**A Study on milk consumption pattern among the rural farmers in Noakhali, Bangladesh**

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**By:**

**Md. Nazmul Islam**

**Roll No: 17/56**

**Registration No: 01892**

**Intern ID: 47**

**Session: 2016-17**

**Faculty of Veterinary Medicine**

**Chattogram Veterinary and Animal Sciences University  
Khulshi, Chattogram – 4225, Bangladesh**

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**Approved by:**

Ms. Shahnaz Sultana

Professor

Department of Agricultural Economics and Social Science

**Faculty of Veterinary Medicine**

**Chattogram Veterinary and Animal Sciences University  
Khulshi, Chattogram – 4225, Bangladesh**

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**Statement of Author**

I, Md. Nazmul Islam, hereby declare that I have successfully completed all of the duties listed in this report and submitted on 14th September, 2022. Books, regional and worldwide publications, and other sources were used to collect the data. The required citations have all been made. As a result, I am entirely accountable for gathering, processing, maintaining, and disseminating all information gathered for this report.

The Author

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**Abstract**

Milk serves as an essential source of protein for people of all ages. Bangladeshi farmers in the rural areas are less likely to know the advantages of drinking milk. The current cross-sectional study set out to determine how much knowledge there was about milk consumption practices among rural farming families in the Noakhali Sadar Upazila. All told, thirty farmers were interrogated in order to learn more about their awareness of the dangers of consuming raw milk as well as their perception of its significance. Approximately 73% of agricultural families drink milk daily and 73% of the families who drink milk daily consume the milk produced in their own farm. It is observed that there is variation in the time of having milk, 52% families prefer to have milk at night. However, it is concerning that 63% of respondents were unaware of this fact regarding the recommended daily intake of milk. There is lacking of knowledge regarding the raw milk consumption. Even though drinking raw milk can lead to a variety of health issues, including abdominal pain (32%), coughing (24%), vomiting (24%) and diarrhea (19%), still 13 families continue to do so. The results of this study indicate that rural farmers' ignorance may have prevented them from developing the practice of consuming boiled hygienic milk. It is advised that veterinarians, extension agents, and all other stakeholders play their respective parts to increase the rural farmer's understanding.

**Keywords:** dairy, rural farmers’ family, knowledge, health issue, raw milk

**Introduction**

Milk lacks iron, copper, and vitamin C, thus it isn't quite the perfect meal. Milk is defined as the whole, fresh, clean, lacteal secretion obtained by the thorough milking of one or more healthy milk animals, excluding that obtained within 15 days prior to or 5 days following calving or such periods as may be necessary to practically render the milk colostrum-free, and containing the minimum prescribed percentage of milk fat and milk-solids-not-fat. (Sukumar De, 2013)

Due to its high water content, relatively neutral pH, and range of readily available vital elements, milk is a complex biological fluid and, by its very nature, is an ideal growth medium for many bacteria. (Teshome, 2013). As a result, spoilage of milk is possible. It is crucial to keep in mind that different health problems may arise based on how milk is stored.

For the proper development and upkeep of human and animal bodies, milk offers all of the necessary and digestible building blocks. (Pandey and Voskuil, 2011). Therefore, milk is crucial for people of all ages to consume for their health. When farming in the Middle East started to supplant hunting and gathering, milk was first used for human sustenance some 11,000 years ago. In order to digest the milk sugar lactose, which was indigestible for adults, cattle herders first started fermenting milk to make yoghurt and cheese. (Curry, 2013).

Chicago was the first US city to adopt pasteurization regulations for cow's milk in 1908. (Except for cows that were certified tuberculosis-free). However, political bickering and a disagreement over "pure milk" (raw milk) vs "purified milk" delayed its full adoption in Chicago by 8 years (pasteurized milk). Around that time, public health professionals started to have serious concerns about the possibility of human-to-cattle TB transmission through cow's milk. Up to 10% of TB cases in humans were thought to be brought on by milk drinking by the year 1900, and in 1910 an epidemic of the disease raged through Illinois, affecting over 300,000 animals. (Czaplicki, 2007). People continue to often ingest raw milk in rural regions. The hazardous, disease-causing bacteria, viruses, and parasites present in raw milk have not been destroyed by pasteurization. Although many select raw milk in the mistaken belief that it would enhance their health, it can instead make anyone seriously unwell. Mycobacterium tuberculosis, campylobacter sp., Escherichia coli, Listeria sp., Salmonella sp., and many more bacteria are a few of the pathogens connected to raw milk outbreaks. There is a misconception that drinking raw milk is healthier than drinking pasteurized milk, however the majority of the nutritional advantages of drinking raw milk can be obtained from pasteurized milk without the danger of disease that comes with drinking raw milk. (Center for Disease control and Prevention, Food Safety, Raw milk danger). Therefore, this study discusses about how the rural farmer's family where the milk is produced is ignorant of the health risks associated with drinking raw milk.

**Objectives**

This study includes consumption pattern of milk in the rural farmers’ family to detect the unhealthy practices of milk consumption and knowledge about the detrimental effect of raw milk consumption. The other objective of this study to reveal the insufficiency of knowledge regarding habit of milk consumption at daily basis.

**Materials & Method**

**Study area and period**

The study was conducted at Noakhali Sadar, Noakhali. Sadar is an Upazila of Noakhali District in the division of Chittagong, Bangladesh. Noakhali Sadar Upazila has a total area of 336.06 square kilometers (129.75 sq. miles) (Bangladesh Bureau of Statistics, District Statistics: Noakhali, 2011).It borders Begumganj Upazila to the north, Kabirhat Upazila to the east, Suborno Char Upazila to the south, and Komolnagar and Lakshmipur Sadar upazilas of Lakshmipur District to the west. There are 10 unions, 163 villages in this upazila (Bhuiya & Rahman, 2012). The study period was from 17th February to 28th April, 2022.

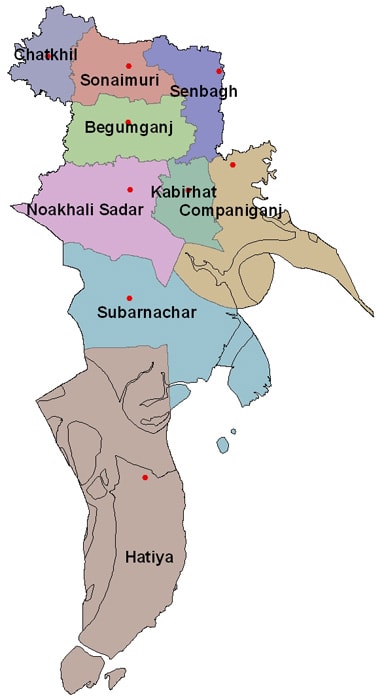


Figure 01: Map of Noakhali District (The red arrow mark indicating the study area, Noakhali Sadar)

**Participants of the study**

The participants who participated in this study had some basic criteria. All the participants are rural dairy farmers of Noakhali Sadar Upazila who have minimum three cattle. The data was collected at their own farm. Total 30 rural farmers participated in this study.

**Questionnaire design & data collection**

The study was conducted based on a cross-sectional study. The data for this cross-sectional study were collected using a standardized questionnaire. Using the questionnaire, data was collected through interview physically. The questionnaire was prepared based on some similar research in other countries and the objectives of this study. This questionnaire was examined by an expert supervisor and livestock extension officer (LEO) of Upazila Veterinary Hospital (UVH), Noakhali Sadar. Some farmers filled up the form independently, but the survey conductor explained and translated every question into the native language. In case of remaining farmers, the survey conductor collected the data through interview. Farmers willingly participated in the survey and had the option to opt out at any moment.

**Data analysis**

The collected data were sorted and imported into Microsoft Excel (Microsoft 365 Apps for Enterprise). Descriptive statistics were adopted with Stata MP 16.0\_SS\_2019 & Microsoft Excel, mainly to demonstrate the results per the objective of the study.

**Result & Discussion**

Demographic characteristics of respondents:

The respondents were the farmers of Noakhali Sadar Upazila. Table-01 shows that the educational status of those farmers vary. 27% of them completed the secondary standard, 23% completed primary level, 17% completed higher secondary, 17% completed graduation and 16% has done post-graduation. Table-02 shows that 57% of them are single family and 43% are combined family. In table-03, it is indicated that 26% of them are large farmers.

Table-01: Educational qualification of the farmers

|  |  |  |  |
| --- | --- | --- | --- |
| Educational level | Frequency | Percentage | Cumulative Frequency |
| Primary | 07 | 23% | 07 |
| Secondary | 08 | 27% | 15 |
| Higher Secondary | 05 | 17% | 20 |
| Graduation | 05 | 17% | 25 |
| Post-Graduation | 05 | 16% | 30 |
| Total | 30 | 100% |  |

Table-02: Family type of the farmers

|  |  |  |  |
| --- | --- | --- | --- |
| Types of family | Frequency | Percentage | Cumulative Frequency |
| Single | 17 | 57% | 17 |
| Combined | 13 | 43% |  |
| Total | 30 | 100% |  |

The farmers can be categorized into three categories according to the number of animals in their farms:

1. Small Scale farmers: Have 2 – 5 animals
2. Medium Scale farmers: Have 6 – 15 animals
3. Large Scale farmers: Have more than 16 animals

Table-03: Types of farmers according to their farm size

|  |  |  |  |
| --- | --- | --- | --- |
| Types Of farmers | Frequency | Percentage | Cumulative Frequency |
| Small | 11 | 37% | 11 |
| Medium | 11 | 37% | 22 |
| Large | 8 | 26% | 30 |
| Total | 30 | 100% |  |

Consumption of milk in the farmers’ family:

Every person should consume 250 ml milk/day (Demand of milk, Livestock economy 2020-21, DLS, Bangladesh). Among the 30 farmers, 11 farmers did not know about this information and the remaining ones knew. So it is praiseworthy fact that majority percentage (63%) of the farmers have the knowledge (Indicated in figure 02)

Figure 02: Knowledge about the daily consumption of milk in the farmers’ family

It is demonstrated in figure 03 that among the 30 farmer families, 22 families (73%) consume milk on a daily basis where 8 families (27%) don’t. The 22 families who drink milk, have variations in the amount. Among the 22 families, 74% of the families drink half glass milk (125ml) daily, 20% drink one glass (250ml) daily and 6% drink 2 glass (500 ml) daily. As cow’s milk includes a complex combination of macronutrients, micronutrients, and growth-promoting factors that can contribute to human nutrition (Willett & Ludwig, 2020), so it is praiseworthy fact that those families are trying to keep a sound health.

Figure 03: Frequency and amount of milk in the farmers’ family

Figure 04: Food stuffs consumed with milk

Figure 04 shows that, total 9 families (32%) consume milk with biscuits, 5 families (23%) with rice, 3 families (14%) with horlics, 2 families (9%) with puffed rice, 2 families (9%) with bread and 5 families (23%) with nothing. Their preferable time for milk consumption also varies. Figure 05 explains that among 22 families who consume milk, 16 families (73%) consume the milk produced from their own farm and 6 families (27%) consume the market milk as their average milk production in the farm is not optimum. They sell the whole amount of milk produced in the farm to meet up the economic crisis running in their family. According to a study finding people of urban areas mainly depends on the market milk and the people of rural areas collect milk for drinking from both farm and market (Halder & Barua, 2003). Again the 22 families who consume milk daily have different choice of food stuffs to have with milk e.g., biscuits, horlics, rice, puffed rice, bread etc. Figure 06 shows that 12 families (54%) prefer to drink milk at night, 7 families (32%) in the morning & 3 families (14%) in the afternoon.

Figure 05: Source of milk for consumption

Figure 06: Preferable time for milk consumption

Figure 07: Reasons for not drinking milk daily

There is also found that, in the study population of 30 farmer families, 8 families don’t consume milk at a daily basis. The reasons behind this practice of those farmers are shown in figure 07.There are 4 reasons behind this: a) 02 families (25%) don’t drink milk as they have less milk production in the farm due to lack of milk producing cows or high yielding breed of cow, b) 03 families (37.5%) think it causes extra money to drink milk daily which may contribute in shortage of monthly budget to run their family, c) 02 families (25%) had economic crisis and they are too poor to spend money on drinking milk daily, thus they usually sell the whole volume of milk produced in their farm, d) 03 families (37.5%) think it is not so necessary to drink milk as they are fine without drinking it. In a study held in Mymensingh, Bangladesh, it is found that the main factor of not drinking milk is the income level of a family (Jabbar & Raha, 1984), which reflects this study result.

Raw milk consumption:

Frequency of raw milk consumption in Noakhali Sadar is an alarming issue. Among the 30 farmer families, total 13 families have the habit of having the milk without boiling or pasteurization that means they consume raw milk directly. For this habit, these 13 families sometimes suffer from different health issues, such as abdominal pain, diarrhea, vomition, coughing etc. In figure 08, among these farmers, after raw milk consumption, 33% felt abdominal pain, 24% faced coughing, 24% had vomition tendency & 19% suffered from diarrhea pain. A previous research finding is that 38% of the respondents had abdominal pain after raw milk consumption (Reza et al., 2021).There are variety of reasons lying behind this habit. According to figure 09, 04 families (31%) think raw milk provides more energy, 05 families (38%) think it is more nutritious, 05 families (38%) think it is tastier than pasteurized or boiled milk, even 2 families (15%) think that it increases the sexual vigor. According to a study held in coastal belt of Bangladesh, 79% of consumers believe that raw milk is more nutritious than heat processed or pasteurized milk (Reza et al., 2021). But it is highly appreciable that many people know about the hazardous effects of raw milk consumption. They are gaining the knowledge about it from many sources such as television, UVH, academic study, Facebook, YouTube and even from their children who learnt it from the school. In table – 04, it is tabulated that 04 families (13%) got to know about this information through television, 03 families (10%) from UVH, 03 families (10%) through YouTube, 02 families (07%) through Facebook, single family (03%) during their academic study and 02 families (07%) from their school going children. But it is alarming that 15 families (50%) have no idea about the detrimental effects of raw milk consumption.

Table – 04: Source of knowledge about the effects of raw milk consumption

|  |  |  |  |
| --- | --- | --- | --- |
| Source of knowledge | Frequency | Percentage | Cumulative Frequency |
| Television | 04 | 13% | 04 |
| YouTube | 03 | 10% | 07 |
| Facebook | 02 | 07% | 09 |
| UVH | 03 | 10% | 12 |
| Academic study | 01 | 03% | 13 |
| School going children | 02 | 07% | 15 |
| No Knowledge | 15 | 50% | 30 |
| Total | 30 | 100% |  |

Figure 08: Problem raised in the farmers family members through raw milk consumption

There are some farmers who drink milk from cows with mastitis, according to the study's population. Consumption of raw or unpasteurized milk poses the highest danger of high Somatic cell count (SCC) which is hazardous for human health. SCC are prevalent in great numbers in the milk of cows that have mastitis. (Oliver et al., 2005). Pasteurized milk is obtained by heating milk for a minimum time of 15 sec (at a temperature of 72°C) or 30 min (at a temperature of 63°C) (Karmakar et al., 2020). As no farmers in this study population do mastitis test in their farm, so there is a high risk of mastitis prevalence in the farm. Direct transmission of viable infections and their toxins from the milk of infected animals to humans is possible. The environment of the cow is home to a wide range of human diseases, such as *Listeria monocytogenes, Campylobacter jejuni, and Salmonella dublin*. (Oliver et al., 2005). These bacteria are frequently pathogens or a typical component of dairy cow flora. *Mycobacterium avium subsp. paratuberculosis*, linked to Johnes in cattle and identified from people with Crohn's disease, has been suggested to be able to withstand several common milk pasteurization techniques. The spread of live pathogens from milk of diseased mammary glands to people can be effectively avoided by properly pasteurizing milk. Pasteurization decreases the amount of live bacteria, however it frequently does not counteract the harmful effects of the toxins created by mastitis infections. (Sharma et al., 2011)

Figure 09: Reasons of having raw milk

**Conclusion**

According to this study, many farmers of Noakhali Sadar Upazila do not consume milk due to lack of the knowledge regarding the beneficial aspects of milk. Different government and non-government organizations should come forward to play a vital role in this sector. Even today still some farmers’ family consume raw milk for lack of consciousness. UVH can arrange some seminars and training program to raise awareness in the rural farmers’ family to meet up their protein demand and also to build up the knowledge about the detrimental effects of raw milk consumption.

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**Strength and Limitations of this study**

This study's respondents came from different locations, and they ranged in age, income, and educational attainment, allowing the study's conclusions to be generalized to the overall community. Additionally, the respondents were interrogated in-person for the sample of this study. To eliminate random mistakes, face-to-face questionnaire collecting enables researchers to confirm that respondents completed the survey and cross-check survey responses. This study does have some drawbacks. The research duration was constrained, and it could only be done in a certain location. Because of this, the results might not accurately represent the entire nation.

**Data availability statement**

The author personally used a questionnaire to gather the data, which was then entered in an excel document that was kept on the author's computer. No one has access to the information save the author (both soft and hard copy). Thus, the information is completely trustworthy and bias free.

**Competing interests**

There is no conflict of interest because the author personally conducted the study.

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**Appendix**

**Questionnaire**

1. General Information

|  |  |
| --- | --- |
| 1. Name of the farmer: |  |
| 1. Mobile No.: |  |
| 1. Address: |  |
| 1. Educational qualification: | Primary/ Secondary/ Higher Secondary/ Graduation/ Post-graduation |
| 1. Types of family: | Single/ Combined |
| 1. No. of family members: |  |

1. Farm related Information

|  |  |
| --- | --- |
| 1. Location of the farm: |  |
| 1. No. of cattle in the farm: |  |
| 1. Tests done in farm: | Mastitis/ TB test/ No test is done |
| 1. Avg. production of milk/cow/day (in litter): |  |

1. Milk consumption related information: (Knowledge)

|  |  |
| --- | --- |
| 1. Do you know that every adult person should drink 250 ml milk every day? | Yes/ No |
| 1. Do you know that raw milk can cause detrimental effects to our health? | Yes/ No |

1. Milk consumption related information: (Practice)

|  |  |
| --- | --- |
| 1. Do your family members drink milk daily? | Yes/ No |
| 1. How many times do your family members drink milk in a day? | Once/ Twice/ Thrice |
| 1. Usually in which your family members prefer to drink milk? | Morning/ Afternoon/ Night |
| 1. What do you like to have with milk? | Biscuites/ Horlics/ Puffed rice/ Bread/ Rice/ Something else/only milk is consumed |
| 1. What is the source of milk that you drink from? | Own farm/ Market milk |
| 1. How much milk do your family members drink daily? | 2 glass/ 1 glass/ Half glass |
| 1. If you do not drink milk, then what is the reason behind this? | 1. It causes extra cost 2. I don’t think that drinking milk daily is necessary for our health 3. Family has economic crisis 4. Less milk production in the farm |

1. Raw milk consumption related information: (Knowledge)

|  |  |
| --- | --- |
| 1. Do you know that raw milk consumption can cause detrimental effects to our body? | Yes/ No |
| 1. How did you about the detrimental effects of raw milk consumption? | 1. Television 2. YouTube 3. Facebook 4. Academic study 5. Upazilla Veterinary Hospital 6. School going children of the family 7. No Knowledge |
| 1. Do you know that we must boil the milk before drinking it? | Yes/ No |

1. Raw milk consumption related information: (Practice)

|  |  |
| --- | --- |
| 1. Do you or your family members have the habit of drinking raw milk? | Yes/ No |
| 1. Do the children of your family consume raw due to their curiosity? | Yes/ No |
| 1. If you have ever drunk raw milk, then what is the reason behind this? | 1. Raw milk is more tasty than boiled milk 2. It provides more energy 3. It is more nutritious 4. It increases sexual vigour 5. No enough time for boiling |
| 1. What kind of abnormality have you faced after drinking raw milk? | 1. Abdominal pain 2. Coughing 3. Vomition 4. Diarrhea |

**Biography of Author**

I am Md. Nazmul Islam, the second child of Md. Tazul Islam Islam and Mrs. Nazma Sultana, and I am graduating with a Doctor of Veterinary Medicine (DVM) from Chattogram Veterinary and Animal Sciences University's Faculty of Veterinary Medicine. He earned a GPA of 5.00 while passing the Secondary School Certificate Examination (SSC) at Bangladesh Nou-Bahini School in Chattogram in 2013 and the Higher Secondary Certificate Examination (HSC) at Bangladesh Nou-Bahini College in Chattogram in 2015. He is now working on his 12-month internship. He is really enthusiastic about learning new things and expanding his practical knowledge in order to become a qualified veterinarian and contribute to the development of the economy.