

## Original Research Article

# FOOD SAFETY KNOWLEDGE AND QUALITY OF WORK LIFE AMONG DAIRY PLANT WORKERS IN KOLAR: A CROSS-SECTIONAL SURVEY

Pruthvi. P<sup>1</sup>, Harshitha H. N<sup>2</sup>, Prasanna Kamath B.T<sup>3</sup>

<sup>1</sup>Postgraduate, Department of Community Medicine, Sri Devaraj Urs Medical College, Sri Devaraj Urs Academy of Higher Education and Research (A Deemed to be University), Tamaka, Kolar, Karnataka, India.

<sup>2</sup>Assistant Professor, Department of Community Medicine, Kasturba Medical College, Manipal Academy of Higher Education, Manipal, Karnataka, India.

<sup>3</sup>Professor, Department of Community Medicine, Sri Devaraj Urs Medical College, Sri Devaraj Urs Academy of Higher Education and Research (A Deemed to be University), Tamaka, Kolar, Karnataka, India.

Received : 12/05/2025  
Received in revised form : 19/05/2025  
Accepted : 23/05/2025

## Corresponding Author:

Dr. Pruthvi.P,

Postgraduate, Department of Community Medicine, Sri Devaraj Urs Medical College, Sri Devaraj Urs Academy of Higher Education and Research (A Deemed to be University), Tamaka, Kolar, Karnataka, India.  
Email:pruthvimsp3@gmail.com

DOI: 10.70034/ijmedph.2025.2.253

Source of Support: Nil,

Conflict of Interest: None declared

Int J Med Pub Health

2025; 15 (2); 1407-1411

## ABSTRACT

**Background:** Dairy products are one of the most used products globally. Foodborne diseases (FBD) are linked to outbreaks and pose a significant threat to global public health security, making them a matter of international concern. Ensuring food safety has become an increasingly important public health priority. **Objectives:** 1. To assess the knowledge of food safety in dairy plant workers and the quality of their work life.

**Materials and Methods:** A cross-sectional study was conducted at a southern district of India. Systematic Random Sampling technique was used for selection of participants. 3-point Likert scale was used for assessing food safety knowledge and behavior. A 5-point Likert scale was used for assessing quality of Work life.

**Results:** A total of 364 workers participated in the study who were working across various units of the dairy plant. 277(76%) had good knowledge of food safety. There was significant association of Knowledge and practices of food safety with socio-demographic factors such as education, working unit and years of work experience. 89.2% of the participants had good quality of life and it was significantly associated with age, marital status and working unit.

**Conclusion:** The food safety knowledge and practices are good among dairy plant workers. The quality of work life is good in the majority of the dairy industry employees.

**Keywords:** Across sectional, dairy plant, food safety, Occupational health, Quality of worklife.

## INTRODUCTION

The World Health Organization (WHO) estimates that 600 million people—almost 1 in 10 worldwide—fall ill due to contaminated food each year, leading to approximately 420,000 deaths (WHO, 2020).<sup>[1]</sup>

Foodborne diseases (FBD) are linked to outbreaks and pose a significant threat to global public health security, making them a matter of international concern.<sup>[2]</sup> Ensuring food safety has become an increasingly important public health priority.<sup>[3]</sup>

Dairy products are one of the most used products globally. The dairy industry is the leading

commercial enterprise that deals with the processing and harvesting of cow or buffalo milk for the large-scale production, distribution, and consumption of various dairy products. The dairy industry should be concerned about dairy food safety because, outbreaks of disease in humans have been majorly traced to the consumption of unpasteurized milk, entry of foodborne pathogens via contaminated raw milk into dairy food processing plants can lead to persistence of these pathogens in biofilms, and subsequent contamination of processed milk products and exposure of consumers to pathogenic bacteria.<sup>[4]</sup> The dairy products that are produced from raw milk are often found to contain *Staphylococcus aureus*, *Salmonella* spp., *Listeria*

monocytogenes, and *E. coli*, which are among the most common pathogens.<sup>[5]</sup> In addition, *Staphylococcus aureus*, *Listeria monocytogenes*, and *Salmonella* spp. may contribute to bovine mastitis and can be directly excreted in milk. The highest burden of foodborne illness per capita has been reported in Africa, with a median foodborne disability-adjusted life-year (DALY) of 2455 per 100,000 populations.<sup>[5]</sup> In this study, we assess the knowledge of food safety on dairy products and the behaviour towards keeping the safety standards recommended in dairy plant.<sup>[6]</sup>

The concern of Quality of Work Life (QWL) is taking a centre stage in providing good working conditions to the employees across all the sectors. Since people are the main resources in the organisation, their productivity and efficiency depend on the work quality experienced in the organisations. The basic purpose of QWL is to provide improved working conditions to the employees so that their productivity is increased.<sup>[7]</sup> Quality of work life is the degree to which members of a work organisation can satisfy important personal needs through their experiences in the organisation. QWL, as it is understood today, includes four essential elements: a) The programme seeks to promote human dignity and growth. b) Employees work collaboratively. c) They determine participation in work changes. d) The programmes assume compatibility of people and organisational goals. Quality of work life is explained in terms of eight broad conditions of employment that constitute desirable quality of work life - a) adequate and fair compensation, b) safe and healthy environment, c) growth and security, d) development of human capabilities, e) the total life space, f) constitutionalism, g) social integration, and h) social relevance for measuring QWL. Employees today are more likely to express a strong desire to have a harmonious balance among career, family life and leisure activities. This has been suggested at the international level the need for national policies in many countries. It is very important for organisations to help their employees to balance their work and non-work demands.<sup>[8-11]</sup> Milk and milk products are the essential consumable products, contamination of the same will lead to various diseases. Food safety knowledge of dairy products and adhering to the food safety standards will reduce the diseases, awareness of the same will help in reduction of risk factors of contamination.

An organisation which gives priority to enhance the quality of work life of its employees through job security, adequate compensation, scope for better career opportunities, creation of healthy work environment and the provision of suitable welfare benefits results in increased level of satisfaction, motivation, involvement, and commitment and brings transparency and cost consciousness among its employees. Employees feel a sense of ownership and belonging to the organisation and sacrifice their individual interests for the accomplishment of the

interest of the organisation. There is lack of studies pertaining to assessment of food safety knowledge and the quality of work life in Indian dairy plant workers. This study we have assessed the knowledge of food safety in dairy plant workers and quality of their work life.

## MATERIALS AND METHODS

We conducted a Cross-sectional study to assess the food safety and QWL of the Kolar-Chikkaballapura District Co-operative Milk Producers Union Ltd. (KO-CHIMUL) workers from November 2023 – March 2024. We selected the study participants in accordance with the study conducted in Dakshina Kannada Co-operative Milk Union Ltd in 2017 where 75.4% agreed upon having safe and favourable environment at workplace. Taking this into consideration, the minimum sample size calculated is 300. (With the formula  $4pq/d^2$ ,  $d = 5\%$ ).<sup>[12]</sup>

364 participants who were employees of KO-CHIMUL were selected using Systematic Random Sampling technique. Participants were randomly chosen from the list of workers provided from all the units of dairy plant (Processing unit, Production unit, Milk product production unit, Packing and Dispatch unit, Administration unit, Security unit, Milk tank drivers and housekeeping unit).

Informed written consent was taken from the participants before their enrolment into the study. Those participants who were not present at the time of visit were excluded. The study protocol was approved by the Institutional Ethics Committee of SDUAHER. (SDUMC/KLR/IEC/462/2023-24)

A pre-tested, structured questionnaire was used to assess the sociodemographic details such as Age, gender, marital status, residence, education, working unit of the employee and monthly income. knowledge of food safety and behaviour towards safety measures while dealing with dairy products of dairy products in the workers were assessed using 3-point Likert's scale. (Agree-2, Disagree-1, Don't know/Neutral-0) Subsequent scoring and categorization was done, total score >13 was taken as good and score <13 was taken as poor, 13 being the mean score. The QWL of dairy plant workers were evaluated using 5-point Likert's scale. (Strongly agree-5, Agree-4, Neutral-3, Disagree-2, Strongly Disagree-1) The components included were as follows – 1. working experience (yrs.), 2. relationship with management, superiors, and colleagues, 3. Claiming medical insurance, 4. Attended any medical camp that was conducted in workstation, 5. Work environment (stress at work, work target achievement, work satisfaction, felt replaceable at work, and work-personal life balance), 6. Training program, 7. Equipment supply quality, 8. Transportation service, 9. Canteen service, 10. Gender specific toilets, 11. Drinking water facility, 12. Resting room facility, 13. Work

place safety, 14. Bonus facility, 15. Overall working experience. Subsequent scoring and categorization were done, total score >75 was taken as good and score <75 was taken as poor where 75 being the mean score.

Collected Data was entered in Microsoft office excel sheet and analysed using SPSS v 22 (IBM Corp). The association of food safety knowledge and QWL of the workers with sociodemographic characteristics with  $p < 0.05$  was considered statistically significant.

## RESULTS

Out of 364 consented participants, majority (37%) belonged to age group of 41-50yrs. And males (63%) were more than females. More than half of the residents (54%) were from rural area and majority were illiterate (40%). 80% of the workers were married, 60% of the workers were employed in milk handling units and majority (26%) had work experience of 5-10 years. The training and strict work discipline has made majority (76%) of the

workers to know and practice safe food handling practices in the dairy plant.

Working in this dairy plant accounts for a major employment hub in Kolar, majority of the workers (89%) could balance the work and personal life well, however we found 11% of them still battling with the occupational stress. Of the participants, 277 (76%) had good knowledge of food safety, while 87 (24%) had poor knowledge. Regarding food safety behaviour, 118 (32%) exhibited good practices, whereas 246 (68%) demonstrated poor behaviour. 325(89%) had good QWL and 39(11%) had poor QWL here age group, working units were having statistical significance.

Knowledge on food safety was found to be significantly associated with gender, residence, education, working units and years of work experience. Whereas the behaviour was found to be significantly associated with age, education, working units and years of work experience. The Quality of work life also showed significant association with sociodemographic factors such as age, education, marital status and working units.

**Table 1: Sociodemographic details of the milk plant workers**

Sl. No	Particulars	Frequency (n=364)	Percentage
1	Age group		
	18-30	64	18%
	31-40	74	20%
	41-50	136	37%
2	51-60	90	25%
	Gender		
	Male	230	63%
	Female	134	37%
3	Residence		
	Urban	168	46%
	Rural	196	54%
4	Education		
	Illiterate	144	40%
	Primary school	46	13%
	Middle school	30	8%
	High school	42	12%
	PUC/Diploma	62	17%
	Graduation	36	9%
5.	Postgraduation	4	1%
	Marital status		
	Married	290	80%
	Unmarried	74	20%
6.	Monthly income		
	Rs <10,000	10	3%
	Rs 10,000 – 20,000	128	35%
	Rs 21,000 – 30,000	160	44%
	Rs 31,000 – 40,000	38	12%
7	Rs 41,000 – 50,000	28	6%
	Working units		
	Milk handling unit. (Processing unit, Production unit, Milk product production unit, Packing and Dispatch unit, housekeeping unit)	220	60%
	Non milk handling units (Administration unit, Security unit, Milk tank drivers)	144	40%
8	Work experience (yrs.)		
	<5	74	20%
	5-10	94	26%
	10-15	70	19%
	15-20	44	12%
	>20	82	23%

**Table 2: Association of Knowledge and Behaviour towards safe food handling scores with sociodemographic details**

Sl. No	Particulars	Poor knowledge n=87	Good knowledge n=277	Chi-square ( $<0.05$ )	Poor behaviour n=118	Good behaviour n=246	Chi-square ( $<0.05$ )
1	Age group (yrs.) 18-30 31-40 41-50 51-60	14(16.0%) 17(19.5%) 28(32.1%) 28(32.1%)	50 (18%) 57 (20.5%) 108(38.9%) 62 (22.3%)	0.311	40(33.8%) 14(11.8%) 44(37.2%) 20(16.9%)	24(9.7%) 60(24.3%) 92(37.3%) 70(28.4%)	0.01*
2	Gender Male Female	71(81.6%) 16(18.3%)	159(57.4%) 118(42.5%)	0.01*	80(67.7%) 38(32.2%)	150 (60.9%) 96 (39%)	0.125
3	Residence Urban Rural	31(35.6%) 56(64.3%)	137(49.4%) 140(50.5%)	0.01*	58(49.1%) 60(50.8%)	110 (44.7%) 136 (55.2%)	0.247
4	Education Illiterate Primary school Middle school High school PUC and above	55(63.2%) 14(16.1%) 4(4.5%) 4 (4.5%) 10 (11.4%)	89(32.1%) 32(11.5%) 26(9.3%) 38(13.7%) 92(33.2%)	$<0.001^*$	40(33.8%) 6(5.08%) 8(6.7%) 12(10.1%) 52(44%)	104(42.2%) 40(16.2%) 22(8.9%) 30(12.1%) 50(20.3%)	$<0.001^*$
5	Marital status Married Unmarried	73(83.9%) 14(16.1%)	217(78.3%) 60(21.6%)	0.167	78(66.1%) 40(33.8%)	212(86.1%) 34(13.8%)	0.01*
6	Working units A Milk handling unit. B Non milk handling units	17(19.5%) 70(80.4%)	203(73.2%) 74(20.6%)	0.01*	44(37.2%) 74(62.7%)	176(71.5%) 70(28.4%)	0.01*
7	Work experience (yrs.) <5 5-10 11-15 16-20 >20	23(26.4%) 12(13.7%) 8(9.1%) 12(13.7%) 32(36.7%)	51(18.4%) 82(29.6%) 62(22.3%) 32(11.5%) 50(18%)	0.01*	46(38.9%) 20(16.9%) 28(23.7%) 18(15.2%) 6(5%)	28(11.3%) 74(30%) 42(17%) 26(10.5%) 76(30.89%)	0.01*

\*p value less than 0.05 is taken as significant

**Table 3: Association of Quality of work life scores with sociodemographic details**

Sl. No	Particulars	Poor QWL (Score $\geq 75$ ) n=39	Good QWL (score $<75$ ) n=325	Chi-square ( $<0.05$ )
1	Age group (yrs.) 18-30 31-40 >41yrs	20 (51.2%) 17 (43.5%) 2 (5.1%)	44 (13.5%) 57 (17.5%) 224 (68.9%)	$<0.001^*$
2	Gender Male Female	31 (79.4%) 8 (20.5%)	199 (61.2%) 126 (38.7%)	0.172
3	Residence Urban Rural	20 (51.2%) 19 (48.7%)	148 (45.5%) 177 (54.4%)	0.301
4	Education Illiterate Primary school Middle/High school PUC and above	7 (17.9%) 10 (25.6%) 4 (10.2%) 18 (46.1%)	137 (42.1%) 36 (11%) 68 (20.9%) 84 (25.8%)	$<0.001^*$
5	Marital status Married Unmarried	21 (53.8%) 18 (46.1%)	259 (79.69%) 56 (17.2%)	$<0.001^*$
7	Working units A Milk handling unit. B Non milk handling units	18(46.1%) 21(53.8%)	202 (62.1%) 123 (37.8%)	0.041*
8	Work experience (yrs.) <5 5-10 11-15 16-20 >20	26 (66.6%) 7 (17.9%) 6 (15.3%) 0 0	48(14.76%) 87 (26.7%) 64 (19.6%) 44 (13.5%) 82 (25.2%)	

\*p value less than 0.05 is taken as significant

## DISCUSSION

Our study suggests that only 76% of workers had sufficient knowledge and 68% had good attitude towards food safety which is in line with cross-sectional survey by Chen Y et al, 2016 in Beijing, northern China among 194 dairy plant workers interviewed there was sufficient level of knowledge (78%) and 99% had good attitude.<sup>[13]</sup> In the study conducted by M. S.Kayshar et al in 2021,<sup>[14]</sup> the majority of participants reported having a fair level of awareness of general hygiene and sanitary procedures in the workplace, such as washing hands before work (96%), wearing gloves (90%), and food storage knowledge (89.3%) which is close to our study findings, 100% of the workers washed their hands and wore personal protective equipment before handling the milk and its products.

67% of workers in KO-CHIMUL had a highly satisfied overall experience at work, cross-sectional study by Dr. Yogesh Jain in 2014 on the comparative study on Chatratl and Charotar regions of Gujrat on working conditions observed 70% of respondents to be satisfied with their jobs.<sup>[15]</sup> 21.3% are highly satisfied for providing good transportation facilities in the study on QWL conducted by N Navaneeth in VKA dairy farm workers, Karur in 2023,<sup>[16]</sup> whereas in our study 44% of workers were satisfied with the transportation facility given. QWL is a multi-dimensional concept influenced by individual and workplace factors. Understanding the relationship between age, education, marital status, and working units helps organizations design policies that improve employee well-being, job satisfaction, and overall productivity. Implementing flexible work arrangements, professional development programs, and mental health support can enhance QWL across different employee groups.

## CONCLUSION

In our study, we have observed that workers in KO-CHIMUL have sufficient knowledge and required behaviour regarding the food safety. Based on the findings of this study, we propose the implementation of recreational programs and the establishment of regular health camps or health checkups for further enhancement of the quality of work-life among dairy plant workers. By incorporating such measures, we anticipate a positive impact on both the overall well-being of the workers and the sustained improvement of food safety practices within the dairy plant.

### Limitations

We have included only 364 participants of the whole dairy plant workers in different units, the overall picture might be different compared to the

study as not every worker has given his/her opinion on the work life in the dairy.

**Financial support and sponsorship:** Nil

**Conflict of interest:** Nil

## REFERENCES

1. World Health Organization (WHO). (2020). Food safety: Key facts. Retrieved from <https://www.who.int/news-room/fact-sheets/detail/food-safety>
2. Adesokan HK, Akinseye VO, Adesokan GA. Food safety training is associated with improved knowledge and behaviours among foodservice establishments' workers. *Int J Food Sci.* 2015; 2015:328761.
3. Osimani A, Aquilanti L, Tavoletti S, Clementi F. Evaluation of the HACCP system in a university canteen: microbiological monitoring and internal auditing as verification tools. *Int J Environ Res Public Health.* 2013;10(4):1572–85.
4. Oliver SP, Jayarao BM, Almeida RA. Foodborne pathogens in milk and the dairy farm environment: food safety and public health implications. *Foodborne Pathogens & Disease.* 2005 Jun 1;2(2):115–29.
5. Hassani S, Moosavy MH, Gharajalar SN, Khatibi SA, Hajibemani A, Barabadi Z. High prevalence of antibiotic resistance in pathogenic foodborne bacteria isolated from bovine milk. *Scientific Reports.* 2022 Mar 9;12(1):3878.
6. World Health Organization. Investing to overcome the global impact of neglected tropical diseases: third WHO report on neglected tropical diseases 2015. World Health Organization; 2015 Aug 5.
7. Adhikari DR. Human resources management for public enterprises: a model for designing jobs in Nepalese factories. na; 1992.
8. Guest RH. Quality of work life, learning from Tarrytown. *Harvard University Graduate School of Business Administration;* 1979 Jul.
9. Walton RE. Improving the quality of work life. *Harvard Business Review.* 1974 May;52(3):12.
10. Nachmias D. The quality of work life in the federal bureaucracy: Conceptualization and measurement. *The American Review of Public Administration.* 1988 Jun;18(2):165–73.
11. Nadler DA, Lawler 3rd EE. Quality of work life: Perspectives and directions. *Organizational dynamics.* 1983 Jan 1;11(3):20–30.
12. Ganesh A. A Case Study on Quality of Work Life with Respect to Dakshina Kannada Co-operative Milk Union Ltd. *Journal of Rural and Industrial Development Volume.* 2017 Apr 1;5(1).
13. Chen Y, Ji H, Chen LJ, Jiang R, Wu YN. Food safety knowledge, attitudes and behaviour among dairy plant workers in Beijing, northern China. *International journal of environmental research and public health.* 2018 Jan;15(1):63.
14. Kayshar MS, Arifin MS, Rana MM, Akter SS, Hossain MN, Jubayer MF. Factors Associated with the Current State of Food Safety Knowledge and Practices among the 'Doi' Workers in Bogura, Bangladesh: A Cross-sectional Study. *European Journal of Agriculture and Food Sciences.* 2021 Nov 9;3(6):8–14.
15. Jain DY, Thomas RE. Quality of work life: A comparative study of selected food units of Chatratl and Charotar region of Gujarat. *IRMJCR.* 2014;2(2):145–52.
16. Navaneeth N, Ramprathap K. A STUDY ON FACTORS INFLUENCING ON QUALITY OF WORK LIFE WITH REFERENCE TO V.K.A DAIRY FARMS, KARUR. *International Research Journal of Modernization in Engineering Technology and Science.* 2023 May;5(5):2582–5208.