Section: Community Medicine

Original Research Article

STUDY ON THE KNOWLEDGE, ATTITUDE AND PRACTICE REGARDING SAFE FOOD HANDLING AMONG PRIMARY FOOD HANDLERS IN RURAL AREAS OF SIVAKASI, TAMILNADU

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ABSTRACT

Background: Food safety means assurance that food is acceptable for human consumption according to its intended use, while everyone is exposed to foodborne health risks it is the poor who are most exposed and vulnerable to these risks. According to WHO, the five key principles of food hygiene are Preventing pathogens from people, pets, and pests from contaminating food, keeping raw and cooked foods separate to avoid cross-contamination, cook foods for the appropriate amount of time and temperature to kill pathogens, keep food at the appropriate temperature, Use only clean water and raw materials. The objective is to assess the knowledge, Attitude and Practice of safe food handling among the households in the rural areas of Sivakasi, Tamilnadu.

Materials and Methods: It was cross-sectional study done in rural areas of Sivakasi, from June 2022 to January 2023, the sample size was 178, multi-stage random sampling was adopted in 5 villages. The interviewer administered a Semi-structured questionnaire for collecting socio-demographic details and Knowledge, Attitude and Self Practice regarding safe food handling.

Results: Among the 179 study participants the safe food handling by the primary food handler's knowledge was 78.8%, Attitude was 75.4% and self-reporting practice was 67.4%. respectively. Self-Practice towards food safety was not adequate. Such non-compliance could result in outbreaks of foodborne illness. Therefore, is an urgent need to raise interest in food safety.

Conclusion: Among the 179 study participants the safe food handling by the primary food handler's knowledge was 78.8 %, Attitude was 75.4% and but Self-reporting practice was only 67.4%. "Knowledge is of no value, unless you put it into practice", this study demonstrates that the adequate Knowledge, Attitude and but self-Practice towards food safety was not adequate. Such non-compliance could result in outbreaks of foodborne illness. Therefore, is an urgent need to raise interest in food safety. The better female educational status would improve the KAP on food safety measures. Media campaigns pertaining to food safety measures may be organized as they provide an excellent opportunity for such information to be received by a large number of consumers including those at home. Knowledge needs to be sustained about the WHO's five key principles of food hygiene, which are keep clean, separate raw and cooked food, cook thoroughly, keep food at safe temperatures and use safe water.

Keywords: Primary Food handlers, Personal hygiene practices, Safe food handling, Cross-sectional study, KAP.

INTRODUCTION

Food is one of the most basic human needs. The food we eat provides nourishment and nutrition. However, it can also be a source of disease and illness. The difference between food as a source of energy and food as a source of illness is determined by the quality of the food consumed.[1] The foodborne illnesses are among the most widespread public health concern in the current scenario.[2] As per WHO food safety report each year 4,20,000 deaths were reported due to food borne diseases, among these 30% of deaths occur in children under 5 years of age. WHO estimates that Africa and South-East Asia have the highest burden of foodborne diseases.[3] As per the world bank report US$ 110 billion is lost each year in productivity and medical expenses resulting from unsafe food in low and middle-income countries.[4] Each year in India an estimated 100 million foodborne illnesses and 1,20,000 foodborne illness related deaths occur and 8,000,000 DALYs (Disability Adjusted Life Years) lost.[5]

Foodborne disease not only adversely affected people's health and well-being but also have negative economic consequences for individuals, families, communities, business and countries. These diseases impose a substantial burden on the healthcare system, trade and tourism markedly reduce economic productivity and threaten livelihood.[6]

According to WHO, the five key principles of food hygiene are:

- Preventing pathogens from people, pets, and pests from contaminating food.
- Keep raw and cooked foods separate to avoid cross-contamination.
- Cook foods for the appropriate amount of time and temperature to kill pathogens.
- Keep food at the appropriate temperature.
- Use only clean water and raw materials.[7]

Food handling consists all steps involved in storing, preparing, and preserving food until it is ready for consumption. The food storage aspect of food hygiene is concerned with preserving the quality of the food so that it remains fresh when used in various recipes. Cross-contamination is another important aspect of food hygiene. When cooking and preparation utensils are used with more than one type of food at the same time, cross contamination can occur[8]. Studies have found pathogenic microbes on found in food handler's hands and therefore these workers can be a source of foodborne diseases. [9,10] Contaminated food is one of the most serious health threats, and it is a leading cause of disease outbreaks and transmission. Food that has been stored for an extended period can spoil and often contain toxic chemicals or pathogens, and foods that are eaten raw, such as fruits and vegetables, can become contaminated by dirty hands, contaminated water, flies and other vectors. Chemical poisoning can also be caused by improperly prepared food. Half-cooked or overcooked foods, such as half-boiled eggs and overcooked meat, are unhealthy.[11]

Review of literature:

Nithya and Joice,[8] (2017) Study on awareness and practice regarding safe food handling practices among 150 women above the age of 18 years of rural-urban & tribal areas in Kannur district that 30% of the tribal population was unaware of safe food handling practices while only 4% and 12 % urban and rural population respectively were unaware of it. 80% of the tribal population unaware that the personal hygiene.

Chellaiyan et al,[12] (2018) Study on Food safety awareness and food handling practices among rural population of Tamilnadu was conducted among 200 participants in kelambakkam village, Kancheepuram district showed that 52% persons wash their hands before and only 8% wash after handling raw food, and only 37% wash their hands before and after handling raw food. 24.5% had the no knowledge about overcooking, 43% had knowledge about reheating of food is harmful.

Rakesh thakur et al,[13] (2020) Study on assessment of Food safety knowledge, Practices in Shimla city of Himachal Pradesh on 640 households surveyed 90% of respondents had knowledge about food storage and nearly all (99.8%) wash their hands, fruits, vegetables before eating. Almost all 99.7% respondents keep raw and cooked food separately and in covered containers.

Kalpana et al,[14] (2018) Study on Food safety knowledge, Attitude and Practices followed by 180 street food vendors in Chennai, 82.6% of the respondents possessed minimum knowledge on food safety. In food handling 86.5% used clean water for cooking and cleaning vessels, 52.9% used separate vessels for different foods. 60% store separately vegetarian and non-vegetarian food during storage. 68% used to cover the food items.

Somiya Gutbi Salim Mohammed,[15] (2006) Study on Food Safety Knowledge among women in Khartoum city, Sudan showed that age and education levels significantly influenced the confidence of ensuring food safety in purchasing and preparation of food. 75 % of respondents were following hand washing practices and 87.1% thawed frozen foods at room temperature.

Objective:

- To assess the knowledge, Attitude and Practice of safe food handling among the households in the rural areas of Sivakasi, Tamilnadu.

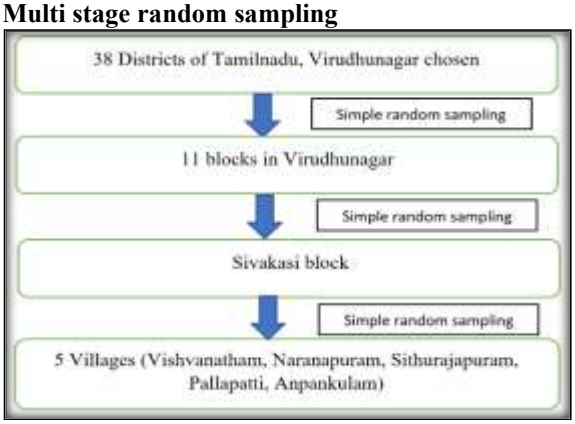
MATERIALS AND METHODS

A community based cross sectional study was conducted to assess the Knowledge, Attitude and Practice about safe food handling among primary food handlers above 18 years in rural areas of Sivakasi, from June 2022 to January 2023 using an interviewer administered semi structured questionnaire. The family who resides less than 6 months in that area and house found locked even after 2 attempts were excluded from the study. The sample

size was calculated based on the study by Nithya R. Joice 11 prevalence of 12% with 95% confidence interval and absolute precision of 5% with 10% non-responsive rate, the final sample size of 178 was derived. The sample size was calculated using the formula: n=z2 x pq/ d2.

Primary Food handler: Any person aged above 18 years who is largely responsible for food handling and distribution within the household. "Largely responsible" means that the female handles the food preparation and food distribution for more than two complete meals a day and at least five days a week within the household.

Multi stage random sampling



Sampling method:

PLACE	CENSUS	Number of Households	Proportionate sample for study
Viswantham	25,555	7134	43
Narnapuram	11,605	6268	37
Sithurajapuram	16,860	4728	29
Pallapatti	27,925	7831	47
Anupankulam	13,526	3679	22
	95,471	29,640	178

Source: Provisional Population Tool- Tamilnadu Census 2011 16

Study Tool: The study was conducted using a WHO five keys to safer manual questionnaire containing Knowledge, Attitude and Self practice related questions. The questionnaire was initially written in English before being translated into Tamil. To assess the accuracy of the translation, back translation was performed by professionals. Depending on the study participants preferred language, questions were delivered in both English and Tamil. The study was done among the participants after receiving final approval.

For the knowledge, attitude and self-practice questions, one point was assigned for each correct answer, each incorrect answer received zero points. The range of possible scores for the knowledge, attitude and self-practice range from 0 to 10 points.

Analysis: The data will be entered in MS Excel and will be analysed using SPSS Version 16. Appropriate descriptive, mean and standard deviation statistics will be used to analyse the data.

RESULTS

Table 1: socio-demographic profile of study participants (n=179)

S.NO	Socio-demographic profile	Frequency	Percentage (%)
Gender			
	Female	176	98.3
	Male	3	1.7
Age group (in years)			
	19-34	44	24.6
	35-49	66	36.9
	50-64	52	29.1
	65-79	17	9.5
Marital status			
	Married	166	92.7
	Widow	13	7.3
Occupation			
	Housewife	78	42.5
	Daily wage	63	35.2
	Self employed	12	6.7
	Teacher	28	15.6
Socioeconomic status classification (BG Prasad)			
	Upper class I	26	14.5
	Upper middle class II	102	57
	Middle class III	47	26.3
	Lower middle class IV	4	2.2

Table 2: Housing of study participants (n=179)

Type of house		Frequency	Percentage
	Pucca	152	84.9
	Semi pucca	27	15.1
Separate kitchen			
	Yes	100	55.9
	No	79	44.1
Source of drinking water			
	Municipal	131	73.2
	Borewell	35	19.6
	RO Water	13	7.3
Method of water purification			
	No filter methods	87	48.6
	Boiling and filter	79	44.1
	Water purifier	13	7.3

Table 3: score obtained in the evaluation of the knowledge, attitudes, and practices of the food handlers (n=179)

Dimension	Good score (more than mean)	Mean ± SD	Range
Knowledge	78.8%	7.4 ± 1.5	4-10
Attitude	75.4 %	7.9 ± 0.6	5-9
Self-Practice	67.4 %	7.9 ± 0.9	6-9

Table 4: Knowledge about safe food handling (n=179)

S.no	KEYS	Questions	Knowledge
1	Keep Clean	It is important to wash hands before handling food	179 (100%)
2		Wiping clothes can spread microorganisms	151 (84.4%)
3	Separate Raw and Cooked	The same cutting board can be used for raw and cooked foods provided it looks clean.	85 (47.5%)
4		Raw food needs to be stored separately from cooked food	179 (100)
5	Cook Thoroughly	Cooked foods do not need to be thoroughly reheated	75 (41.9%)
6		Proper cooking includes meat cooked to 40 °C. or 104° F	179 (100%)
7	Keep Food at Safe Temperature	Cooked meat can be left at room temperature overnight to cool before refrigerating	89 (49.7%)
8		Refrigerating food only slows bacterial growth	170 (95%)
9	Use Safe Water and Raw Materials	Safe water can be identified by the way it looks	55 (30.7%)
10		Wash fruit and vegetables	179 (100 %)

Table 5: Attitude about safe food handling (n=179)

S. No	KEYS	Questions	Attitude
1	Keep Clean	Frequent hand-washing during food preparations is worth extra time	174 (97.2%)
2		Keeping kitchen surfaces clean reduces the risk of illness	179 (100%)
3	Separate Raw and Cooked	keeping raw and cooked food Separate helps to prevent illness	179 (100 %)
4		Using different knives and cutting boards for raw and cooked foods is worth the extra effort	23 (12.85%)
5	Cook Thoroughly	Do you consider colour attained during cooking as a reliable indicator?	171 (95.53%)
6		Meat and soups should always be boiled to ensure safety	179 (100%)
7	Keep Food at Safe Temperature	Thawing food in a cool place is safer	163(91.1%)
8		I think it is unsafe to leave cooked food out of the refrigerator for more than two hours	25 (14%)
9	Use Safe Water and Raw Materials	Inspecting food for freshness and wholesomeness is valuable	179 (100%)
10		I think it is important to throw away foods that have reached their expiry date	179 (100%)

Table 6: Practice regarding safe food handling (n=179)

Sno	KEYS	Questions	Practice
1	Keep Clean	I wash my hands before and during food preparation	170 (95%)
2		I clean surfaces and equipment used for food preparation before re-using on other food	137 (76.5%)
3	Separate Raw and Cooked	I use separate utensils and cutting-boards when preparing raw and cooked food	47 (26.26%)
4		I separate raw and cooked food during storage	179 (100%)
5	Cook Thoroughly	I check that meats are cooked thoroughly by ensuring that the juices are clear or by there is no pink meat left	179 (100%)
6		I reheat cooked food until it is piping hot throughout	151(84.35%)
7	Keep Food at Safe Temperature	I thaw frozen food in the refrigerator or other cool place	149 (83.24%)
8		After I have cooked a meal I store any left-overs in a cool place within two hours	120 (67%)
9	Use Safe Water and Raw Materials	I check and throw away food beyond its expiry date	179 (100%)
10		I wash fruit and vegetables with safe water before eating them	157 (87.71%)

Socio demographic profile: Among the study participants 98.3% were female, 87.2% Hindu and 12.8% were Christians. 36.9% were between the age group of 35-49 years Mean age group of the study participants 45.25 ± 13.04 years. 92.7% were married. 42.5% were house wife, 35.2% were daily wage, 15.6% were teacher, 6.7% were self-employed. [Table 1]. 65.4% had own house, 34.6% had rented

house. 84.9% had pucca house, 15.1% had semi pucca house. 55.9% had separate kitchen, 73.2% used municipal water as source of drinking water. 48.6 % doesn't use any filter methods for drinking water. According BG Prasad socioeconomic status classification 57% respondents were belonging to upper middle class, 26.3% belongs to middle class, 14.5% belongs to upper class, 2.2% belongs to lower middle class. [Table 2]

Knowledge, Attitude and self-practice among primary food handlers: Overall, Knowledge, Attitude and self-practice among primary food handlers was 78.8%, 75.4% and 67.4%, the respective mean ± SD and range are shown Table 3. The WHO five key messages and their respective knowledge, attitude and self-practice score percentage are shown [Table 4-6].

DISCUSSION

Food safety starts from the farm to plate. Food contamination can occur anywhere in the food cycle. Food sanitation starts from personal hygiene, germ free preparation area to the dishes being microbes free. Food contamination can lead to food borne illness and intoxication. A total of 179 respondents participated in the study. This study provided insights into the common practices with regard to food handling and cooking among the study population.

Knowledge: In our study, overall good knowledge about food handling was 78.8% [mean 7.4± 1.5, n=141]. In similar study done in Brazil by Alyne Gomes da Vitória et al (2021)9 knowledge about food handling was 73.3% [mean 7.1 ± 1.2]

In this study Knowledge on "Keep Clean" WHO Key message was 92.2% [95% CI 87.2-95.6], These findings are comparable to study done by Chellaiyan VG et al,[12] (2018) at Kelambaakam village, Kancheepuram district showed that the knowledge showed 99%.

"Separate raw and cooked food" is second key message, in this study knowledge was 73.8 % [95% CI 66.6-80.0], When compared the current study with Rakesh thakur et al,[13] (2020) in Shimla city, Himachal Pradesh showed knowledge about separate raw and cooked food was 99%,

"Cook thoroughly" is third key message, as per WHO recommendations, food must reach a 60 °C to ensure it is safe to eat. In this study knowledge was 70.9% [95% CI 63.7 -77.5], Chelliyan.V.G et al,[12] (2018) study in rural areas of Kancheepuram shows that only 29.5% had the adequate knowledge about overcooking, reheating.

Fourth key message was "keeping food at safe temperature", In this study keep food at safe temperature knowledge was72.4% [95% CI 64.8 -78.5], Hamed et al,[15] (2020) study showed knowledge on food safety in food handlers in Egypt was 40.9%

"Use safe water and raw materials" is final key message, the safe water means that water is free from dangerous microorganisms and toxic chemicals at levels that could cause illness or disease. In this study knowledge about safe water and raw materials was 65.4% [95% CI 57.9 -72.3], Kalpana et al,[14] (2018) study om food safety in food vendors in Chennai showed knowledge about safe water and raw materials was 76.5%.

Attitude: In our study, overall good Attitude about safe food handling was 75.41% [mean 7.9 ± 0.6, n=135]. In similar study done by Kalpana et al (2018) 14attitude about food handling was 76.1%

Attitude on "Keep Clean" was 99% [95% CI 95.1-99.6] similar study compared to by Chellaiyan VG et al,[12] (2018) showed that result of 97%.

"Separate raw and cooked food is second key message" the Attitude was 56.4 % [95%CI 48.8-63.8], Rakesh Thakur et al,[13] (2020) study showed result of 99%. Our study showed lower attitude scores because 12.85% only reported positive attitude towards using different knives and cutting boards for raw and cooked foods is worth the extra effort Cook thoroughly is third key message, in this study Attitude about cook thoroughly was 98.8% [95% CI 94.4 -99.4] Attitude about "keep food at safe temperature" was 52.5% [95% CI 44.9 -60.1]. Similar study done by Hamed et al (2020)15 showed that Attitude was 56.3% "Safe water and raw materials" Attitude was 100%, Kalpana et al (2018)14 study on food vendors in Chennai showed that 87.5% of the respondents use safe water and wash vegetables before they cook.

Self-Practice: In our study, overall good self-practice about safe food handling was 67.04% [mean 7.9 ± 0.9, n=120]. In similar study done by Lee et al,[17] (2017) study showed self-practice was 57.3%.

In this study "Keep Clean" practice was 85.7% [95%CI 80.08-90.7]. Similar stydy by Chelliyan VG et al,[12] (2018) showed that practice of 97%. This may be because 76.5% of participants only practised keeping clean surfaces and equipment used for food preparation before re-using on other food.

"Separate raw and cooked food" is second key message, in this study self-practice was 63.3% [95% CI 55.6 -70.2]. When compared the current study with Kalpana et al (2018) in Chennai city showed that 60%. "Cook thoroughly" is third key message. in this study self-practice was 92.2% [95% CI 82.7 -95.7]. Chelliyan V.G et al,[12] (2018) study in rural areas of Kancheepuram shows that only 67.5% had the adequate knowledge about overcooking, reheating.

Fourth key message was "keeping food at safe temperature", cooked food should not leave in room temperature for more than 2 hours. In this study self-Practice 75.2% [95% CI 68.4 -81.5]. Byrd-Breedbenner et al,[18] (2007) study on food safety self-reported behaviours of young adults of national study showed that 67% following the food at safe temperature.

"Use safe water and raw materials" is final key message, Self-practice about that was 93.9% [95% CI 82.9 -96.9]. Kalpana et al,[14] (2018) study on food vendors in Chennai showed that 87.5% of the

respondents practiced safe water for wash vegetables before they cook. 100% of respondents attitude and self-practice regarding expiry date of food.

CONCLUSION

Among the 179 study participants the safe food handling by the primary food handler's knowledge was 78.8 %, Attitude was 75.4% and but Self-reporting practice was only 67.4%. "Knowledge is of no value, unless you put it into practice", this study demonstrates that the adequate Knowledge, Attitude and but self-Practice towards food safety was not adequate. Such non-compliance could result in outbreaks of foodborne illness. Therefore, is an urgent need to raise interest in food safety. The better female educational status would improve the KAP on food safety measures. Media campaigns pertaining to food safety measures may be organized as they provide an excellent opportunity for such information to be received by a large number of consumers including those at home. Knowledge needs to be sustained about the WHO's five key principles of food hygiene, which are keep clean, separate raw and cooked food, cook thoroughly, keep food at safe temperatures and use safe water.

Limitations

- Even though in the present study it was face to face interview, the cooking process of the study respondents could not be observed.
- Only primary food handler was studied in this present study whereas the other persons who come in contact with handling food were not interviewed separately.

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