

RESEARCH ARTICLE

Purchase and consumption pattern of milk and dairy products in Salem district of Tamil Nadu

K T Surya and K Ponnusamy*(✉)

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Abstract: Dairy consumption is witnessing gradual transformation across the socio-economic groups in India. Analysis of milk purchase and consumption pattern across men, women and children would generate better insights to formulate policies and strategies thus promoting the right purchase and consumption behaviour. Accordingly, this study was conducted during 2022-2023 in the Salem district which is the highest milk producing district in Tamil Nadu. Three blocks viz., Thalaivasal, Konganapuram and Salem were selected with varying levels of milk production and urbanization. The sample size constituted 225 comprising 25 men, women and children each in each of three blocks who were randomly chosen. The respondents were interviewed using a pre-tested interview schedule. The collected data were analysed for gaining better understanding about consumption behaviour. The quantity of milk purchased per day varied between 1 and 2 litres and less than a litre for 39.56 per cent and 23.11 per cent of households respectively. About three-fourth of the adults (74.67%) consumed less milk than the recommended level by ICMR (300 ml per day) whereas none of the children consumed the recommended level of milk per day. The factors such as age, awareness regarding health benefits of milk and monthly expenses on milk and milk products had a positive relationship on milk consumption level whereas cost per litre of milk had an inverse relationship. The findings suggest raising the awareness about recommended milk consumption levels and educating parents for promoting better dietary habits and healthy living among people.

Key words: Dairy products, Milk consumption pattern, Better dietary habits, Salem district

Introduction

Milk is a complete food for human beings with all essential nutrients including minerals (Fuente et al. 2003) and serve as the basis for health and wellness for all age groups. Consumption of milk and milk products play a critical role in the wellbeing of

people (Ponnusamy and Chakravarty, 2018; Ponnusamy, 2019). The per capita consumption of milk in India was only 124 g per day in 1950-51 which rose to 444 g per day in 2022 (DAHD, 2022). As per ICMR - National Institute of Nutrition's "Dietary Guidelines for Indians-A manual", the milk consumption level recommended is 300 ml/day for both active and sedentary men and women and 500 ml/day for children under 18 years of age. Milk-consuming population has been increasing in increasing trends in rural as well as in urban areas, which is about 78 per cent and 85 per cent respectively (NSSO, 2012).

The probability of milk consumption appears to be positively related to age, education level and income level (Robb et al. 2007). Consumption of dairy products per consumption unit showed an increasing trend with an increase in family income, which continues to have income elastic demand (Shilpashree et al. 2016). The future demand for dairy products can be predicted to be high, due to rise in per capita income (Kale et al. 2018). Despite the increasing trend in overall milk consumption, there remains an inadequacy of comprehensive understanding regarding the dynamics of milk purchase and consumption patterns across different sections of the society. Thus, the study aimed is to investigate the factors influencing milk consumption patterns and also to assess the differences in milk purchase and consumption behaviour among men, women and children across different sections of the society. By elucidating these aspects, the study endeavours to contribute valuable insights to the discourse on nutrition policy and public health initiatives, thereby fostering informed decision-making and promoting the well-being of the populace.

Materials and Methods

The study was conducted in the Salem district of Tamil Nadu during December 2022 and January 2023. Ex-post facto research design was used in this study. In this context, the variables related to milk consumption levels were measured based on data that had already been happened, rather than being manipulated or controlled by the researcher.

In Tamil Nadu, Salem district was selected for the study because it stands first in the average milk sales per day (1,86,494 litres per

Dairy Extension Division

ICAR-National Dairy Research Institute, Karnal-132001, Haryana

(✉) Email: ponnusamyk@hotmail.com

*Present address: Social Science, ICAR-Central Plantation Crops Research Institute, Kasaragod-671124, Kerala

day) among the District Unions (Animal Husbandry, Dairying, Fisheries and Fishermen Welfare Department, 2023). It was assumed that higher milk sale can be associated with highest milk consumption as well. Out of 20 blocks in the Salem district, Thalaivasal and Konganapuram were chosen for the study as they stood as the highest and lowest milk producing blocks respectively (Statistical Handbook 2020-21, 2021). This would help in comparing the differences in milk purchase and consumption pattern among the highest and lowest milk producing blocks. In addition, Salem block was also chosen because it was the most urbanized block in the Salem district, making it suitable for comparing it with rural areas namely Thalaivasal and Konganapuram blocks for observing variations between urban and rural households. From each of the three blocks, 75 respondents were randomly selected, comprising 25 Men, 25 Women and 25 Children (10 to 18 years of age). This age group was selected as it is suitable for evaluating milk consumption level from school children. In total, the study comprised of 225 respondents including 75 men, 75 women and 75 children.

Personal interviews were conducted with the respondents using a pretested structured interview schedule to collect primary data. A pre-testing phase was conducted in different locations in the Ariyalur district of Tamil Nadu in November, 2022. The collected data were then scored, tabulated and analysed using MS-Excel 2021 and SPSS software version 22 to draw rational and meaningful conclusions. Variables were categorized into frequency and percentage for interpretation of findings. Regression analysis was carried out to observe the factors affecting milk consumption level of respondents.

Results and Discussion

Socio-economic profile

Milk consumption varies among different age groups with respect to individual preferences and availability of alternatives. From the results, other than children population, more than one third of population belonged to the working age population, that is, middle age group (35.55%). It is evident that in Salem, almost half of the population had better educational status. Education is often associated with awareness and knowledge level of people (Ponnusamy et al. 2016). Higher level of education will have a profound influence on changes in lifestyle habits and better knowledge regarding healthy diet.

The monthly family income will have a significant effect on the healthy diet intake of a family. A larger percentage (65.33%) was belonging to the income range between Rs. 2000 and Rs. 33491, followed by medium (25.33%) and high (9.33%) income groups. A study conducted in the Nagpur city propounded a substantial relationship between income level and expenditure on milk and milk products. Consumption ranges from 168.01 ml per day in the

low-income group (monthly income up to Rs. 20,000) to 211.54 ml in the high-income group (monthly income beyond Rs. 60,000), with an average per head consumption rate of 193.47 ml per day (Anole et al. 2021).

Milk purchase pattern

Households that do not have dairy animals have to depend on open-market for purchase of milk and milk products. From the Table 1, It is observed that a two-fifth of households (39.56%) were found to be purchasing 1 to 2 liters of milk per day. About one-fourth (23.11%) were found to be purchasing less than a liter of milk per day. Only 5.33 per cent of households were found to be buying more than two liters of milk per day. One-third (32.00%) of the households were found to be not purchasing milk.

The probable reason for number of people buying milk between 1 and 2 liters might be using milk not only for the purpose of drinking as tea, coffee or plain milk but also for preparing curd, lassi, ghee and other milk sweets. The reason for the very low percentage of people purchasing more than two litres of milk may be due to the low percentage of large families with more than seven members (4.44%) in the study area. It was observed that households with fewer than four members in the family were more common in the study area (71.11%), which means that they do not need to buy more than one litre of milk per day. Apart from those who maintain cattle, some of the respondents were found to be drinking milk in their workplace, while a few of them were found not to be drinking milk.

Form of milk purchase

About two-third (64.05%) of the respondent's households were found to be buying loose milk which is followed by packet milk (35.95%). None of the respondents were found to be buying milk powder. Major proportion of the sample belonged to rural households where loose milk is more readily available consumers often perceived about loose milk to be fresher and tastier than packet milk. In addition, there may not be as many supermarkets or convenience stores in rural areas that sell packet milk. In addition, loose milk was found to be often cheaper than packet milk. Milk powder was not a popular choice, even in urban areas, which might be due to its perceived lack of freshness and nutrition as well as habits of consuming /using fresh milk traditionally.

Table 1: Distribution of respondents according to milk purchase

| Quantity of milk purchase in litres | F (P) |
|-------------------------------------|------------|
| No milk purchase | 72 (32.00) |
| Less than a litre per day | 52 (23.11) |
| 1 to 2 litres per day | 89 (39.56) |
| More than 2 litres per day | 12 (5.33) |
| Total | 225 (100) |

F – Frequency; P – Per cent

Amount spent on milk and milk products per month

More than half of the respondents (52.29%) were spending between Rs. 900 and Rs. 1271 for purchase of milk and milk products per month, as compared to medium (Rs. 1272-1593) and high category (Rs. 1594-3000) respectively. The economic conditions and consumption behaviour determine the spending on milk and milk products and majority restrict their spending to daily liquid milk consumption. The higher disposable income of respondents prompts them to spend on variety of milk and milk products, but they still represent a relatively smaller proportion of population. It was observed that milk plays a major role in the diet of households without much of difference in their age and income level. Milk is consumed as an essential supplement for daily nutrition requirements, especially for children and age-old people.

Milk and milk products consumption pattern in the study area

Quantity of milk consumption per day

For adults, the quantity of milk consumption per day was found to be less than ICMR recommendation for about three-fourth of the population (74.67%) as observed from the Table 2. Only a 16.67 per cent were found to be drinking the recommended milk consumption level. Less than five per centage of the population were not milk consumers (4.67%) and four per cent consumed more than recommended level. Only a 10 per cent of the urban consumers were drinking milk to the recommended level whereas 14 per cent and 26 per cent of the milk consumers were meeting the recommended milk consumption level in lowest milk producing and highest milk producing blocks respectively in the Salem district. Also, Salem urban area was found with greater per cent of people drinking less than the recommended level (84%), whereas it is comparatively less in the rural areas like Konganapuram (74%) and Thalaivasal (66%).

People who restrict milk consumption were found to more in the both the rural areas namely Konganapuram (12%) and Thalaivasal (7%) whereas all the respondents were found to drink milk in the

urban area. It can be observed that 6 per cent of the population in Salem and Thalaivasal block were found to be drinking more than the recommended level of milk consumption. A considerable per cent of people drinking more than the recommended level might be due to their tea or coffee consuming habits in their work places during brakes. Also, some of the respondents reported that they will not be able to work without drinking tea or coffee which shows their addiction towards them.

Lack of knowledge about the recommended level of milk consumption might be a possible reason for maximum percentage of people for not drinking milk to the recommended level. Despite being an urban area, the milk consumption level was found to be less in Salem which shows that location of the respondents doesn't have any dent on the milk consumption level. This inequality in milk and milk products consumption was also observed in rural and urban Kerala (Krishnadas et al. 2016). Overall, there is need to educate people about the health benefits of milk and make them aware about the recommended milk consumption levels.

None of the children were found to be meeting the recommended level and also all the children were milk drinkers. Though children in all the three blocks were milk drinkers, the milk consumption level is not meeting the recommended level. Most of the adolescents in India does not meet the recommended level of dairy intake (Gopinath et al. 2014). Parents need to be educated about the recommended milk consumption level of children as well as adults. Additionally, in schools the health benefits of milk and recommended milk consumptions levels should be taught which in turn increase the awareness level of parents also. It is to be noted that mass media can play prominent role in influencing the consumption behaviour of people.

Quantity of milk and milk products consumption per month

On a monthly basis a majority of the respondents were found to be consuming a medium quantity (6-8.5 litres) of milk and milk products per month (58.67%). About 22.67 per cent of the

Table 2: Distribution of respondents according to milk consumption level among adults and children

| Categories | Konganapuram | Salem | Thalaivasal | Overall |
|---|--------------|----------|-------------|-------------|
| | F (P) | F (P) | F (P) | F (P) |
| No milk consumption | 6(12) | 0 (0) | 1 (2) | 7 (4.67) |
| Less than recommendation (<250 ml) | 37 (74) | 42 (84) | 33 (66) | 112 (74.67) |
| Meeting the recommendation (250-350 ml) | 7 (14) | 5 (10) | 13 (26) | 25 (16.67) |
| Exceeding the recommendation (>350ml) | 0 (0) | 3 (6) | 3 (6) | 6 (4) |
| Total | 75 (100) | 75 (100) | 75 (100) | 225 (100) |
| No milk consumption | 0 (0) | 0(0) | 0(0) | 0(0) |
| Less than recommendation (<450 ml) | 25(100) | 25(100) | 25 (100) | 75 (100) |
| Meeting the recommendation (450-550 ml) | 0 (0) | 0 (0) | 0 (0) | 0 (0) |
| Exceeding the recommendation (>550) | 0 (0) | 0 (0) | 0 (0) | 0 (0) |
| Total | 25 (100) | 25 (100) | 25 (100) | 75 (100) |

F – Frequency; P – Per cent

respondents were found to be drinking lower quantity of milk with 2.5 litre to 6 litres per month. High quantity of milk consumption was found with 18.67 per cent of respondents (8.5 to 20 litres per month). Higher percentage of medium level milk consumers were found in the Salem block (64%). Apart from milk beverages like tea and coffee, people also intake milk products like curd, ghee, butter milk, paneer and other milk sweets on a weekly basis, which increase their milk consumption level per month. Urban area was found with more milk consumption per month due to ready availability of milk products like curd, paneer and other milk products when compared to rural areas.

Preferred milk product

Based on the method of garret ranking (Table 3), it was found that beverages like tea/coffee is the most preferred milk product by the consumers in all the three blocks as well as overall category with a high Total Garrett Mean (TGM) score. In Salem district tea and coffee play a major role in the consumption pattern of commercial consumers (Selvakumar and Yoganandan, 2019). The curd, milk sweets, ghee and other milk products were given 2nd, 3rd, 4th and 5th places respectively. Curd was second most preferred milk product in all the three blocks.

Beverages like tea and coffee were consumed by people twice or sometimes thrice everyday which makes it the most preferred milk product. Curd was consumed three to four times per week

which makes it the second most preferred milk product. Sweets were liked by people more than any other milk product. Ghee and other milk beverages were least preferred compared to other milk products which might be due to their least quantity of consumption and as well as people consume them very often. Cost and availability of the milk products also makes an important role for the preference of milk products of consumers. Low cost and easily available milk products were consumed more often and preferred by the consumers.

While studying the milk consumption levels it was found that only 4.89 per cent of the respondents were found to be lactose intolerant. The lactose intolerance was found either with the respondents’ family members, neighbours, friends or the respondent themselves. The reason for very less percentage of people admitting about lactose intolerant might be either they may be lactose intolerant without knowing about its symptoms or they may not come across any visible symptoms of lactose intolerance. There is need to educate people about lactose intolerance and suggest alternatives for lactose intolerance.

Factors influencing the milk consumption level per month of respondents

The identification of factors influencing the milk consumption level per month of respondents helps in determining the policy measures to be undertaken to increase their milk consumption

Table 3: Distribution of respondents according to preference for milk product

| Milk products | Konganapuram | | Salem | | Thalaivasal | | Overall | |
|----------------------|--------------|------|-------|------|-------------|------|---------|------|
| | TGM | Rank | TGM | Rank | TGM | Rank | TGM | Rank |
| Coffee/Tea | 74.3 | 1 | 73.3 | 1 | 73.3 | 1 | 73.67 | 1 |
| Curd | 57.3 | 2 | 57.5 | 2 | 56.7 | 2 | 57.16 | 2 |
| Sweets | 43.4 | 4 | 44.2 | 3 | 48.6 | 3 | 45.40 | 3 |
| Ghee | 48.7 | 3 | 43.7 | 4 | 43.3 | 4 | 45.22 | 4 |
| Other milk beverages | 26.3 | 5 | 31.3 | 5 | 28.1 | 5 | 28.56 | 5 |

TGM-Total Garrett Mean

Table 4: Factors influencing the milk consumption level of respondents

| Variables | Beta | Std. Error | T | p-value |
|--|----------|------------|--------|---------|
| Age | 39.699 | 9.864 | 4.025 | 0.000** |
| Education level | 6.777 | 39.739 | 0.171 | 0.865 |
| Monthly income | -0.002 | 0.002 | -0.952 | 0.342 |
| Family size | -124.574 | 105.495 | -1.181 | 0.239 |
| Awareness on health benefits of milk | 271.067 | 32.443 | 8.355 | 0.000** |
| Herd size | -41.774 | 107.978 | -0.387 | 0.699 |
| Milk production per day | 19.988 | 19.562 | 1.022 | 0.308 |
| Cost of milk per litre | -73.074 | 28.108 | -2.600 | 0.010* |
| Monthly expense on milk and milk products | 2.472 | 0.417 | 5.925 | 0.000** |
| Model summary of regression analysis of factors influencing milk consumption level | | | | |
| R square | | F | | p-value |
| 0.45 | | 19.850 | | 0.000** |

**Significant at 1% level of significance, * Significant at 5% level of significance

levels. The results of regression analysis are presented in Table 4. Out of the nine selected independent variables four are found to have significant relationship with milk consumption level of respondents. The model comprising nine independent variables were found to explain 45 per cent of the variance there by confirming to the model at 1 per cent level of significance (Table 4).

The significant factors identified out of this regression analysis are age, awareness on health benefits of milk, cost of milk per liter and monthly expenses on milk and milk products. Among these three variables, age of the respondent, awareness on health benefits of milk and monthly expenses on milk and milk products had a significant relationship with the milk consumption level at 1 per cent level of significance. This implies that as the age of the respondent increases, their milk consumption also tends to increase. Respondents who prefer spending more on milk and milk products will tend to have a high level of milk consumption. The cost per liter of milk had significant relationship with the milk consumption level at 5 per cent level of significance but a negative association was found. It implies that as the cost per liter of milk increases the level of milk consumption tend to decrease. Further, none of the other variables are found to be influencing the milk consumption level of respondents. It signifies the need for more of such studies in the study area to find the potential impact of these variables in the milk consumption level of respondents. It brings forth the fact that affordability of consumers is having a direct bearing on the consumption level of milk and milk products. The differential pricing pattern among cooperative and private dairies also makes an impact on the sales pattern of their respective products in the market, warranting rationalization of pricing strategies to capture the demand potential. In addition to the nine independent variables, variables such as medical condition (lactose intolerance), proximity and availability of milk throughout the day and night, peer-pressure and psychological and behavioral factors related to milk consumption may explain the remaining 65 per cent of the variance.

Conclusion

Although the purchase of liquid milk is prevalent among households, measures should be strengthened to increase the purchasing habits of other milk products as well. Awareness regarding milk benefits had greater impact on the milk consumption levels. Raising awareness about recommended milk consumption levels would promote milk consumption and health of living among people. Educational institutes should be encouraged to offer one course on healthy lifestyle practices encompassing milk as a healthy diet and importance of making healthy lifestyle choices in school syllabus which can have drastic impact on the family members too. Healthcare professionals, including doctors and dieticians, can play a crucial role in increasing awareness about milk benefits. Their personalized recommendations to patients and clients will further reinforce

the importance of milk consumption for maintaining good health. Policies should aim at formulating targeted awareness campaigns that strengthens the education of public about the various health benefits of milk and milk products.

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