



A Study of Awareness and Student's Buying Behaviour towards Probiotic Dairy Products at Anand City, India

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Probiotics are essential for maintaining a healthy gut microbiome, especially in an era of rising antibiotic resistance among harmful bacteria. A survey conducted among college students revealed that most respondents had a good understanding of probiotics, primarily gaining awareness from books and commercials. The majority of respondents were male (69%), aged 20-25 years and undergraduate students (71%), with about 50% coming from agricultural family backgrounds and a monthly family income of approximately ₹40,000 (37%). Most respondents were from rural areas and were aware of probiotic dairy products. Awareness sources included books, social media, and friends & family. Most respondents consumed probiotic dairy products weekly, favouring products such as lassi, buttermilk, ice cream and dahi, with a preference for the Amul brand. Only around 3%

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were dissatisfied with probiotic dairy products and 73% purchased them for their health and nutritional benefits. About half perceived these products to be more expensive than regular dairy products and 97% of aware respondents were satisfied and willing to recommend them to family and friends.

Keywords: Probiotics; students; milk products; dairy probiotic products; healthy; bacteria.

1. INTRODUCTION

Consuming live probiotics has a positive impact on one's health. The gut microbiota which is thought to be essential to health. It is made up of trillions of these microbes that reside in the stomach and intestines. The "good" bacteria in the intestines live in symbiotic harmony with the human body, obtaining energy from food and benefiting general health. Every person has a particular gut flora that reacts differently to probiotics and not all probiotics are created equal. To obtain the highest possible health benefit, it is crucial to combine several strains that have been proven to be efficient. Consuming a range of dairy products rich in probiotics can boost the beneficial bacteria in the stomach, improve health, lower the risk of disease and provide essential vitamins, minerals and protein.

The gut membrane is home to the majority of probiotics, which are living bacteria with positive health effects that can regulate harmful pathogens. Probiotics may have been coined for the first time by Mechnikov in 1907 [1,2]. Probiotics are described by the Food and Agriculture Organisation (FAO), World Health Organisation (WHO) and International Scientific Association for Probiotics and Prebiotics (ISAPP) as live organisms that, when supplied in sufficient proportions boost the host's health. The most common probiotic microorganisms found in food are the two main genera of bacteria: Bifidobacterium (*B. adolescentis*, *B. animalis*, *B. bifidum*, *B. breve* and *B. longum*) and Lactobacillus (*L. acidophilus*, *L. casei*, *L. fermentum*, *L. gasseri*, *L. johnsonii*, *L. paracasei*, *L. plantarum*, *L. rhamnosus* and *L. salivarius*) [3]. Numerous studies have demonstrated the effectiveness of these probiotics in the prevention and management of a number of diseases; they enhance the gut microbiota's defences against pathogens and lower the risk of gastrointestinal (GI) infections, lactose intolerance, various types of diarrhoea (including acute infectious and some dental issues). Probiotics are also helpful for people with type 2 diabetes, allergies, liver illnesses, hypercholesterolemia and cancer. Probiotics are commonly employed in the manufacture of food

due to their beneficial characteristics. The three main categories of probiotic goods are dairy products, particularly probiotic yogurt; non-dairy food products, like probiotic candy and dietary supplements in the form of tablets, powders and capsules. Probiotic drinks, milk, cheese, buttermilk and sour cream are just a few of the items that are currently made and sold all over the world [4].

On the commercial market, probiotics and prebiotics can be found in a wide range of products, including functional foods and beverages (dairy and non-dairy products, breakfast cereal, baked goods, fermented meat products, dry-food probiotics), dietary supplements (food supplements and nutritional supplements), specialty nutrients (infant formulation), pharmaceutical preparations and animal feed. The growing self-care and health-embracing population made the probiotic sector as lucrative market for functional food manufacturers and suppliers [5].

Although the average person is aware of the benefits that probiotics offer, which has led to an increase in demand, many consumers lack the nuances necessary to recognize and purchase these probiotic foods. There are still many people who are unaware of it. People don't know much about probiotics and are generally unaware of their health benefits [6], which leads to underconsumption and intake of inappropriate probiotics or dosages that may prevent desirable results. According to the Vahoniya survey, the majority felt that probiotic products were priced too high compared to non-probiotic ones, though they were considered healthy, tasty and available in insufficient quantities, with many noting that other consumers were less aware of their benefits [7].

The roles of probiotics in the body are as follows colonizing the gut and inhibiting the growth or decreasing the activity of harmful bacteria in the intestine. Antimicrobial action increases our body's resistance to illnesses and infections which boosts immunity. Increases lactic acid generation and controls pH balance in the colon and other bodily areas. Improves the secretion of

digestive enzymes and aids in appropriate digestion. The absorption of protein and minerals including calcium, copper, magnesium, iron and manganese is facilitated by an acidic pH which is promoted. It may ferment fructo-oligosaccharides which causes a decrease in pH equilibrium and raises the acidity in the gut, improving calcium absorption and allowing it to enter the bloodstream [8].

1.1 Research Objectives

1. To assess awareness of various probiotic Dairy Products
2. To assess the buying behaviour of respondents towards probiotic dairy products

2. METHODOLOGY

The relevant data for the research study was collected by using a primary survey done by a questionnaire. The selection of respondents was based on simple random sampling. The questionnaire was filled out by respondents using Google Forms. In the present study, there were 109 number of respondents. Respondents were students and they were randomly selected from

colleges in Anand City. The collected data was analyzed using descriptive statistics [9].

3. RESULTS AND DISCUSSION

3.1 Demographic Profile of Respondents

The Demographic profile of respondents is shown in the Table 1.

Table 1 shows that among 109 respondents, 68.81% identified as male and 31.19% as female. Among them, 62.39% were aged 20-25 years and 37.61% were aged 18-20 years, showing a focus on young adults. In terms of education, 71.56% were undergraduates and 28.44% were pursuing postgraduate studies. Occupation-wise, 49.54% reported their families were engaged in agriculture, 31.19% in jobs and 19.27% in business. Regarding monthly family income, 36.70% reported incomes above ₹40,000 while 15.60% earned less than ₹10,000. Geographically, 63.30% were from rural areas and 36.70% from urban areas. These demographics provide a clear picture of the survey sample's composition, reflecting diverse backgrounds in gender, age, education, occupation, income and residential location.

Table 1. Demographic profile of respondents (n = 109)

Gender			
Sr. No.	Particular	No of Respondents	Percentage(%)
1	Male	75	68.81
2	Female	34	31.19
	Total	109	100.00
Age (Years)			
1	18-20	41	37.61
2	20-25	68	62.39
	Total	109	100.00
Education Level			
1	Undergraduate	78	71.56
2	Postgraduate	31	28.44
	Total	109	100.00
Occupation of Respondent's Family			
1	Agriculture	54	49.54
2	Job	34	31.19
3	Business	21	19.27
	Total	109	100.00
Monthly Family Income of Respondents			
1	<10000	17	15.60
2	10000-20000	29	26.61
3	20001-30000	16	14.68
4	30001-40000	7	6.42
5	more than 40000	40	36.70
	Total	109	100.00
Area of Residence of Respondents			
1	Rural	69	63.30
2	Urban	40	36.70
	Total	109	100.00

3.2 Analysis of Awareness of Probiotic Dairy Products

The awareness of Probiotic Dairy Products is shown in the Fig. 1.

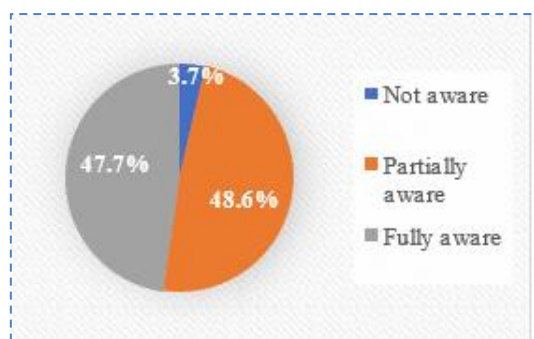


Fig. 1. Awareness of probiotic dairy

The pie chart shows that nearly half (48.6%) of the respondents surveyed were fully aware of probiotic dairy products. A slightly smaller proportion (47.7%) were partially aware and only 3.7% were not aware at all.

3.3 Analysis of Awareness with Respect to the Area of Residence

The awareness with respect to the area of residence about Probiotic Dairy Products is shown in Table 2.

Table 2 shows around 44.9% were fully aware of probiotic dairy products among rural area respondents, 52.5% were fully aware of urban area respondents and 52.2% were partially aware of probiotic dairy products among rural

Table 2. Study of Awareness & Area of Residence (n = 109)

Sr No.	Area of Residence of Respondents	Fully aware respondents (%)	Partially aware respondents (%)
1	Rural	44.9	52.2
2	Urban	52.5	42.5

Table 3. Consumption frequency of probiotic dairy products (n = 109)

Sr. No.	Frequency	No of Respondents	Percentage (%)
1	Daily	11	10.10
2	Weekly	50	45.90
3	Occasionally	45	41.30
4	Never	3	2.80
	Total	109	100.00

area respondents and 42.5% were partially aware of urban area respondents.

3.4 Source of Awareness of Probiotic Dairy Products

Various Sources of awareness about Probiotic Dairy Products are shown in Fig. 2.

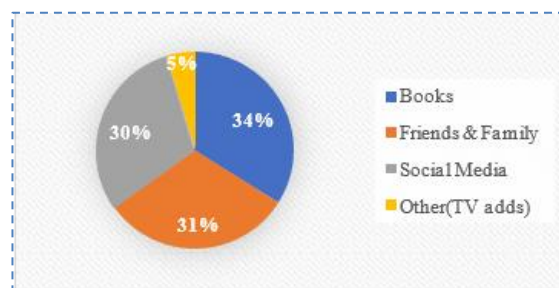


Fig. 2. Source of awareness

From Fig. 2, it can be seen that around 34% of respondents came to know from books, 30% from social media, 31% from friends and family and 5% from other sources like TV ads, product displays, etc.

3.5 Consumption Frequency of Probiotic Dairy Products

The Frequency of Consumption of Probiotic Dairy Products by various respondents is shown in Table 3.

From Table 3, it can be seen that among consumers of probiotic dairy products, only 10.1% were consuming daily, 45.9% were consuming every week, 41.3% were consuming occasionally and 2.8% of respondents never consumed probiotic dairy products.

Table 4. Probiotic dairy products purchased by respondents (n = 109)

Sr. No.	Products	No of Respondents	Percentage (%)
1	Lassi	84	77.10
2	Buttermilk	68	62.40
3	Ice-cream	57	52.30
4	Dahi	55	50.50
5	Yogurt	38	34.90
6	Cheese	30	27.50
7	Yakult	1	00.09

3.6 Details of Various Probiotic Dairy Products Purchased by Respondents

The product-specific purchase of probiotic products is shown in Table 4.

Table 4 shows the percentage of respondents who have purchased specific types of probiotic products out of 109 respondents. The most popular type of probiotic product was Lassi, with 77.10% of respondents having purchased it. Buttermilk was the second most popular product, with 62.40% of respondents having purchased it. Ice cream was the third most popular product, with 52.30% of respondents having purchased it. Yakult was the least popular product, with only 00.09% of respondents having purchased it.

3.7 Various Probiotic Dairy Product Brand Preferred by Respondents

The probiotic dairy product Brand preferred by respondents is shown in Table 5.

Table 5 shows the brand-specific purchase of probiotic dairy products among respondents. Amul was the most popular brand, with 98.2% of respondents having purchased it. Yakult was the second most popular brand, with 19.30% of respondents having purchased it. Nestle was the third most popular brand, with 10.10% of respondents having purchased it. Mother Dairy was the least popular brand, with only 09.20% of respondents having purchased it.

3.8 Satisfaction Level of Respondents

The Satisfaction level of respondents about probiotic dairy products is shown in Table 6.

In terms of satisfaction, 38.5% were highly satisfied, 44% of respondents were satisfied, 14.7% were neutral, and 2.8% were dissatisfied with probiotic dairy products. The table shows that most of the respondents were satisfied or highly satisfied with the probiotic dairy products.

Table 5. Specific brand purchase by respondents (n = 109)

Sr. No.	Brand	No of Respondents	Percentage (%)
1	Amul	107	98.2
2	Yakult	21	19.30
3	Nestle	11	10.10
4	Mother Dairy	10	09.20

Table 6. Satisfaction level (n=109)

Sr. No.	Satisfaction level	No. of Responses	% of Responses
1	Highly Dissatisfied	0	0.00
2	Dissatisfied	3	2.75
3	Neutral	16	14.68
4	Satisfied	48	44.04
5	Highly Satisfied	42	38.53

Table 7. Purchased specifically because it contained probiotics (n = 109)

Sr. No.	Reason for purchase	No of Respondents	Percentage (%)
1	I purchase it because of its probiotic benefits	79	72.50
2	I purchase for other than probiotic benefits	30	27.50
	Total	109	100.00

Table 8. Preference to recommend probiotic dairy products to other (n = 109)

Sr. No.	Recommend	No of Respondents	Percentage (%)
1	Yes	105	96.30
2	No	4	03.70
Total		109	100.00

Table 9. Preference toward price of probiotic dairy products (n = 109)

Sr. No.	Price probiotic dairy products	No of Respondents	Percentage (%)
1	Probiotic dairy products price is too High	58	53.20
2	Probiotic dairy products price is Not too High	51	46.80
Total		109	100.00

3.9 Main Reason for Purchasing Probiotic Dairy Products

The main reason for purchasing probiotic dairy products is shown in Table 7.

Table 7 shows that around 72.5% of respondents purchased probiotic dairy products especially because of their health benefits and 27.5% of respondents purchased for other than probiotic benefits.

3.10 Detail about Respondents' Preference to Recommend Probiotic Dairy Products to Other

The details about respondents' preference to recommend probiotic dairy products to friends and family is shown in Table 8.

Table 8 shows that almost 96.30% of respondents liked to recommend it there to family and friends to consume probiotic dairy products.

3.11 Respondents Preference towards Price of Probiotic Dairy Products

The detail about respondents' preference towards the price of probiotic dairy products is shown in Table 9.

From Table 9, it can be seen that around 53.20% of respondents believe that probiotic dairy products are more expensive than normal dairy products and 46.8% of respondents believe that probiotic dairy products are not more expensive than normal dairy products.

4. CONCLUSION

The majority of respondents in the study were male (69%), belonged to the 20-25 years age group, were studying in undergraduate course (71%), their family background belonged to agriculture (50%) and their family's monthly

income was around ₹ 40000(37%). Further, the Majority of respondents students belonged to rural areas and they were found to be aware of probiotic dairy products.

The main source of awareness of the respondents about probiotic dairy products was found to be books, social media and friends & family. The finding also suggests that most of the respondents consume probiotic dairy products every week and some probiotic dairy products were consumed occasionally. Lassi, buttermilk, ice cream and dahi were probiotic products that were purchased most by respondents. Consumer preference toward the Amul brand was found to be higher compared to other brands.

Only around 3% of respondents had indicated dissatisfaction with probiotics dairy products. A majority of respondents (73%) purchased probiotic dairy products mainly because of its health and nutritional benefits. Further, around half of the respondents believed that probiotic dairy products were more expensive than normal dairy products. The aware respondents (97%) in the study were satisfied and were willing to recommend probiotic dairy products to their family and friends.

Overall, while some research indicates that general awareness of probiotics is low, this study limited to students, shows a higher level of awareness and consumption of probiotic dairy products.

5. RECOMMENDATIONS

Based on the survey findings, several recommendations can enhance awareness and consumption of probiotic dairy products among college students. Implementing educational campaigns in colleges, leveraging social media and targeting promotions in rural and agricultural

areas can increase knowledge and interest in probiotics. Addressing the perception of high costs through discounts and affordable packaging, ensuring a variety of probiotic products in local markets and building trust through quality assurance and endorsements by health professionals is crucial. Additionally, establishing feedback mechanisms can help manufacturers address any dissatisfaction and continuously improve their products.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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