

## EMBRACING DIVERSITY: EXPLORING THE GLOBAL IMPACT OF MILK AND DAIRY CONSUMPTION ON HUMAN HEALTH

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### ABSTRACT

Milk and dairy products play pivotal roles in global dietary habits, with bovine milk dominating production and Ayurveda emphasizing their therapeutic value. While ancient wisdom extols the benefits of cow's milk and clarified butter (ghrita), contemporary research continues to uncover their precise mechanisms of action. Recent studies corroborate dairy's potential in mitigating cardiovascular diseases, diabetes, cancers, and dementia. Beyond their nutritional content, dairy products harbor biologically active compounds vital for human health, impacting digestion and immunity. Calcium, a cornerstone mineral in dairy, influences skeletal development and oral health throughout life stages, while also potentially benefiting lipid metabolism. Contrary to prior concerns, high-fat dairy consumption exhibits neutral or positive effects on cholesterol levels, with whole milk even elevating beneficial HDL cholesterol. A variety of milk, from raw to reconstituted, offer diverse options catering to different dietary needs and preferences. Whether consumed in its natural state or processed into various products, milk remains a fundamental source of nutrition for individuals of all ages, contributing significantly to global health and well-being.

**KEYWORDS:** Milk, Milk Products, Complete Food, Nutritional Composition, Health Benefits, Comparative Study .

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### Article History

Received: 21 Jun 2024 | Revised: 25 Jun 2024 | Accepted: 30 Jun 2024

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### INTRODUCTION

Milk is a vital aspect of the dietary regimen for approximately 6 billion individuals. Bovine milk holds a predominant position in global milk production, accounting for around 83% of the total output. Over about three decades, there has been a notable rise in milk production levels. The annual global milk production amounts to an impressive 730 million tons. <sup>[1]</sup>

India holds the title of the largest producer of milk globally. Products containing substantial portions of milk and their constituents are called dairy products. Indian dairy products encompass those derived within the country. The benefits of dairy products have been acknowledged since ancient Vedic times. Dairy constitutes an integral component of the food culture in the Nordic countries; hence, the incorporation of milk and dairy products into the diet is likely to feel inherent for many Nordic individuals. <sup>[2]</sup>

In addition to milk, various dairy products such as cream, butter, yogurt, kefir, and cheese have been produced and consumed for centuries. Consequently, the impact of milk and dairy products on human health holds considerable

quantitative significance. Ayurveda, a time-honored Indian medical system with over 2000 years of practice, takes a holistic approach to well-being. This ancient science prioritizes personalized treatments and medications, giving equal weight to both medicine and dietary considerations. In Ayurveda, health is perceived as the harmonious equilibrium of all anatomical, physiological, and psychological elements within an individual.<sup>[3]</sup>

Although Ayurveda utilizes milk and its derivatives for both preventive and therapeutic purposes, the precise rationale behind these specific formulations and their corresponding effects remains to be fully understood.<sup>[3]</sup>

According to Ayurveda, milk from a variety of animals is utilized, with eight main types specified, including cow, buffalo, goat, camel, human, sheep, elephant, and single-hoofed animals like horses. Among these, cow's milk is regarded as the most beneficial. Additionally, among all lipid preparations, ghrta (clarified butter) is deemed the most superior. It is recommended to incorporate these milk varieties and ghrta into daily consumption for promoting healthy living. According to Ayurveda, incorporating milk and ghee into the daily diet is deemed essential to enhance individual health. Furthermore, recent studies have indicated that increased consumption of milk and dairy products might offer protective benefits against coronary heart disease, stroke, diabetes, certain cancers, and dementia.<sup>[3]</sup>

Milk and dairy products serve as fundamental food sources for people of all ages due to their essential biological components, which are crucial for promoting and maintaining proper nutrition across populations. With its significant nutritional value, milk stands as a multifaceted mixture primarily composed of lactose, vitamins, and minerals.<sup>[4]</sup>

Many vital micronutrients, including calcium, magnesium, potassium, zinc, and phosphorus, are provided in a readily absorbable form. Considered a vital food source, milk provides children with significant proportions of essential nutrients: 51% of calcium, 31% of phosphorus, 27% of zinc, 41% of iodine, 15% of selenium, 39% of Vitamin B2, 42% of retinol, 20% of Vitamin B12, 24% of protein, and 18% of magnesium, based on recommended daily intake. However, the dietary contribution of milk and dairy products differs for adults. By consuming the recommended daily intake of these products, adults typically acquire 45% of calcium, 24% of phosphorus, 20% of zinc, 32% of iodine, 11% of selenium, 29% of Vitamin B2, 30% of retinol, 20% of Vitamin B12, 18% of protein, and 11% of magnesium.<sup>[4]</sup>

Fat and carbs are significant energy sources and minerals fundamental for teeth, bones, and body cells. Nutrients are expected for guidelines and performing crucial activities for the body. Proteins in milk contain all the essential amino acids in enormous amounts, so milk proteins are eluded as a complete protein. Milk fat assumes a huge part in nutritive qualities. Besides filling in as a rich wellspring of energy, milk fat also contains critical measures of fundamental unsaturated fats. Lactose supplies energy assists with laying out a somewhat acidic response in the digestive system and works with absorption. Aside from nutritional values of milk and dairy products their biologically active compounds (bioactive peptides, probiotic bacteria, antioxidants, vitamins, specific proteins, oligosaccharides, Nutrients, organic acids, highly absorbable calcium, conjugated linoleic acid and others) have crucial impacts on human functioning and health.<sup>[5]</sup>

Milk minerals are essential for human health and development, playing a crucial role in dairy processes like cheese-making and in traits involving salt-protein interactions. They are particularly important for promoting healthy nutrition and development throughout life, with childhood being a critical stage. Adequate calcium intake is vital for influencing skeletal calcium retention during growth, thereby affecting peak bone mass achieved in early adulthood. Calcium levels are pivotal for bone development, strength, and density in children, and for preventing bone loss and osteoporotic fractures in the elderly. Moreover, studies suggest that regular consumption of dairy foods and milk can help prevent periodontal disease. Additionally, calcium has been shown to be beneficial in reducing cholesterol absorption and

in managing body weight and blood pressure. Recent research indicates that high-fat milk and dairy products do not lead to an increase in total and LDL cholesterol levels, as shown in several studies. Moreover, whole milk has been found to significantly elevate high-density lipoprotein (HDL) cholesterol concentrations when compared to skimmed milk.<sup>[6]</sup>

## MILK

Milk is a liquid secretion produced by the mammary glands of mature female mammals, containing nearly all essential nutrients necessary for sustaining life. Throughout history, humans have utilized the milk of goats, sheep, and cows as a source of nourishment. Presently, the term "milk" primarily refers to bovine milk, even though the milk of different animals, such as sheep or goats, is also commercially available.<sup>[1]</sup>

### Varieties of Milk

- Raw liquid milk (also known as fresh milk) must adhere to strict sanitary regulations.
- Whole milk undergoes heat treatment and typically contains approximately 3% fat. It can also be standardized to a predetermined fat content, which must be at least 3.5%.
- Low-fat milk undergoes heat treatment, with cream separated to achieve a fat content of 1.52%. Skim milk is heat-treated, with a fat content below 0.3%.
- Reconstituted milk is commonly found in areas where milk production is not feasible (e.g., many Japanese cities). Here, liquified dispersible fat is emulsified into a suspension of skim milk powder at 45°C. A "cream" with a fat content of 20-30% undergoes two stages of homogenization (at 20 and 5 MPa, 55-60°C) and is diluted with a skim milk suspension.
- Filled milk is more cost-effective as it replaces butterfat with plant-based fat.<sup>[1]</sup>

## METHODOLOGY

The information in this survey was obtained from online a verification consisting of completing a survey of dairy customers in INDIA. The study involved 150 people from 15-20, 21-25, 26-30, 31-35, 36-40, 41-45 who were tested at various levels. The survey included questions about the purpose behind dairy purchases, how often they were consumed, Type of milk, and where they were purchased.

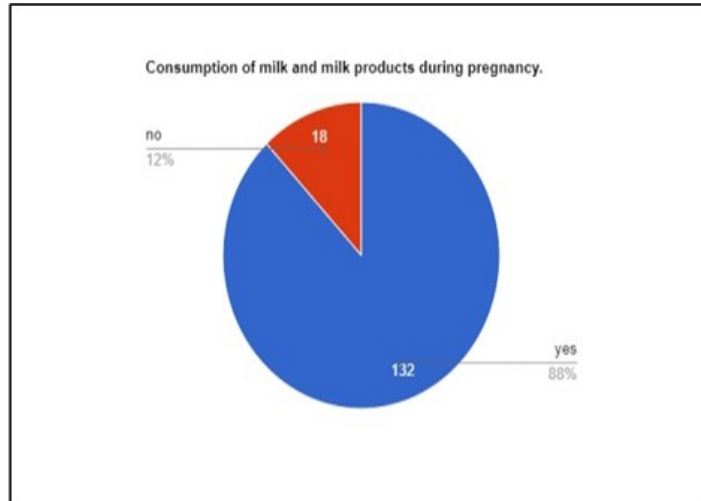
## DATA AND ANALYSIS

To understand market research, we chose one examiner because it is the easiest and most well-known method of investigating purchasing behavior and patterns in milk and dairy products. The survey used contained eight questions, and the results of each question are as follows:

### Q1- Consumption of Milk and Milk Products during Pregnancy

**Table 1: Evaluation of the Questionnaire**

	Frequency	Percentage
Yes	132	88%
No	18	12%



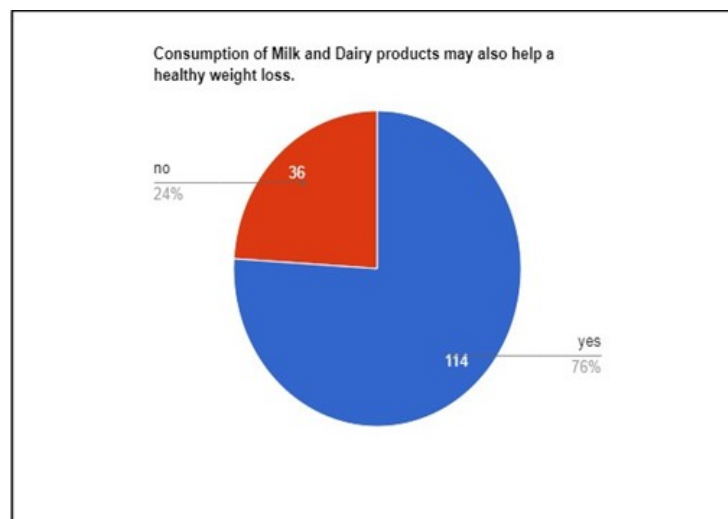
**Figure 1**

- 132 (88%) answered "Yes" to consuming milk and milk products during pregnancy.
- 18 (12%) answered "No" to consuming milk and milk products during pregnancy. This suggests that most respondents (88%) reported consuming milk and milk products during their pregnancies, while a minority (12%) did not.

**Q 2- Consumption of Milk and Dairy Products may also Help a Healthy Weight Loss**

**Table 2: Evaluation of the Questionnaire**

	Frequency	Percentage
Yes	114	76%
No	36	24%



**Figure 2**

The data from Table 2 indicates responses from another questionnaire, likely focusing on whether consumption of milk and dairy products aids in healthy weight loss. Here's the breakdown:

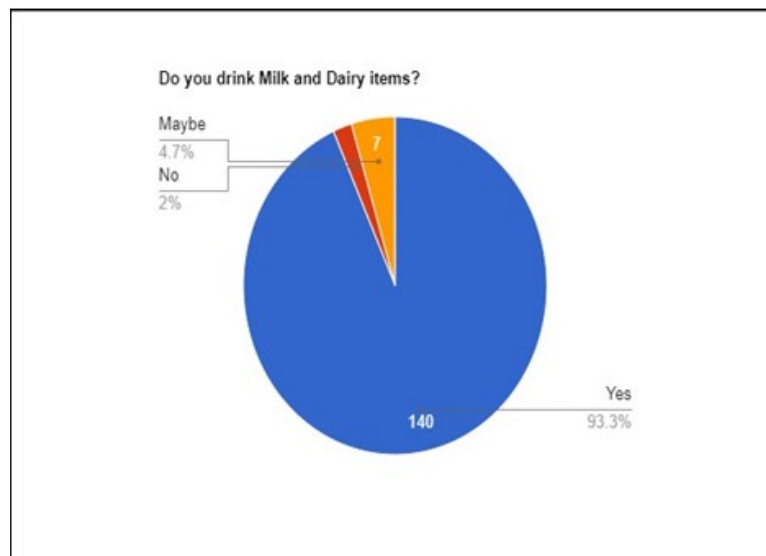
- 114 respondents (76%) answered "Yes," suggesting they believe that consumption of milk and dairy products can help with healthy weight loss.
- 36 respondents (24%) answered "No," indicating they do not believe milk and dairy consumption aids in healthy weight loss.

This data suggests that most respondents (76%) perceive a positive correlation between consuming milk and dairy products and achieving healthy weight loss, while a minority (24%) do not share this belief.

**Q 3- Do you Drink Milk and Dairy Items?**

**Table 3: Evaluation of the Questionnaire**

	Frequency	Percentage
Yes	140	93.3%
No	3	2%
Maybe	7	4.7%



**Figure 3**

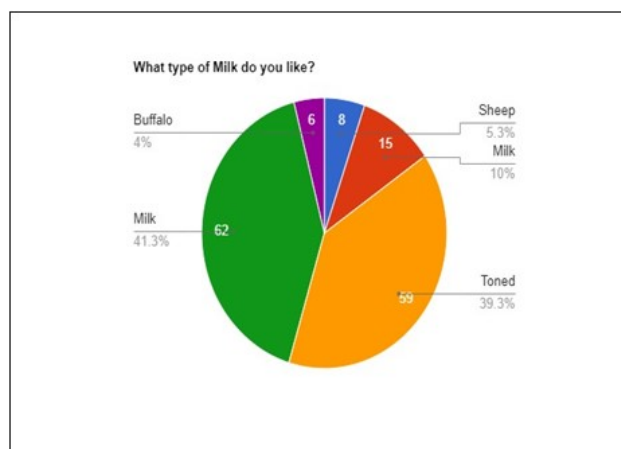
The data in Table 3 presents responses from a questionnaire regarding the consumption of milk and dairy items. Here's the breakdown:

- 140 respondents (93.3%) answered "Yes," indicating that they do consume milk and dairy items.
- 3 respondents (2%) answered "No," suggesting they do not consume milk and dairy items.
- 7 respondents (4.7%) answered "Maybe," implying uncertainty or occasional consumption. This data illustrates that most respondents (93.3%) reported consuming milk and dairy items, with only a small percentage either abstaining from or uncertain about their consumption.

#### Q4- What Type of Milk do you Like?

**Table 4: Evaluation of the Questionnaire**

	Frequency	Percentage
Sheep Milk	8	5.3%
Toned Milk	15	10%
Buffalo Milk	59	39.3%
Cow Milk	62	41.3%
Goat Milk	6	4%



**Figure 4**

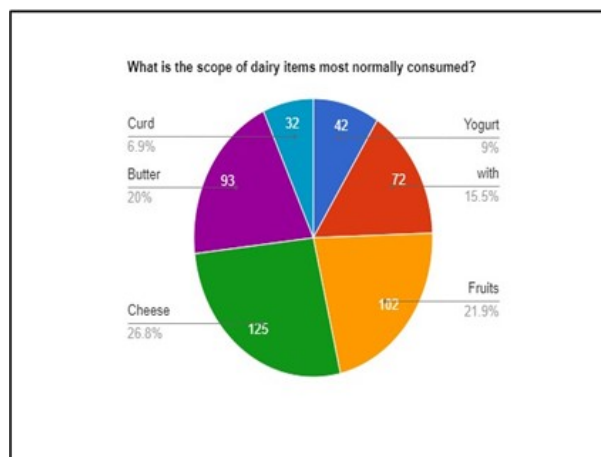
The data in Table 4 presents responses from a questionnaire asking about preferences for different types of milk. Here's the breakdown:

- 8 respondents (5.3%) prefer Sheep Milk.
- 15 respondents (10%) prefer Toned Milk.
- 59 respondents (39.3%) prefer Buffalo Milk.
- 62 respondents (41.3%) prefer Cow Milk.

#### Q 5- What is the Scope of Dairy Items Most Normally Consumed?

**Table 5: Evaluation of the Questionnaire**

	Frequency	Percentage
Yogurt with Fruits	42	28%
Cheese	72	48%
Butter	102	68%
Curd	125	83.3%
Ice-creams	93	62%
Cream	32	21.3%



**Figure 5**

The data from Table 5 provides insights into the scope of dairy items commonly consumed based on the responses from the questionnaire. Here's the breakdown:

- Yogurt with Fruits: 42 respondents (28%) reported consuming this dairy item.
- Cheese: 72 respondents (48%) reported consuming cheese.
- Butter: 102 respondents (68%) reported consuming butter.
- Curd: 125 respondents (83.3%) reported consuming curd.
- Ice creams: 93 respondents (62%) reported consuming ice cream.
- Cream: 32 respondents (21.3%) reported consuming cream.

From this data, we can see that curd and butter are the most consumed dairy items, with 83.3% and 68% of respondents reporting consumption, respectively. Cheese and ice cream are also quite popular among respondents, with 48% and 62% reporting consumption, respectively. Yogurt with fruits and cream is consumed by a relatively smaller percentage of respondents.

## DISCUSSION

The paper aptly highlights the historical reverence for milk and dairy products, dating back to ancient practices such as Ayurveda. This holistic medical system emphasizes personalized dietary recommendations, endorsing the consumption of cow's milk and clarified butter (ghrita) for their therapeutic benefits. Milk emerges as a complete food source, rich in essential nutrients such as proteins, carbohydrates, fats, vitamins, and minerals. The study underscores the pivotal role of milk minerals, particularly calcium, in promoting skeletal development, oral health, and overall nutrition across various life stages. Furthermore, the presence of biologically active compounds in dairy products underscores their potential in impacting digestion, immunity, and overall human functioning. Contrary to past concerns, recent scientific evidence suggests neutral or even positive effects of high-fat dairy consumption on cholesterol levels, with whole milk demonstrating a capacity to elevate beneficial HDL cholesterol. Moreover, the paper discusses the potential of milk and dairy products in mitigating chronic diseases such as cardiovascular diseases, diabetes, cancers, and dementia, thus aligning with the therapeutic claims of ancient practices like Ayurveda. The study provides a comprehensive exploration of

the global impact of milk and dairy consumption on human health. By synthesizing insights from ancient traditions and contemporary research, the study sheds light on the nutritional, therapeutic, and cultural significance of dairy products, paving the way for future research and public health initiatives aimed at optimizing human health and well-being.

## CONCLUSION

In conclusion, milk and dairy products represent integral components of global dietary habits, enriched with essential nutrients vital for human well-being. From ancient traditions like Ayurveda to modern scientific research, the therapeutic value of dairy, particularly cow's milk and clarified butter, has been acknowledged and validated. Recent studies affirm their potential in combating chronic diseases such as cardiovascular diseases, diabetes, cancers, and dementia. Contrary to past concerns, high-fat dairy consumption shows neutral or positive effects on cholesterol levels, with whole milk even boosting beneficial HDL cholesterol. The nutritional richness of dairy, encompassing proteins, carbohydrates, fats, vitamins, and minerals, contributes significantly to overall health, impacting digestion, immunity, and human functioning. Milk minerals, notably calcium, play pivotal roles in skeletal development, oral health, and overall nutrition across various life stages. With diverse options catering to different dietary needs and preferences, milk remains a cornerstone of nutrition, fostering global health and well-being. In essence, milk and dairy products emerge as complete foods, supported by ancient wisdom and contemporary science, promising to promote and sustain human health across diverse populations.

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