.28	320	320	300	-	-	-	380	380	380
6	<i>Chomchom</i>	440	550	495 $\pm$ 77.78	320	400	360 $\pm$ 56.57	400	420	410 $\pm$ 14.14	280	500	390 $\pm$ 55.56
7	<i>Hashikhushi/Baby sweets</i>	400	430	415 $\pm$ 21.21	360	360	300	-	-	-	280	360	320 $\pm$ 6.57
8	<i>Roshkodom</i>	-	-	-	400	600	500 $\pm$ 41.42	-	-	-	-	-	-
9	<i>Sandesh</i>	450	500	475 $\pm$ 35.35	480	600	540 $\pm$ 84.85	500	520	510 $\pm$ 14.14	400	460	430 $\pm$ 2.43

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10	<i>Maowa Laddu/ Cream Laddu</i>	440	460	450± 14.14	200	200	200	-	-	-	250	250	250
11	<i>Dudhiya</i>	-	-	-	620	620	620	-	-	-	600	600	600
12	<i>Kheerbhog</i>	-	-	-	400	400	400	-	-	-	600	600	600
13	<i>Lalmohon</i>	400	420	410± 14.14	300	400	350± 70.71	380	400	390± 14.14	280	320	300±2 8.28
14	<i>Rashomalai</i>	500	550	525± 35.35	480	600	540± 84.85	400	420	410± 14.14	400	420	410±1 4.14
15	<i>Papri</i>	-	-	-	400	400	400	-	-	-	-	-	-
16	<i>Gopalbhog/ Dagorbhog</i>	500	550	525± 35.35	400	400	400	-	-	-	-	-	-
17	<i>Nobabibhog</i>	-	-	-	400	400	400	-	-	-	-	-	-
18	<i>Badshahbhog</i>	-	-	-	400	400	400	-	-	-	-	-	-
19	<i>Maowa Chomchom</i>	-	-	-	400	400	400	-	-	-	-	-	-
20	<i>Golapjam</i>	500	550	525± 35.35	400	400	400	-	-	-	-	-	-
21	<i>Kosturibhog/ Kathalibhog</i>	420	450	435± 21.21	400	400	400	-	-	-	-	-	-
22	<i>Malaichomchm /Malaikari/ Khirchomchom</i>	400	450	425± 35.35	400	400	400	400	450	425 ±35. 36	330	450	390±8 4.85
23	<i>Jamairaja</i>	-	-	-	400	400	400	-	-	-	-	-	-
24	<i>Kheer Toast</i>	-	-	-	400	600	500±1 41.42	-	-	-	480	600	540±8 4.85
25	<i>Dudhmohon</i>	-	-	-	400	400	400	-	-	-	-	-	-
26	<i>Balushai</i>	280	300	290± 14.14	400	400	400	-	-	-	-	-	-
27	<i>Channamurki</i>	420	450	435± 21.21	450	450 30	450	-	-	-	-	-	-
28	<i>Kodomdana/ Roshkodom</i>	450	500	475± 35.35	500	500	500	-	-	-	300	300	300
29	<i>Kataribhog</i>	540	600	570± 42.42	600	600	600	-	-	-	-	-	-
30	<i>Dudh balucha</i>	620	650	635± 21.21	-	-	-	-	-	-	300	300	300
31	<i>Pranhara</i>	-	-	-	600	600	600	-	-	-	-	-	-

32	<i>Shornomukhi</i>	-	-	-	600	600	600	-	-	-	-	-	-
33	<i>Raghobshahi</i>	-	-	-	600	600	600	-	-	-	-	-	-
34	<i>Kheermon</i>	-	-	-	600	600	600	-	-	-	450	450	450
35	<i>Shorporiya Sandesh/ Channa</i>	450	580	515± 91.92	600	600	600	450	480	465± 21.21	-	-	-
36	<i>Ilishpeti</i>	-	-	-	600	600	600	-	-	-	600	600	600
37	<i>Dry Balisha</i>	300	350	325± 35.36	-	-	-	-	-	-	-	-	-
38	<i>Peda Sandesh</i>	560	600	580± 28.28	600	600	600	-	-	-	-	-	-
39	<i>Lengcha</i>	540	580	560± 28.28	580	700	640± 84.85	-	-	-	340	350	345±7 .07
40	<i>Iranibhog</i>	-	-	-	600	600	600	-	-	-	650	650	650
41	<i>Japanibhog</i>	-	-	-	600	700	650± 70.71	-	-	-	-	-	-
42	<i>Dudhraj</i>	-	-	-	600	600	600	-	-	-	-	-	-
43	<i>Kacha Sandesh</i>	-	-	-	-	-	-	-	-	-	640	640	640
43	<i>Kachagolla</i>	600	620	610± 14.14	600	600	600	-	-	-	600	660	630±4 2.42
44	<i>Barfi</i>	480	500	490± 14.14	600	600	600	450	470	460 ±14. 14	600	600	600
45	<i>Indranibhog</i>	-	-	-	-	-	-	450	480	465± 21.21	-	-	-
46	<i>Malaipetis</i>	440	460	450± 14.14	-	-	-	-	-	-	-	-	-
47	<i>Pestabhog</i>	550	570	560± 14.14	560	600	580± 28.28	-	-	-	-	-	-
48	<i>Malaichop</i>	-	-	-	560	31 600	580± 28.29	-	-	-	-	-	-
49	<i>Jafranbhog/ Jafrani</i>	-	-	-	600	600	600	-	-	-	520	520	520
50	<i>White Sweet</i>	280	300	290± 14.14	300	320	310± 14.14	280	300	290± 14.14	-	-	-
51	<i>Shor Roll</i>	540	560	550± 14.14	-	-	-	-	-	-	600	600	600

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52	<i>Madraji golla</i>	640	680	660± 28.28	-	-	-	-	-	-	-	-	-
53	<i>Shormalai</i>	-	-	-	-	-	-	-	-	-	650	650	650
54	<i>Rice Pudding</i>	-	-	-	-	-	-	300	320	310± 14.14	-	-	-
55	<i>Monda</i>	-	-	-	-	-	-	-	-	-	600	660	630±4 2.43
56	<i>Gur Monda</i>	-	-	-	-	-	-	-	-	-	600	660	630±4 2.43
57	<i>Krisnokodom</i>	-	-	-	-	-	-	-	-	-	280	280	280
58	<i>Channarpolao</i>	-	-	-	-	-	-	-	-	-	350	360	355±7 .07
59	<i>Porabarir Chomchom</i>	440	480	460± 28.28	-	-	-	-	-	-	280	280	280
60	<i>Roshmunjuri</i>	540	560	550± 14.14	-	-	-	-	-	-	-	-	-
61	<i>Special Doi (650gm)</i>	350	400	375± 35.35	280	300	290± 14.14	280	300	290± 14.14	180	230	205±3 5.36
62	<i>Shahi doi (650gm)</i>	-	-	-	300	350	325± 35.36	-	-	-	-	-	-
63	<i>Sada Doi(650gm)</i>	-	-	-	200	280	240± 56.57	-	-	-	240	240	240
64	<i>Tokdoi (500gm)</i>	300	320	310± 14.14	180	200	190± 14.14	260	280	270± 14.14	120	140	310±1 4.14
65	<i>Badam Toast</i>	-	-	-	-	-	-	-	-	-	440	-	440
66	<i>Kheersha (650gm)</i>	-	-	-	520	700	610± 127.2 8	-	-	-	-	-	-
67	<i>Cup doi</i>	-	-	-	35	50	42.50± 10.61	-	-	-	30	30	30
68	<i>Sugarfree Shahi doi</i>	-	-	-	300	300	300	-	-	-	-	-	-

Milk requirement (Liter/day)

There is variation in the case of regular milk requirement across the districts. The milk requirements (Table 5) shows Bogura has the

highest milk requirement (2240 liters), while Panchagarh has the lowest (10 liters). This variation is likely due to differences in shop size, customer demand, and production capacity.

Table 5: Sweetmeat shops information

District Name	Milk requirement	Source of Milk	Milk requirement per product per day:	Regulation Institutes	sweetmeats sell per
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	per day (Litre)						Certificate				day(kg):		
	Low est	High est	Own Farm	Own chilli ng cent er	Other Dairy Farm	Unkn own	Sweetmeat		Doi		lowe st	High est	
							Low est	High est	low est	High est			
Dhaka	40	600	40%	N/A	55%	15%	20	450	20	150	100%	8	220
Mymensingh	80	320	N/A	N/A	100%	N/A	-	-	-	-	100%	20	200
Bogura	150	2240	22.22%	11.11%	77.78	0%	38	1700	110	1680	100%	20	560
Panchagarh	10	200	N/A	N/A	100%	N/A	170	8	5	50	100%	5	60

Source of milk for making various products

Sweetmeat shops in the four districts source their milk from different dairy farms near the shop or factory, chilling centers, or their own farms. However, some shops do not produce their own products; instead, they purchase pre-made items from other shops, especially those with low daily sales. Most of the owners who collected milk from other farms primarily sourced their milk from specific regions within the districts, such as Nokla Bazar in Mymensingh, Shibganj in Bogura, Aloakhua Union in Panchagarh, and Manikganj in Dhaka.

Milk requirement for product (Liter/day)

This study divided the product between Sweetmeat and *doi*. The period of data collection, the researcher

noticed that in the Dhaka district, the maximum milk required for sweetmeat per day is about 450 liters and for *doi* it's about 150 liters, and the minimum milk required per day for sweetmeat and *doi* is about 20 liters. In the Mymensingh district's case, the sweetmeat shop employee was not ready to provide sufficient information about the milk required for Sweetmeat and *doi*. In another district of Bogura, the maximum milk required for Sweetmeat per day is about 1700 liters, and for *doi* about 1680 liters. And minimum amount of milk required for Sweetmeat and *doi* is about 38 and 110 liters respectively. That is the highest amount of milk used for products compared to other districts. In Panchagarh district maximum milk required for sweetmeat is about 170 liters, which is 50 liters for *doi*. The minimum milk required for Sweetmeat is about 8 liters and for *doi* it is about 5 liters. That is the lowest amount of milk used in products compared to other districts (Table 5).

Table 6: Regulation certificates of different districts

	District Name			
	Dhaka	Mymensingh	Bogura	Panchagarh
Regulatory Certificates	BSTI VAT	BSTI VAT	BSTI VAT	Trade License Public Health
		Trade license	Trade License GMO HACCAP TIN Environment Bangladesh Food Safety Authority Fire License	

*BSTI=Bangladesh Standards and Testing Institution; TIN=Tax Identification Number; VAT=Value Added Tax; HACCP=Hazard Analysis and Critical Control Point; GMO=Genetically Modified Organisms; DAM=Department of Agricultural Marketing

Regulation certificate

All the shops of these four districts possess necessary regulation certificates like Tax Identification Number (TIN), Value Added Tax (VAT), Trade license, etc. However, Bogura shops owner carried additional certificates like Hazard Analysis and Critical Control Point (HACCP),

Genetically Modified Organisms (GMO) license, Bangladesh Food Safety Authority license, Bangladesh Standards and Testing Institution (BSTI), Department of Agricultural Marketing (DAM) License, Fire License, etc. (Table 5 and Table 6). This indicates a higher level of

compliance with food safety and quality standards in Bogura compared to the other districts.

Sweetmeats sell (kg/day)

The daily sales of sweetmeats differ significantly across the districts (Table 5): Dhaka: 8–220 kg/day, Mymensingh: 20–200 kg/day, Bogura: 20–560 kg/day, Panchagarh: 5–60 kg/day. Bogura has the highest daily sales (560 kg), while Panchagarh has the lowest (5 kg). This reflects differences in consumer demand and market size.

Conclusion

The study mainly helps introduce our native sweetmeats with their individuality and distinct names. It also included the current status of the surveyed districts. It also illustrated the national regulation certificates owned by the sweetmeat shops with their milk collection sources. Further, it included the personal preferences of the surveyed people regarding their milk and milk product consumption regularity. The survey also conveys the message of homemade milk products and their regularity. The study recommends conducting further surveys across districts to better understand regional milk consumption variations in the sweetmeat sector, identify key influencing factors, and support the sustainable growth of the dairy industry.

Authors contribution

Elena Hoque Raka: Data collection, curing, processing, writing original draft and correction; Layabin Lota: Data collection, curing, processing, writing manuscript; Shafayat Rahman Shaon: Data collection, curing, processing, writing manuscript; Mohammad Ashiqul Islam: Conceptualizing, facilitating the data collection and finalizing the manuscript.

Data availability

Data will be available on reasonable request.

Conflict of interests

The authors disclose no conflicts of interest in publishing this research.

Consent for publication

All the authors agreed and decided to publish this article in the Bangladesh journal of Animal Science.

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