Food Science

MILK CONSUMPTION PATTERNS AMONG ADULTS FROM MUMBAI METROPOLITAN REGION

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ABSTRACT This study aims to understand the consumption patterns of milk and selected milk products in the Mumbai Metropolitan region. 1060 participants were interviewed about their milk consumption patterns including type of milk, frequency of consumption, amount consumed per day, attitudes towards milk products, and awareness and opinions regarding A1/A2 milk. 94.2% of participants were milk consumers, their average daily intake being 220±91ml. Only 5.8% of participants did not consume milk, primarily due to personal dislike. Among consumers, 57.3% consumed cow milk and 27.1% consumed buffalo milk. 88.7% of participants opined that milk is healthy. However, some consumers expressed concerns about milk adulteration. Of all, only 21.8% knew about A1/A2 milk but most could not provide details. These findings indicate an overall positive attitude of consumers towards milk and its continued inclusion in diets. Further studies and definitive steps are needed to resolve consumers' concerns about A1/A2 milk and milk adulteration.

INTRODUCTION

Bovine milk has a long history of use by humans. Milk has been considered a complete food, as it is a good source of protein, minerals like calcium, magnesium, B-complex vitamins, vitamins D and E; as well as several bioactive substances (Pereira 2014). This complex biological fluid has numerous components such as peptides, oligosaccharides, fatty acids like conjugated linolenic and linoleic acids, and polar lipids with many of them reducing the risk of several diseases (Yusuf et al. 2004, Da Silva and Rudkowska 2015, Zhang et al. 2021). The American Heart Association (Van Horn et al. 2016) has recommended that adult diets should include three servings of dairy every day and the Dietary Guidelines for Americans (2015-2020) recommended consuming the equivalent of three cups of fat-free milk daily. In India, the Indian Council of Medical Research National Institute of Nutrition (ICMR NIN, 2020) has recommended that adults, both males and females, consume at least 3 servings of milk daily.

Milk production in India has continued to increase over the last few years. In 2023, India ranked first in milk production, contributing almost one-fourth to the global milk production. Also, the distribution network in the country has facilitated much greater availability of milk to the consumers in this country. Thus, the per capita availability of milk was 459 grams per day in India during 2022-23 as against the world average of 322 grams per day in 2022 (Ministry Of Fisheries, Animal Husbandry And Dairying, Govt. Of India, 2023). The consumption of milk varies widely (Zhang et al. 2021). Aswini et al., (2020) surveyed the buying behaviour of 120 consumers in Tamil Nadu.

They reported that almost one-third of the consumers bought 500 ml, 60.8% purchased 500 to 1000 ml and about one-tenth purchased more than 1000 ml. Despite the large-scale production and availability of milk, there are few reports on milk consumption. Also, there is insufficient information regarding the public perceptions about milk and milk products.

There is a dearth of recent information about milk and milk product consumption in urban and metropolitan settings in India. Therefore, we deemed it worthwhile to study consumption patterns of milk and selected milk products in the Mumbai Metropolitan region.

MATERIALS & METHODS

Ethics Approval

The study was approved by the Intersystem Biomedica Ethics Committee (ISBEC) (Approval No. ISBEC/ KM-JJ/ 2020) (September 10, 2020).

Study Location and Sample Selection

The study was conducted in the Mumbai Metropolitan Region between September 2020 and September 2021. One thousand one hundred and fifty-one persons were approached for the study through snowball sampling. Of these, 80 refused to participate. The remaining participants were recruited for the study after obtaining written informed consent. Seven people provided incomplete information and four participants were excluded as they were minors (<18 years of age). Therefore, data were analysed for 1060 participants. Among these, 48 participants did not reveal their gender. Further, 177 participants did not reveal their age.

Data Collection

Participants were contacted through an online survey, telephone interview, and personal face-to-face interviews by a trained dietitian. Seven hundred sixty-three persons participated in the online survey, while the remaining participated through telephone (n=97) and in-person interviews (n=200). The interview schedule was prepared in English, and translated into the two commonly used regional languages – Hindi and Marathi, for effective communication with the participants. Participants were whether or not they consumed milk, the type of milk consumed, the frequency of milk consumption, and the amount of milk consumed per day. Consumption practices related to other milk beverages i.e. tea/coffee/flavoured milk were also recorded. Participants were asked about their opinions regarding milk, whether milk should be replaced in the diet if their opinion about milk was unfavourable, and if so, with what foods. Participants were asked about their preference for consumption of four major dairy products – milk, paneer, curd, and buttermilk using a 10-point visual analogue

scale (VAS) with a scale value of 10 denoting 'will eat at any time', a value of 0 'do not at all like' and the midpoint 5 represented 'neither like nor dislike'. Scale values above 5 represented 'like' and values closer to the maximum of 10, represented a greater degree of liking. Similarly, values below 5 indicated dislike ranging from mild to moderate to extreme dislike at the lowest scale value of 0. Additionally, participants were asked about their awareness and opinions regarding A1 and A2 milk.

Data Analysis
The data was analysed using SPSS version 20. Descriptive statistics i.e., percentages, means and standard deviation were calculated. Age-wise and gender-wise comparison was done using the t-test and analysis of variance.

RESULTS
Profile of Participants
Approximately three-fourths of the respondents were females (n=781,73.7%) and 21.8% (n=231) were males. However, a small percentage of respondents (n=48, 4.5%) did not disclose their gender. Also, 177 respondents did not specify their age. The mean age of the remaining 883 respondents was 32.4 ± 13.1 years. The average age of males was 35 ± 17 years and the average age of females was 30 ± 13 years.

Milk consumption
Nine hundred ninety-eight (94.2%) participants consumed milk, but only 62 participants (5.8%) did not consume any milk or milk products. Of these, approximately one-third (n=20, 32%) did not give any reason for not consuming milk, another 20 (32%) reported that they disliked milk; one-fifth (n=12, 20%) had lactose intolerance and 3% (n=2) were recommended by their physician not to consume milk or milk products. Additionally, 13% (n=8) of the non-consumers were vegans (Figure 1).
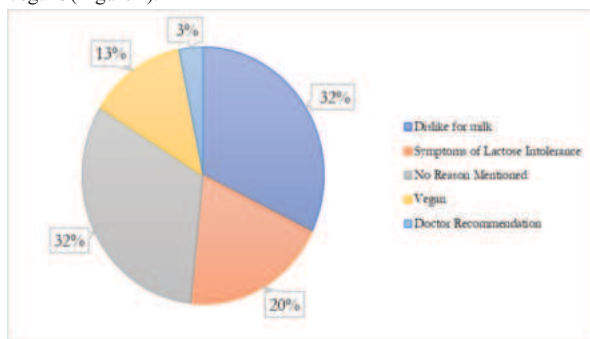

Figure 1: Participants' Reasons for Non-consumption of Milk

Type of milk consumed
Cow milk was the most popular, as a little more than half the participants (n=607, 57.3%) consumed cow milk. Among the 607 cow milk consumers, the majority used only cow milk (n=462) and 145 consumed both buffalo milk and cow milk. Among the cow milk consumers, only 2 participants consumed A2 milk. A little more than one-fourth of the 1060 participants (n=270, 27.1%) consumed only buffalo milk. A small percentage of the participants used milk powder (n=12, 1.2%) and 89 (8.9%) used toned milk. However, they did not know whether the milk powder or toned milk was cow or buffalo milk. One participant consumed soy milk and the remaining 19 participants (1.9%) did not respond to this question.

Frequency of consumption
A little more than half the participants (n=540, 54.1%) drank milk once a day, and almost one-fifth of participants (n=197 persons, 19.7%) consumed milk twice a day. A little more than one-tenth of the participants (n=116, 11.6%) consumed milk sometimes. Forty-seven participants (4.7%) consumed milk on alternate days and 44 (4.4%) consumed milk only once a week. A very small percentage of participants (n=22, 2.2%) consumed milk once a fortnight. Thirty participants (3.0%) reported that they consumed it occasionally and 2 participants (0.2%) did not respond to this question.

Amount of milk consumed
Among the 998 milk consumers, 222 (22.2%) participants did not report the amount of milk consumed by them. Eight participants (0.8%) consumed milk only with tea/coffee, but did not provide

sufficient information to quantify their intake. Thirteen participants (1.3%) reported that they only consumed milk products but not milk. Mean intakes were therefore calculated for 669 participants for whom complete gender, age and intake data were available. The average daily milk consumption of the participants was 220 ± 91 ml (95% CI: 213-227 ml). Gender-wise comparison showed that the average daily intake of males was slightly higher than that of females in all age groups except in the 71-80 years group (Table 1).

ICMR NIN (2020) recommends that sedentary adults, irrespective of gender should consume 300ml of milk or milk products daily. The daily mean intake of participants (220 ± 91 ml) was less than the recommended amount (Table 1). Also, none of the participants' intake was close to the recommended amount of 300 ml /day. The mean intake of males was significantly higher than that of females, although the difference between the two genders was relatively small i.e. 47 ml (t=5.004, p=0.000).

Comparison between age groups indicated that older adults, particularly those above 60 years of age, tended to consume slightly lesser amounts of milk than younger adults. However, there was no statistically significant difference between age groups (Table 1).

Table 1: Comparison of milk consumption by age group (mL/d)

Age group (years), n	Total (n=669)	Males (n=105)	Females (n=564)	t, p
All age groups	220 ± 91a 213-227b	260 ± 141; 233-287	213 ± 76; 207-219	5.004, 0.000
17-20 years	239 ± 54 218-260 (n=28)	250 ± 0 0-0 (n=3)	238 ± 57 215-261 (n=25)	0.359, 0.722
21-30 years	222 ± 98 213-232 (n=429)	297 ± 182 241-354 (n=42)	214 ± 81 206-222 (n=387)	5.383, 0.000
31-40 years	232 ± 87 212-252 (n=73)	260 ± 117 212-308 (n=25)	218 ± 62 200-236 (n=48)	2.018, 0.047
41-50 years	212 ± 74 191-232 (n=53)	227 ± 106 166-288 (n=14)	206 ± 60 187-226 (n=39)	0.893, 0.376
51-60 years	201 ± 69 183-219 (n=60)	221 ± 70 174-268 (n=11)	197 ± 69 177-217 (n=49)	1.039, 0.303
61-70 years	196 ± 72 164-229 (n=21)	197 ± 69 144-250 (n=9)	196 ±77 147-245 (n=12)	0.043, 0.966
71-80 years	180 ± 57 109-251 (n=5)	150 ± 0 0-0 (n=1)	188 ± 63 87-288 (n=4)	-0.533, 0.631
F, p	1.370, p=0.224			
aMean ± SD; b95% CI				

Further, age-wise comparison between males and females showed a significant difference only in the age groups of 21 to 30 years (Table 1).

Liking for Milk and Milk Products
The participants were asked to indicate their degree of liking for milk as well as three commonly consumed milk products – curd, buttermilk and *paneer*. The degree of liking was assessed using a VAS with values ranging from 0 to 10. The scale was anchored at 0 represented by the statement "do not like at all' and 10 indicating a high degree of liking with the statement 'will consume at any time' (Table 2).

Table 2: Visual Analogue Scale Rating for four milk products

Milk/ Milk Product	Visual Analogue Scale Rating										
	0	1	2	3	4	5	6	7	8	9	10
	N (%)										
Milk	34 (3.2)	33 (3.1)	35 (3.3)	31 (2.9)	54 (5.1)	135 (12.7)	71 (6.7)	104 (9.8)	144 (13.6)	88 (8.3)	252 (23.8)
Curd	66 (6.2)	10 (0.9)	20 (1.9)	38 (3.6)	40 (3.8)	85 (8.0)	69 (6.5)	74 (7.0)	141 (13.3)	194 (18.3)	318 (30.0)
Paneer	59 (5.6)	20 (1.9)	21 (2.0)	39 (3.7)	34 (3.2)	87 (8.2)	73 (6.9)	88 (8.3)	111 (10.5)	152 (14.3)	371 (35.0)

Butte rmilk	90 (8.5)	28 (2.6)	37 (3.5)	40 (3.8)	40 (3.8)	77 (7.3)	63 (5.9)	81 (7.6)	125 (11.8)	156 (14.7)	318 (30.0)

a. Liking for Milk
Only 34 participants (3.2%) reported that they did not like milk at all and would not consume it. Another 153 participants (14.4%) did not like milk to a varying degree. A little more than one-tenth did not either like or dislike milk (n=135, 12.7%). However, the percentage who liked milk was greater (62%).

Almost one-fourth of the participants (23.8%) liked milk very much and reported that they 'would drink milk anytime'. Seventy-nine participants (7.5%) did not respond to this question.

b. Liking for Curd
A little more than one-fourth of the participants (30.0%) indicated that they were likely to consume curd anytime, whereas 66 participants (6.2%) reported that they absolutely disliked curd. Five participants (0.5%) did not respond to this question.

c. Liking for Paneer
About one-third of the participants (n=371, 35.0%) reported that they were likely to eat *paneer* anytime whereas 59 participants (5.6%) did not like paneer at all. Five participants (0.5%) did not respond to this question.

d. Liking for Buttermilk
Five participants (0.5%) did not respond to this question. Among those who responded, almost one-third of the participants (n=318, 30.0%) liked buttermilk very much as they gave a score value of ''10' i.e. they would consume it any time. Ninety participants (8.5%) reported that they would not like to consume buttermilk.

About three-fourths of participants liked curd (75.1%), paneer (75.0%) and buttermilk (70.0%). About 16 to 17% of participants disliked milk, curds and paneer, but about one-fifth (22.2%) disliked buttermilk. Thus, more participants liked the three milk products i.e., curds, paneer and buttermilk, as compared to the percentage who liked milk.

Flavouring Agents
Three hundred and eighty-two participants (38.2%) added turmeric to their milk, 280 (28.1%) added chocolate, 122 (12.2%) added cardamom, 108 (10.8%) added saffron and another 24 participants (2.4%) preferred to add chocolate-flavoured powders.

A small number of participants added other flavourings to their milk: 6 (0.6%) preferred nuts, 3 (0.3%) preferred protein powders, 4 (0.4%) preferred ginger, 1 (0.1%) preferred black pepper powder, 3 (0.3%) preferred cinnamon, 2 (0.2%) preferred vanilla and 1 (0.1%) participant chose oats.

Four participants (0.4%) chose natural sweeteners including jaggery and dried fig and 3 participants (0.3%) chose rose syrup and *thandai* as their preferred additions to milk. Seven participants (0.7%) did not specify the flavouring agent.

Opinion about milk
Participants were asked whether they considered milk and milk products to be important for health. Majority of the participants (n=940, 88.7%) responded positively, but 31 participants (2.9%) did not consider dairy to be important. Eighty-four participants (7.9%) were not sure, five participants (0.5%) did not respond and 66 participants (6.2%) gave irrational answers. Twenty-nine participants (2.7%) held a positive opinion about milk but did not specify their reasons.

The most common reasons given by participants who considered milk important were associated with good health including, good for immunity (n=16), strengthening (n=13), and easy to digest (n=13) (Figure 2). Other reasons included: weight management/ satiating (n=18), comfort food (n=1), sleep-inducing (n=1), and cooling (n=1).

Additionally, six participants opined that milk is good for brain health (0.6%); five felt it benefits skin and hair health (0.5%), two believed it relieves acidity (0.2%), two believed it can reduce the risk of cancer development (0.2%), and one participant thought milk contains antioxidants (0.1%).
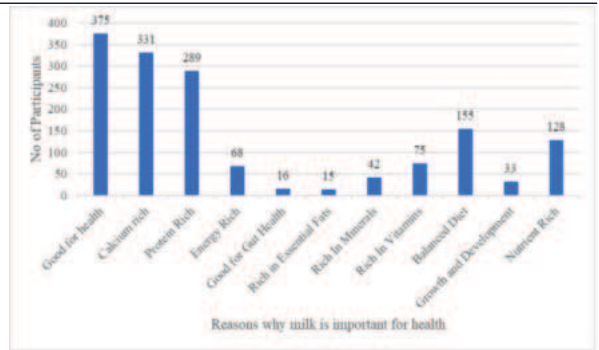

Figure 2: Common reasons by participants why milk is important

Forty-four participants did not consider milk to be important for various reasons: nutritionally insufficient (n=15), not meant for humans (n=8), substitutes easily available (n=8), causes lactose intolerance (n=5), not necessary to maintain health (n=13), and animal cruelty (n=3). Additionally, 15 participants provided irrelevant answers and 23 were unsure of their reasons for not considering milk important. Eleven participants were concerned about milk being adulterated, five had a personal dislike for milk and three believed that milk contains unnatural hormones.

Participants were asked whether they thought any other food material could replace milk. Among the 1060 participants, 230 (21.7%) felt that milk is easily replaceable, 546 (51.5%) did not, 277 (26.1%) were not sure and seven participants (0.7%) did not respond. The main reasons why participants considered milk irreplaceable are illustrated in Figure 3a. Additionally, milk was considered suitable for all age groups (n=37), particularly children (n=2). Some participants considered milk to be protein-rich (n=32), energy-rich (n=13), vitamin-rich (n=12), and mineral-rich (n=8).

Some participants stated that milk consumption did not cause any side effects (n=12), was easy to consume (n=11), and satiating (n=4). Three participants considered milk irreplaceable due to its lactose content, and two due to probiotic potential. One participant considered milk's role in immunity irreplaceable and one considered milk to have irreplaceable evidential benefits.

One participant reported no reason to consider switching from milk, 20 provided irrelevant responses, and 30 participants did not provide any specific reason. Some participants (n=13) stated that they could not replace milk as they had consumed it since childhood and as a part of the Indian food culture.
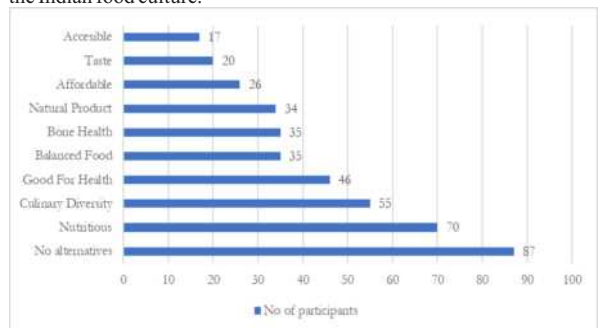

Figure 3a: Reasons by participants why milk is irreplaceable

The participants who opined that milk could be replaced were asked which foods they considered to be suitable substitutes. The most common responses are illustrated in Figure 3b. Majority of the participants (n=79) reported that plant-based milks, i.e., soy milk, almond milk, etc. could be a suitable replacement for milk from animals such as cows and/or buffalo. Other foods considered as alternatives were: protein supplements (n=7), other foods (unspecified) of similar nutritional value (n=7), and a balanced diet (n=6).

Twenty-one participants gave irrelevant answers such as coffee, infused honey lemon water, desserts, makhana/lotus seeds, etc. Eleven participants did not specify any particular food and seven participants were not aware of any alternatives.
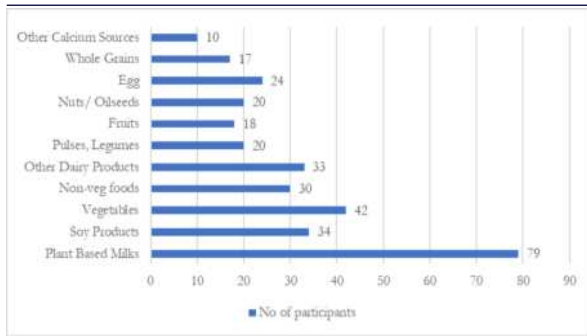
Figure 3b: Foods considered by participants as alternatives for milk. Other dairy products – paneer, curd, buttermilk, etc. Other calcium sources – ragi, sesame seeds, etc. Whole grains including ragi, amaranth and other whole grains. Nuts and oilseeds including sesame products

Knowledge about A1 and A2 milk

Among the 1060 participants, 231 (21.8%) stated that they knew about A1/A2 milk. Majority of the participants (n=718, 67.7%) did not know about A1 and A2 milk, whereas 104 participants (9.8%) were not sure and six (0.6%) did not respond.

The participants were asked to give details about what they knew about A1/A2 milk. Fifty-nine participants (5.6%) knew that A2 milk is obtained from Indian breeds, 46 participants (4.3%) were aware that A1 milk is obtained from foreign cow breeds like Jersey or Holstein and another 6 were aware that there is a difference between breeds but could not name them. Only five participants (0.5%) could give accurate information about the scientific debate about A1 and A2 milk. Thirty-four participants (3.2%) opined that A2 milk is good for health, and 38 stated that the two types of milk differ in their protein with 22 specifically stating that it is related to β-casein. Twenty-one (2.0%) considered A1 milk to be bad for health in terms of risk for disease. Irrational answers and incorrect information were provided by 19 (1.8%) and 18 (1.7%) participants, respectively. Ten participants (0.9%) believed A2 milk to be non-GMO, while another six (0.6%) didn't think there was any difference between the two types of milk. The concept of A1 and A2 milk was believed to be a fad based on fat content by five participants (0.5%) and another five (0.5%) believed A2 milk was obtained from organic cows. Other responses included 'difference in lactose content' (n=3, 0.3%), 'A1 cows yield more milk' (n=4, 0.4%), 'A2 cows yield less milk' (n=2, 0.2%), 'A2 milk is more expensive' (n=1, 0.1%), and 'A1 cows are injected with hormones' (n=3, 0.3%).

Participants were also asked about the source of their information about A1/ A2 milk. Majority of the participants (n=98, 9.2%) got their information from the Internet. Seventy-eight participants (7.4%) did not respond, 20 participants (1.9%) gave irrational answers and nine (0.8%) were not sure. Other sources of information included: educational institutions and colleagues (n=55, 5.2%), friends and family (n=37, 3.5%), books and reading (n=25, 2.4%), scientific literature (n=14, 1.3%), newspaper articles (n=15, 1.4%), and social media including YouTube videos (n=16, 1.5%). Further eight participants got their information from WhatsApp messages (0.8%) and five participants (0.5%) each got the information from television and advertisements respectively. Four participants each learned about A1/A2 milk through professional advice (0.4%), grocery stores and by word of mouth respectively. Additionally, information was sourced from food labels and seminars by three participants each (0.3%). One participant (0.1%) was informed by her/his patient whereas one participant (0.1%) was a user of A2 milk.

Symptoms of Lactose Intolerance

The participants were asked whether they experienced any symptoms of lactose intolerance or discomfort after the consumption of milk and milk products. The majority of participants (n=810, 76.4%) had not experienced any such symptoms. Amongst those who experienced symptoms; 81 (32.4%) participants complained of bloating, 65 (26.0%) of nausea and vomiting and 59 participants (23.6%) complained of gastric discomfort. Flatulence was reported by 56 participants (22.4%), stomach ache by 47 (18.8%), acne by 45 (18.0%), and diarrhoea was reported by 36 participants (14.4%). Further, 34 participants (13.6%) reported borborygmus and 32

participants complained of constipation (12.8%). Five participants (2.0%) were unsure of their exact symptoms and two experienced cough (0.8%) after consuming dairy products. Additionally, chest pain due to flatulence and weight gain was experienced by one participant each (0.4%).

DISCUSSION

Milk has long enjoyed a place of importance in India and is a valued food in Ayurveda for its medicinal properties (Mana, Mohanan, and Venkatesha 2021). It is consumed across the country in various forms including curd, paneer, buttermilk, etc. (Sarkar et al. 2015). India is not only the world's largest dairy producer but also the largest dairy consumer in the world. Bovine milk consumption in India has increased from 203 million metric tons in 2022 to 207 million metric tons in 2023 (India: Milk Domestic Consumption, 2023). However, despite the staggering consumption and production of dairy milk in India, the current study found the mean dairy intake across all age groups to be insufficient. None of the age groups met the recommended 3 servings per day of dairy intake, reporting an average daily intake of 220 ml (ICMR NIN, 2020). These findings are in line with the National Institute of Nutrition 2020 report where the average adult's consumption of milk and milk products was 120.7g in urban areas and 117.9g in rural areas (What India Eats, 2020). The USDA ERS 2022 report also showed a steady decline in the per capita fluid milk consumption in the US since the 1970s. They reported that despite intake recommendations, almost 90% of the American population did not consume sufficient amounts of milk (Stewart and Kuchler 2022).

In the current study, consumer opinions about milk as a health-providing food were sought. Three-fourths (88.7%) of all participants responded positively and affirmed that milk is important for health. Most of these (35.2%) attributed the health benefits of milk to its calcium content. They also mentioned that milk is important for protein adequacy, growth and development, strength, immunity, satiety, etc. A similar finding was also reported by Mondal et al., (2022), where participants perceived milk as important for the development of children and a necessity for maintaining bones and teeth, an indication towards its calcium content. However, they also reported that despite acknowledging the health benefits of milk, consumers did not consider milk to be a safe food commodity and had concerns about the level of adulteration. The current study also found that some consumers were concerned about the safety of milk and the possibility of adulteration.

One of the reasons for the downward trend was found to be the increasing popularity of plant-based dairy alternatives. Plant-based milks are white-coloured non-dairy beverages made from water-based extracts of plant materials (Sethi, Tyagi, and Anurag 2016). The commonly consumed plant-based milks include oats, soy, rice, almond, etc. Plant-based milks have been gaining a steady market increase in India amounting to almost 295 million USD in 2023 with a projected rise to approx. 918 million USD by 2030 (India: Plant-Based Dairy Market Size, 2023). Similarly, ERS research reported that the increasing sales of plant-based milks have negatively affected the sales trends of bovine milk in the US (Stewart and Kuchler 2022). In 2022, Basu and colleagues (Basu, Murti, and Mandal 2022) studied the motivators and deterrents of vegan milk alternatives in Indian markets. They reported that this growing interest stemmed from a desire to explore a variety of flavours, for the health attributes they offer, to increase a sense of moral self-identity, to avoid perpetuating animal cruelty and to support new entrepreneurs. The evidence of these trends was seen in the current study as well, where, 230 participants responded that bovine milk was easily replaceable and 79 of them opined that plant-based milks could be a suitable substitute.

Another reason for the decreasing popularity of milk is the debate surrounding A1 and A2 β-casein and its supposed adverse effect on health. Several studies have reported that the by-product of A1 β-casein metabolism in the body, beta casomorphin7 (BCM7), can potentially increase the risk of development of type 1 diabetes, leaky gut, schizophrenia, etc. (Chia et al. 2017, Sheng et al. 2019, Jarmołowska et al. 2019). As a result, a wide range of A2 milk products have hit the shelves and are being sold at a premium price. However, the results regarding this topic are inconclusive (EFSA, 2009). A bibliometric analysis of A1/A2-related research reported insufficient evidence to conclude any adverse health effects of consuming A1 milk but stated that the digestive system may better tolerate A2 milk (Gonzales-Malca et al. 2023). The reports about BCM7's effect on

health are equivocal, with some studies showing its beneficial effect on mucus secretion, increased superoxide dismutase activity, etc (Trompette et al. 2003, Zoghbi et al. 2006, Yin, Miao, and Zhang 2010, ul Haq et al. 2014). In the current study, only about one-fifth of the participants (n=231) knew about A1 and A2 milk, of which most people were unable to provide adequate details to make an informed decision about their consumption. Interestingly, the main source of information was reported to be the internet.

All these findings indicate an overall positive attitude of consumers towards milk. Our results clearly show that milk is still a valued food despite reports of its possible role in adverse health effects and the increasing popularity of trends like veganism. The beneficial role of milk is well documented and it is of immense importance for health. Given the significant nutritional content of milk, its intake should be encouraged, especially during the formative years. Further studies are needed to form a conclusive educated opinion about A1 milk. Meanwhile, steps must be taken to ensure that the consumers' main concerns regarding milk adulteration are resolved.

Disclosure of Interest
The authors report there are no competing interests to declare.

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