Section: Community Medicine

Original Research Article

A CROSS-SECTIONAL KAP STUDY OF FOOD SAFETY MEASURES (WHO) AMONG RURAL HOUSEHOLDS IN BELAGAVI DISTRICT, KARNATAKA

Shilpa Reddy Ganta[1], Deepti. M. Kadeangdi[2], Amit Kumar[3], Anish Prabhakar[4], Macha Niranjan Reddy[5]

[1]Assistant Professor, Department of Community Medicine, TMMC & RC, Moradabad, Uttar Pradesh, India.
2Associate Professor, JNMC, Kaher, India.
[3]Assitant Professor, Department of Community Medicine, TMMC & RC, Moradabad, Uttar Pradesh, India.
[4]Associate Professor, Department of Community Medicine, TMMC & RC, Moradabad, Uttar Pradesh, India.
[5]Assistant Professor, Department of Anaesthesiology, TMMC & RC, Moradabad, Uttar Pradesh, India.

Received : 30/09/2023
Received in revised form : 10/11/2023
Accepted : 25/11/2023

Keywords:
Attitude, five keys for food safety, knowledge, practice, rural households.

Corresponding Author:
Dr. Shilpa Reddy Ganta,
Email: dr.reddyshilpa21@gmail.com

DOI: 10.47009/jamp.2023.5.6.107

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2023; 5 (6); 525-530

Abstract

Background: Food is essential for human growth and development, but it can become contaminated when it comes into contact with various factors such as water, air, dust, equipment, sewage, insects, and rats. Inadequate hygiene practices among food handlers can also lead to food contamination. Improper production, preparation, and handling of food make it a significant source of infectious agents for the human body. The objective of this study was to assess knowledge, attitude, and practices of food safety measures among rural households of Belagavi using the World Health Organization (WHO) "Five keys for food safety." **Materials and Methods:** A cross-sectional study was carried out in the rural households residing within the practice areas of Rural Health Training Centre, Primary Health Centre, Kinaye, in the Belagavi Taluka and District of Karnataka State. The study spanned over a duration of one year, starting from January 1, 2017, and ending on December 31, 2017. **Result:** Out of the 400 rural households included in the study, the sociodemographic characteristics of the participants revealed that 63.3% were between the ages of 18 and 35, with a mean age of 33.48 ± 13.5 years. According to the modified BG Prasad classification, 41.3% of the households fell under socioeconomic status Class IV. The majority of the participants came from nuclear families (65.3%). **Conclusion:** The KAP of food safety among rural households is crucial. Knowledge gaps and varying attitudes exist, leading to inadequate practices and potential health risks.

INTRODUCTION

Access to an ample and secure food supply that is both safe and nutritious is critical for maintaining and promoting good health. Regrettably, consuming contaminated food can lead to the development of more than 200 illnesses, spanning from common conditions like diarrhoea to serious diseases like cancer. These illnesses are caused by the presence of harmful bacteria, viruses, parasites, or chemical substances in the contaminated food. It is crucial to prioritize measures that ensure food safety to prevent the occurrence of these illnesses and safeguard the well-being of individuals.[1]

Food handlers play a crucial role in maintaining food safety throughout the process of food production and storage.[2,3] They can unintentionally transmit pathogens from contaminated sources, such as raw meat, to ready-to-eat meals. These individuals may carry and spread foodborne pathogens like hepatitis A, norovirus, Salmonella typhi, Staphylococcus aureus, and Shigella spp. on their hands, face, skin, and even body hair, especially if they have cuts or wounds.[4] Additionally, food handlers who are recovering from infections can transmit pathogens like Escherichia coli O157:H7 and nontyphoid Salmonella.[5] Food hygiene encompasses all necessary conditions and measures to ensure the safety and suitability of food throughout its production stages.[6] By practicing good food hygiene, the risk of food contamination and subsequent infections can be minimized.

ISSN (O): 2687-5365; ISSN (P): 2753-6556

The World Health Organization (WHO) designated the theme for 'World Health Day' in 2015 as "From farm to plate, make food safe," reflecting the concerning global status of food safety. The primary objective of observing this day is to encourage policy decisions regarding food safety, promote population health, and advocate for improved food safety practices.[7] To assess food hygiene and ensure adequate cooking and serving practices, WHO provides the 'Five Keys for Safer Food.' These guidelines serve as a tool to identify areas of contamination and take appropriate measures to prevent foodborne illnesses. The key messages of the 'Five Keys to Safer Food' are: 1) Maintain cleanliness, 2) Separate raw and cooked foods, 3) Thoroughly cook food, 4) Keep food at safe temperatures, and 5) Use safe water and raw materials.[8] These guidelines aim to enhance food safety and reduce the risk of foodborne diseases.

MATERIALS AND METHODS

A cross-sectional study was carried out in the rural households residing within the practice areas of Rural Health Training Centre, specifically Primary Health Centre, Kinaye, in the Belagavi Taluka and District of Karnataka State. The study spanned over a duration of one year, starting from January 1, 2017, and ending on December 31, 2017.

The sample size for the study was determined using the formula n = 4pq/d^2, where the prevalence (p) of knowledge about food safety in households was assumed to be 50%, and the acceptable error (d) was set at 5%. Therefore, a sample size of 400 was calculated for the rural households. The total number of households was obtained from the relevant health centre.

Among the nine sub-centres in the rural practice area, the Kinaye sub-center was randomly selected for the study. Data collection was focused on three villages within the Kinaye sub-center, namely Kinaye, Bahadurwadi, and Rankunde. The total number of households in the Kinaye sub-center was 970, and a population-proportional sample was conducted. The sampling interval of 2.4 was calculated, resulting in the selection of every second household for data collection in all three villages.

Prior to data collection, the study obtained ethical approval from the Institutional Ethics Committee for Human Subject Research at the Medical School on October 17, 2016, as indicated in the letter (MDC/DOME/5). Written informed consent was obtained from all participants involved in the study before proceeding with data collection.

The investigator conducted data collection through home visits. The study targeted women above the age of 18 who were regularly involved in meal preparation within rural households and had a permanent residence in the region for at least one year. Cooks who were not family members and households that were consistently locked during three consecutive visits were excluded from the study. A face-to-face interview was conducted using a pre-tested questionnaire provided by the WHO, focusing on the five keys to food safety. Sociodemographic information and cooking methods within the past six months were obtained from a household member. The participants' knowledge, attitudes, and everyday food safety practices were observed. Following the interview, the study participants received health education on the importance of the five keys to food safety. Printed brochures, prepared and translated according to WHO guidelines, along with best practices, were distributed to all households.

RESULTS

Out of the 400 rural households included in the study, the sociodemographic characteristics of the participants revealed that 63.3% were between the ages of 18 and 35, with a mean age of 33.48 ± 13.5 years. About 78.8% of the participants identified themselves as Hindus. The majority of the participants were married (94.8%). Regarding education, 83.2% of the participants were literate, with 46% having completed secondary education and 16.8% having completed primary education. Among the participants, 57% were homemakers, while 10% were engaged in other occupations such as farming, labour, and shop keeping. According to the modified BG Prasad classification, 41.3% of the households fell under socioeconomic status Class IV. The majority of the participants came from nuclear families (65.3%). [Table 1].

An overwhelming majority of the participants (98.7%) demonstrated awareness that hands should be washed before handling food. Approximately 86.2% of the participants knew about the importance of storing raw food separately from cooked food. However, only 43.7% were aware that the same cutting board should not be used for both raw and cooked food. Knowledge about thoroughly reheating cooked food was reported by 55% of the participants, while 72.8% knew that cooked food should be served hot. Surprisingly, only 19% of the participants were aware that the appearance of water does not indicate its safety.[Table 2].

A significant proportion of participants (71.5%) acknowledged the necessity of boiling soups and stews to ensure food safety. Approximately 51.8% of participants agreed that thawing food in a cool place is a safe practice. Moreover, 32.5% of participants recognized the potential risks of leaving cooked food outside of the refrigerator for more than 2 hours. [Table 3].

A large majority of the participants (86.5%) consistently practiced handwashing before or during food preparation. A smaller percentage (19.3%) reported always reheating cooked food until it reached a high temperature. Additionally, 21.5% of participants admitted to never thawing frozen food in the refrigerator or a cool place, while 4.3%

ISSN (O): 2687-5365; ISSN (P): 2753-6556

acknowledged not storing leftover cooked food in a cool place within 2 hours. [Table 4].

The participants achieved an average knowledge score of 6.57 ± 1.58 out of a total score of 11. Their mean attitude score was 15.14 ± 2 out of a total score of 18. In terms of practice, the participants achieved a mean score of 25.12 ± 4.55 out of a total score of 40. When considering the WHO's "Five keys for food safety," the mean knowledge scores were satisfactory for the first key - keep clean (1.61 ± 0.49) and the second key - separate raw and cooked food (1.30 ± 0.06).[Table 5].

The mean knowledge score was higher among participants in the age groups of 18 to 25 years (6.7 ± 1.56), 25 to 35 years (6.65 ± 1.5), and 35 to 45 years (6.71 ± 1.83) compared to those in the older age groups of 45 to 55 years (5.9 ± 1.53) and over 55 years (6.52 ± 1.58). The difference in knowledge scores between age groups was statistically significant for the 45 to 55 years age group ($p = 0.002$). Regarding attitude scores, the mean scores were 15.62 ± 2.12 for socioeconomic class I, 15.05 ± 2.36 for class II, 15.2 ± 2.06 for class III, 14.69 ± 2.30 for class IV, and 15.34 ± 2.28 for class V. However, there was no statistically significant difference in attitude scores based on socioeconomic status.

Table 1: Distribution of study participants according to the sociodemographic details (n=400)

Socio demographic details	
Age group (years)	**n%**
18 to 25	143 (35.8 %)
25 to 35	110 (27.5 %)
35 to 45	58 (14.5 %)
45 to 55	49 (12.3 %)
55 and above	40 (10.0 %)
RELIGION	
Hindu	315 (78.8%)
Muslim	85 (21.2%)
Others	0
EDUCATION STATUS	
Illiterate	67 (16.8%)
Primary	67 (16.8%)
Secondary 209 (52.3)	184 (46%)
PUC/diploma	41 (10.3%)
Graduates	41 (10.3%)
OCCUPATION	
Home maker	228 (57 %)
Farmer	92 (23 %)
Labourers	40 (10 %)
Others	40 (10 %)
SOCIO-ECONOMIC STATUS	
Class I	16 (4 %)
Class II	54 (13.5 %)
Class III	70 (17.5 %)
Class IV	165 (41.3 %)
Class V	95 (23.8 %)
MARITAL STATUS	
Married	379 (94.8 %)
Unmarried	12 (3 %)
Widow	9 (2.2 %)
TYPE OF FAMILY	
Nuclear	261 (65.3 %)
Joint	139 (34.8 %)
Pucca	133 (33.3 %)
Semi Pucca	172 (43 %)
Kuccha	95 (23.8 %)

Table 2: Distribution of study participants according to the knowledge on the World Health Organization Five keys for food safety (n=400)

Knowledge on who five keys for food safety	**n (%)**
Key one - keep clean	
Wash hands before food handling (true)	395 (98.7 %)
Wiping cloth can spread microorganisms (true)	250 (62.5 %)
KEY TWO - SEPARATE RAW AND COOKED FOOD	
Same cutting board used for raw and cooked food (false)	175 (43.7 %)
Raw food store separately from cooked food (true)	345 (86.2 %)
KNOWLEDGE OF FOOD SAFETY (COOK THOROUGHLY)	
Cooked food need not be thoroughly reheated(False)	220 (55%)
Proper cooking up to 40˚C (False)	70 (17.5%)
KNOWLEDGE OF FOOD SAFETY (KEEP FOOD AT SAFE TEMPERATURE)	
Cooked meal can be left at room temperature overnight (False)	172 (43%)

ISSN (O): 2687-5365; ISSN (P): 2753-6556

Cooked food should be served hot (True)	291 (72.8%)
Refrigerating food slows bacterial growth (True)	237 (59.3%)
KNOWLEDGE OF FOOD SAFETY (USE SAFE WATER AND RAW MATERIALS)	
Safe water identity by the way it looks (False)	76 (19%)
Wash fruit and vegetables (True)	398 (99.5%)

Table 3: Distribution of participants according to the attitude toward the World Health Organization Five keys for food safety (n=400)

Attitude toward WHO five keys for food safety	Agree, n (%)	Not sure, n (%)	Disagree, n (%)
Key one - keep clean			
Frequent hand washing during food preparation worth	392 (98)	2 (0.5)	6 (1.5)
Keep kitchen surface clean reduce risk of illness	393 (98.3)	4 (1)	3 (0.5)
Key two - separate raw and cooked food			
Keeping raw and cooked food separate helps to prevent illness	332 (83)	37 (9.3)	31 (7.8)
Different knives and cutting boards for raw and cooked food worth	309 (77.3)	46 (11.5)	45 (11.3)
Key three - cook thoroughly			
Soup and stews boiled for safety	286 (71.5)	44 (11)	70 (17.5)
Key four - keep food at safe temperature			
Thawing food in cool place is safe	207 (51.8)	129 (32.3)	64 (16)
Unsafe to leave cooked food out of refrigerator >2 h	130 (32.5)	133 (33.3)	137 (34.3)
Key five - use safe water and raw materials			
Inspecting food for freshness and wholesomeness - valuable	387 (96.8)	11 (2.8)	2 (0.5)
Important to throw food beyond expiry date	386 (96.5)	6 (1.5)	8 (2)

Table 4: Distribution of participants according to the practice of the World Health Organization Five keys for food safety (n=400)

Practice of who five keys for food safety	Always (%)	Most times (%)	Sometimes (%)	Not often (%)	Never (%)
Practice hand wash before or during food preparation	86.5	11.5	1.8	0	0.3
Practice cleaning of kitchen surface for food preparation before reuse on other food	82.3	10.5	4	2.8	0.5
Practice of use of separate utensils and cutting board	55.3	20	6.3	8.7	9.7
Practice of separate raw and cooked food during storage	60.5	25	5	6.5	3
Practice of checking meat cooked thoroughly	15.3	3.3	4.8	17.8	59
Reheat cooked food	19.3	23.3	26.5	17	14
Thaw frozen food in refrigerator or cool place	21.5	14.5	17.8	21	25.3
Practice store left- over food in cool place within 2 hours	4.3	7.5	11.5	19.3	57.5
Practice check and throw away food beyond expiry date	22	18	3	4.8	50.8
Practice wash fruits and vegetables with safe water	86.8	10	1.3	1	1

Table 5: Distribution of study participants according to knowledge regarding the World Health Organization Five keys for food safety

WHO Key	Knowledge	Max. score	Mean ± SD
			Rural (n = 400)
Key 1	Keep clean	2	1.61 ± 0.49
Key 2	Separate raw and cooked food	2	1.30 ± 0.063
Key 3	Cook thoroughly	2	0.73 ± 0.64
Key 4	Keep food at safe temperature	3	1.75 ± 0.88
Key 5	Use safe water and raw materials	2	1.19 ± 0.40

DISCUSSION

Limited research has been conducted on the knowledge, attitude, and practices of the WHO's "Five keys for food safety" specifically among women at the household level in an Indian context. Comparing the results of previous studies with the present study is challenging due to differences in participant groups (such as food handlers in restaurants, messes, street vendors, etc.), diverse sociocultural cooking practices in India, and variations in criteria used to define knowledge, attitude, and food handling practices.

In our study, a high percentage of participants (100%) demonstrated awareness of the importance of handwashing before handling food. This finding is consistent with a study conducted in 2015 among 85 food handlers working in Malaysian canteens, where a similar proportion (100%) displayed knowledge regarding handwashing practices.[4] A study conducted in 2013 on 274 food handlers at food courts in Putrajaya, Malaysia, revealed that all respondents (100%) were aware of the potential health hazards associated with improper food storage. This finding aligns closely with our present study, where a high percentage (98.5%) of participants demonstrated knowledge regarding the risks of improper food storage.[5]

In our study, a lower percentage of participants (44%) demonstrated knowledge of the necessity to thoroughly reheat cooked food. This finding contrasts with a study conducted on 32 Anganwadi workers in Mandya, Karnataka, where a higher proportion (81.3%) were aware of the importance of thorough reheating for cooked food.[6]

ISSN (O): 2687-5365; ISSN (P): 2753-6556

In a study conducted on 72 primary food preparers in the United States, a small percentage (11.3%) were aware that clear juices are an indicator of thoroughly cooked chicken. This finding was lower than what we observed in our study (42.3%), where a higher proportion of participants demonstrated knowledge of using clear juices as a way to check for thorough cooking of chicken.[7]

In our study, 55.3% of participants demonstrated correct knowledge that cooked meat should not be left at room temperature overnight. However, this percentage was lower compared to a study conducted on Anganwadi workers in Mandya, Karnataka state, where a higher proportion (90.1%) displayed knowledge of this food safety practice.[6]

In our study, 48% of participants displayed knowledge that refrigerating food slows down bacterial growth. This finding is comparable to a study conducted on food handlers in Slovenia, where a similar proportion (63.4%) demonstrated awareness of this food safety principle.[8]

In a study conducted on 200 food handlers in Jordanian military hospitals, a high percentage (96%) of participants demonstrated knowledge that fruits and vegetables should be washed. This finding closely aligns with our study, where all participants (100%) exhibited awareness of the importance of washing fruits and vegetables.[9]

In our study, a majority of participants (98.5%) acknowledged the value of frequent handwashing during food preparation, which aligns with a similar study conducted on 200 residential units in Singapore (97.9%). Additionally, in our study, 76.3% of participants agreed that using different knives and cutting boards for raw and cooked food is beneficial, which closely resembles findings from a study conducted on 200 residential units in Singapore (75.4%).[10]

In our study, a majority of participants (98.3%) agreed on the importance of checking and discarding food beyond its expiry date, which is consistent with a study conducted on 200 residential units in Singapore (97.1%).In a separate study conducted on women in households of Kalaburgi, Karnataka, and India, the mean knowledge score for food safety was 8.65 ± 1.25 out of a total score of 11, the mean attitude score was 16.03 ± 1.75 out of a total score of 19, and the mean practice score was 30.87 ± 4.24 out of a total score of 38. These findings were comparable to our present study, where the mean knowledge score was 7.1 ± 1.47 out of a total score of 11, the mean attitude score was 15.45 ± 1.65 out of a total score of 18, and the mean practice score was 30.18 ± 4.21 out of a total score of 40.[11]

This study represents one of the pioneering attempts to assess knowledge, attitude, and practices regarding food safety among food handlers at the urban household level in an Indian context, utilizing the WHO's "five keys for food safety" as a framework. Data collection employed a standardized questionnaire sourced from the WHO food safety manual. However, a limitation of our study was that food safety practices were self-reported by the participants, without direct observation by the investigator, potentially leading to recall bias. Conducting an interventional study that evaluates changes in knowledge, attitude, and practices after health education and demonstrations would have been preferable, but resource and time constraints restricted us to conducting a KAP study.[12]

CONCLUSION

The KAP of food safety among rural households is crucial. Knowledge gaps and varying attitudes exist, leading to inadequate practices and potential health risks. Targeted education, collaboration, and interventions are needed to improve awareness, attitudes, and practices for a safer food environment in rural areas.

Limitation

Limitations in studying the KAP of food safety among rural households include self-reported data, potential recall biases, and difficulty in assessing actual food safety practices due to social desirability bias.

Acknowledgement

We authors acknowledge and appreciate the various individuals who made important contributions to our research, whether through expertise and guidance, institutional support, or active participation in the study.

REFERENCES

1. Khatoon, Ruby & Anwar, Shadma & Khalid, Mohammad & Hasan, Areeba & Khan, Tarique & Ahmad, Sharique. (2023). A KAP STUDY ON FOOD HYGIENE OF FOOD HANDLERS IN SEMI-URBAN LUCKNOW. International Journal of Academic Medicine and Pharmacy. 5. 67-72. 10.47009/jamp.2023.5.1.16.
2. Abdallah M. A., Suliman S. E., Bakhiet A. O. Food safety knowledge and practices of street-food vendors in atbara city (naher elneel state Sudan) African Journal of Biotechnology . 2009;8(24):6967–6971. [Google Scholar]
3. Sharif L., Obaidat M. M., Al-Dalalah M.-R. Food hygiene knowledge, attitudes and practices of the food handlers in the military hospitals. Food and Nutrition Sciences . 2013;04(03):245–251. doi: 10.4236/fns.2013.43033. [CrossRef] [Google Scholar]
4. Adams M. R., Moss M. O. Food microbiology. 2008. https://www.sciencedirect.com/journal/food-microbiology .
5. Fao W. Codex alimentarius international food standards. 2020. https://www.fssai.gov.in/cms/codex.php#:%7E:text=The%20Codex%20Alimentarius%20Commission(CAC,fair%20practices%20in%20food%20trade .
6. Kohli C and Garg S. Food safety in India: An unfinished agenda. MAMC J Med Sci 2015; 1(3):131-5. Available from: http://www.mamcjms.in/text.asp?2015/1/3/131/166308 [cited on 12/5/2018]
7. The WHO, Department of Food Safety, Zoonosis and Foodborne diseases, Five Keys to Safer Food Manual, 2006, pdf. Available from: http://www.who.int/foodsafety/publications/5keysmanual/en/ [cited on 27/06/2016]
8. Elizabeth Scott. Food safety and foodborne disease in 21st century homes. The Canadian Journal of Infectious Diseases, 14(5), 2003: 277–280, pdf. Available from:

ISSN (O): 2687-5365; ISSN (P): 2753-6556

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2094945/ [cited on 27/8/2016]
9. Gail C Frank, Community nutrition applying epidemiology to contemporary practice, 2nd edition, Sudbury ,Massachusetts, USA, Jones and Bartlett Publisher, Page no 261
10. Kohli C and Garg S. Food safety in India: An unfinished agenda. MAMC J Med Sci 2015; 1(3):131-5. Available from: http://www.mamcjms.in/text.asp?2015/1/3/131/166308 [cited on 12/5/2018]
11. The WHO, Department of Food Safety, Zoonosis and Foodborne diseases, Five Keys to Safer Food Manual, 2006, pdf. Available from: http://www.who. int/foodsafety/publications/5keysmanual/en/ [cited on 27/06/2016]
12. The WHO, The five keys for food safety program. Available from: http://www.who.int/foodsafety/consumer/5keys/en/ [cited on 05/09/2018]
13. Definition of food in English by Oxford Dictionaries, Oxford Dictionaries English, 2018. Available from https://en.oxforddictionaries.com/definition/food [cited on 18/10/2018]
14. The WHO, Foodborne disease outbreak, Guidelines for investigation and control, 2008, pdf Available from: http://www.who.int/foodsafety/publications/foodborne_disease/outbreak_guidelines.pdf [cited on 21/08/2018]
15. The WHO, Regional Office for South-East Asia, Foodborne illness, 2015, pdf. Available from: http://www.searo.who.int/entity/world_health_day/2015/foodborne-illnesses.pdf?ua=1 [cited on 12/07/2018]

ISSN (O): 2687-5365; ISSN (P): 2753-6556