

Acquaintance, Outlook and Observance Concerning Handling of Food Among Local Population - A Cross-Sectional Study

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ABSTRACT

Objective: Food safety related knowledge, attitude and practice are crucial in today's era as food handling related health consequences are prevalent worldwide. The current study was conducted to assess knowledge, attitude, and practices of food handling among local population.

Methodology: A community based cross-sectional study was conducted among local population aged above 18 years of Punjab region, India. Data were collected using pretested and predesigned questionnaire and statistical analysis was done by percentages, mean and standard deviation, and t test using SPSS Statistics Version 22.0.

Results: The mean age of the participants was 1.52 ± 0.982 years with majority of the population were females (68.6%), and the mean scores of knowledges i.e. 16.02 ± 1.84 and attitude were 33.20 ± 3.256 . The mean knowledge score was found to be lower in the illiterate group at significant level whereas no significant difference was found regarding attitude and practice scores. Similarly enhanced level of knowledge was assessed among female group at significant level.

Conclusion: Knowledge and attitude scores regarding food handling were good, but food safety practice scores were lower. There is a call for action where awareness related educational interventional programs should be done for local population that would further improve the safety and hygiene practice and enhance the level of knowledge related to food items and regulations etc.

Keywords: Attitude, food safety, knowledge, practice, handling

INTRODUCTION

Food borne illness poses a significant global health burden as WHO reported estimation of around thirty-three million years of healthy lives are mislaid due to intake unsafe food worldwide. Such kind of illness often occurs due to pathogenic bacteria, viruses, parasites, or chemical contaminants which may be due to improper food handling practices. [1, 2]

Proper food handling is a scientific and systematic approach and negligence in this critical area can lead to a cascade of detrimental consequences, ranging from individual illness to widespread economic and reputational damage. [2] The major part

of food borne illness incidence can be traced back to unacceptable food handling. The issues arising from poor food handling practices are multifaceted and extend far beyond a single case of stomach upset as more than 200 diseases which range from Diarrhea to Cancers. [3] The major attributed risk factors that causes Food Borne Diseases (FBDs) includes adverse time interval, unsuitable temperature, weather condition, unhygienic activities, unacceptable handling of food, foodstuff from insecure origins, using untreated water, improper cleaning cooking materials etc. these all are together contributes to rise in food borne diseases and illness. [4]

Food handling practices encompass the entire spectrum of activities involved in the preparation, processing, storage, and service of food. When executed correctly, these practices are the bedrock of public health, ensuring that the food we devour is not only nutritious but also safe. Thus, food safety practices are necessary to provide protection against illness caused by contaminated food among local people in which some set of procedures must be followed. [5]

The Food safety is a term used to describe the degree of confidence that it will neither harm nor make sick the consumer from its initial stage to final stage which includes preparation, serving and consumption based on its intentional use. Food safety knowledge (FSK) is defined as the perceptive of particulars and information related to handling, manufacturing, and storing food items, with a prime objective of preventing food borne diseases and other disease outbreak. [6] It's been reported through existing literature that deprived food handling practices and knowledge and absence of personal hygiene could escalate the extent of food contamination. Even previous studies conducted in Ethiopia reported that poor knowledge, practices or attitude of food handlers such as insufficient hygienic amenities, inopportune waste disposal services were major problems in food establishments [7, 8].

Moreover, studies conducted in Brazil have stated that behavior of food handlers' is having an imperative influence on food contamination.[12] Although food safety is a relevant issue and measures are taken to guarantee food quality. However, there is, no existing data reported on status of food safety related knowledge, attitude and practice in local population. [7,8] The food safety knowledge, attitude and associated practices (KAP) are crucial to prevent the population from the threat of improper food handling. [4] Therefore an attempt has been made through this study where knowledge, attitude and practice regarding food handling were assessed among local population.

MATERIALS & METHODS

A cross-sectional study was conducted among patients attending community dental outreach programs organized by the Dental Teaching Hospital over a period of two months.

Study area and population: The study was conducted in Mandi Gobindgarh, which is located in the eastern part of Punjab, India. A total of 105 persons were selected for the study along the basis of convenient judgment sampling. The patients who were above 15years of age for better comprehension and understanding were included. Ethical approval was received from the institutional review board, and informed consent was obtained from all the study.

Questionnaire: The structured questionnaire on the knowledge attitude and practices regarding food handling among local population was developed focusing on the knowledge, attitude and practices written in English but translated into local language (Punjabi) during interview. The questionnaire was constructed in two-way approach. The first part included the subject's demographic data and the second part included the subject's knowledge, attitude and practices questions. A 31-item

questionnaire was self-administrated by the interviewers whom one was translating from English to Punjabi language. It had 5 demographic questions, 9 knowledge questions, 8 attitude questions and 9 practice questions. The responses to the questions on the subject's awareness about knowledge, attitude and practices regarding food handling among local population were recorded on a point scale ranging from positive to negative answers.

Validity and Reliability: To pretest the validity and reliability of the questionnaire and determine the feasibility of the study, a pilot study was conducted among 20 local populations who were not included in the main study. Reliability was analyzed using Test-Retest conducted over one week duration and internal consistency was measured through Cronbach's alpha i.e. 0.72.

Data collection: The data for this study was collected from various localities near to Mandi Gobindgarh by interviewing them personally; the weekly and monthly camps were organized in the nearby urban and rural areas (Mandi Gobindgarh). All the individual who attended these camps (who attended) were administrated the pretested structured questionnaire. The questionnaire was translated into local language (Punjabi), orally during the interviews.

STATISTICAL ANALYSIS

The data was firstly entered in Microsoft excel then the collected data was analyzed using IBM SPSS Statistic 31.0 and the frequency and percentage was calculated and some descriptive and analytical tests including Mean, Standard Deviation (SD), and independent t tests were used. P value was set at 0.05.

RESULT

This cross-sectional study was conducted among 105 local residents of in and around Mandi Gobindgarh area where knowledge, attitude and practices regarding food handling was assessed. Table 1 show the demographic characteristics of participants where majority of population was in the age group 15-25 years i.e. 73.3%, with mean age of 1.52 ± 0.982 yr and majority were female population i.e. 68.6% and 54.3% were housewives and 68.6% were residing in peri-urban area. Table 2 shows the knowledge of participants where it was seen that 96.2% were having knowledge that food stored in open space area can cause food borne diseases and use of apron, gloves etc. can reduce the risk of food contamination and 30.5% do not know the temperature of storing meat, chicken and protein etc. Regarding food borne diseases 28.9% said that diarrhea and vomit were caused by contaminated food. Table 3 depicts the attitude of the studied participants where majority of the studied participants were having positive attitude towards food safety and handling such as 89.5% participants had positive attitude that hand washing can reduce the risk of food contamination and intoxication and 66.7% thought that attending training on food safety is important Even 82.9% thought that food processing should not be done by injured or cut hands. Table 4 shows the practice level of local population and it was seen that majority of the participants practice the hand washing before handling the food items always i.e.83.8%. However, only 33.3% were always checking the food preservation instructions. Table 5 explains the comparison of mean knowledge, attitude and practice score in accordance with their educational level and it was seen that knowledge scores were higher among literate participants at significant level whereas no significant difference was found among attitude and practice scores

Table: 1 Demographic characteristics of local population

	Number	Percent (%)
Age group (Years)		
15-25 yr	77	73.3
26-35 yr	11	10.5
36-45 yr	7	6.7
46 yr and above	10	9.5
Mean± SD age	1.52±.982	
Gender		
Male	33	31.4
Female	72	68.6
Education Level		
Illiterate	31	29.5
Literate	74	70.5
Occupation		
Housewife	57	54.3
Working	28	26.7
Farmer	14	13.3
Not working	6	5.7
Address		
Rural	17	16.2
Peri-urban	72	68.6
Urban	16	15.2

Table: 2 Assessment of knowledge of food handling among local population

Questions	Yes N (%)	No N (%)	Don't know N (%)	Mean ± SD
Food poisoning is caused by microorganisms/ bacteria	99(94.3%)	2(1.9%)	4(3.8%)	16.02±1.84
Eating raw food and half cooked food is higher risk factor for food poisoning	92(87.6%)	4(3.8%)	9(8.6%)	
Insects and rodents are responsible for transmission of food borne pathogens	100(95.2%)	3(2.9%)	2(1.9%)	
Food stored in open space can cause food borne diseases	101(96.2%)	1(1.0%)	3(2.9%)	
Use of head cap, apron, gloves etc can reduce the risk of food contamination	100(96.2%)	2(1.9%)	3(2.9%)	
Temperature of storing meat, fish, chicken, protein etc	23(21.9%)	50(47.6%)	32(30.5%)	
Typhoid, pneumonia, flu are caused by food poisoning	83(79.0%)	20(19.0%)	2(1.9%)	
Food intoxication or contamination causes food borne diseases	95(90.5%)	5(4.8%)	5(4.8%)	
Are diseases caused by food contamination or intoxication? If yes which diseases are caused by contaminated food?				
Diarrhea, fever	25(13.1%)			
Vomit, diarrhea	29(28.9%)			
Sore throat, cough, infection	3(3.0%)			
Fever, sore throat	3(3.0%)			
Nausea, vomit, infection	22(18.3%)			
All of the above	7(6.8%)			

Table: 3 Assessment of attitude regarding food handling among local population

Questions	Strongly Agree N (%)	Agree N (%)	Neither Agree nor Disagree N (%)	Disagree N (%)	Strongly Disagree N (%)	Mean ±SD
Hand washing can reduce the risk of food contamination/intoxication	94(89.5%)	10(9.5%)	1(1.0%)	0(0.0) %	0(0.0) %	33.20±3.256
Food should be stored in air tight containers only	24(22.9%)	54(51.4%)	17(16.2%)	6(5.7%)	4(3.8%)	
Cooked food should be served hot	17(16.2%)	55(52.4%)	17(16.2%)	11(10.4%)	5(4.8%)	
Training on food safety should be necessary for everyone	70(66.7%)	27(25.7%)	3(2.9%)	2(1.9%)	3(2.9%)	
Raw food and leftover food should be stored in same part of refrigerator	10(9.5%)	17(16.2%)	12(11.4%)	25(23.8%)	41(39.0%)	
Food processing should not be done by injured or cut hands	87(82.9%)	10(9.5%)	3(2.9%)	3(2.9%)	2(1.9%)	
Maintenance of clean environment reduce the risk of food contamination	92(87.6%)	11(10.5%)	1(1.0%)	1(1.0%)	0(0.0%)	
Protective clothing can reduce the risk of food poisoning	64(61.4%)	24(22.9%)	10(9.5%)	2(1.9%)	5(4.8%)	

Table: 4 Assessment of food handling practices among local people

Practice questions	Always (%)	Often (%)	Sometimes (%)	Rarely (%)	Never (%)
Cut your nails	52(49.5%)	38(36.2%)	10(9.5%)	2(1.9%)	3(2.9%)
Cut raw vegetables and meat with same knife	30(28.6%)	10(9.5%)	16(15.2%)	8(7.6%)	41(39.0%)
Hand washing before handling food items	88(83.8%)	9(8.6%)	4(3.8%)	3(2.9%)	1(1.0%)
Check food preservation instructions	35(33.3%)	18(17.1%)	31(29.5%)	14(13.3%)	7(6.7%)
Check expiry date	85(81.0%)	9(8.6%)	4(3.8%)	4(3.8%)	3(2.9%)
Clean your kitchen in a day	68(64.8%)	33(31.4%)	0(0%)	4(3.8%)	0(0%)
Check temperature of refrigerator	9(8.6%)	24(22.9%)	30(28.6%)	22(21.0%)	20(19.0%)
Wash working clothes (Apron, Head cap, Gloves etc.)	64(61.0%)	29(27.6%)	11(10.5%)	1(1.0%)	0(0%)
Wash kitchen related clothes	64(61.0%)	31(29.5%)	7(6.7%)	2(1.9%)	1(1.0%)

Table 5: Comparison of total knowledge, attitude and practice score with education level of participants

	GP	Mean	Std. Deviation	Std. Error Mean	Mean diff	t value	P value
Knowledge	Literate	16.26	1.562	0.182	.805	2.072	0.001*
	Illiterate	15.45	2.321	0.417			
Attitude	Literate	33.12	3.428	0.399	-.265	-.379	0.75**
	Illiterate	33.39	2.848	0.512			
Practice	Literate	27.46	2.901	0.337	.459	.664	0.05**
	Illiterate	27.00	3.933	0.706			

*significant ** non- significant

Table 6. Comparison of total knowledge, attitude and practice score among male and female

	GP	Mean	Std. Deviation	Std. Error Mean	Mean diff	t value	P value
Knowledge	1	15.58	1.937	.337	-.646	-1.681	0.03*
	2	16.22	1.778	.210			
Attitude	1	32.03	3.495	.608	-1.706	-.2557	0.01*
	2	33.74	3.016	.355			
Practice	1	26.58	3.683	.641	-1.091	-1.621	0.09**
	2	27.67	2.960	.349			

*significant **non-significant

DISCUSSION

Food safety is not only essential for building consumers trust but also for improving country's economic conditions. Food safety is measurement and conditions that are implemented for people to prevent them from toxic substances, contaminants and pathogens that results in food borne illness. Awareness regarding food safety is fundamental among consumers for promoting safe food practices as many of them might be unaware of the potential risks associated with it.[10] Therefore, through this cross-sectional study knowledge, attitude and practice regarding food handling among local population of Mandi Gobindgarh was successfully assessed.

This study was conducted among 105 local residents with mean age $1.52 \pm .982$ years and majority residing in peri-urban area. In the current study a positive knowledge was assessed where majority (96.2%) of participants said that food stored in open space area can cause food borne diseases. Even 88.90% had an agreement with it in the study done by Supriyani MP et al in 2018. This represent that all local people were aware that pathogen, bacteria viruses, contaminants etc. are present in open environment and are responsible behind food borne diseases. [2]

Here in the present study 94.3% believed that food poisoning is caused by microorganism and bacteria which showed an agreement with study conducted by Fanta F et al in 2023 in Yeka sub city where 91.4% respondents were agree with the fact that bacteria and microorganisms are the reason for food poisoning. [8] Even Gameda N et al. in 2024 also accomplished in their study that 82.1% participants agreed that

bacteria's/ microorganisms/pathogens are one of the rationales behind food poisoning. [5] This may be due to the reason that due to equivalent educational levels among the local residents as they are aware about contamination of food or cross contamination, proper cooking temperature and safety and handling practices etc.

In the current study 79.0% were knowing that Typhoid, flu was caused by food poisoning as they were more attentive due to fine educational status as well as many were knowing that various pathogens/ bacteria etc are accountable for typhoid, flue related food contaminated diseases. When asked about the type of diseases caused by food contamination and intoxication, 28.9% responded said Diarrhea and vomit occurred while only 3.0% responded for sore throat, cough, infection and fever, respectively. Whereas study done by Gameda N et al. in 2024 in central Ethiopia said that respondent was fewer i.e. only 9.1% population responded for vomit alone and 7.2% for fever and vomit. There was limited number of responses for this category which might be due to their less awareness level towards complications occurring due to intoxication of food or related items.

In the present study 30.7% population doesn't know the temperature of storing meat chicken etc. This study showed an agreement with the study done by Mitakakis TZ et al., 2004 and Li-Cohen et al., 2002 in which most of the participants do not know the correct methods and importance of storing meat separately from other food products. [15] Even, in study of Reddy SG. et al. 55.3% knew that cooked meat should not be stored at room temperature. Even similar kind of study was conducted on

Angwandi workers in Karnataka state also where majority of the population i.e. 90.1% did not know that cooked meat storing temperature and guidelines etc. This variance indicates that people were unaware that storing meat at room temperature may influence the pH and water retention ability of meat. [11,13,14] But the studies done by Redmond, 2002 and Badrie N et al., 2006 the knowledge score for storing meat was higher than the current study.[21] Maybe they knew that improper storage may leads to the hazardous results.

Here attitude of participants towards food handling practices was also assessed with an encouraging approach which showed that majority (89.5%) of participants were sharing a strong agreement that hand washing can reduce the risk of food contamination and intoxication. This is in line with alternative study of Reddy SG. et al. which depicts a greater maintenance of personal hygiene among participants (98.5%). [11] The research conducted by Gameda N et al, 2025 on similar study had contradiction towards hand washing in which only 10.3% were maintaining the practice of hand washing that may be due to distinct demographic factors and living standard of people. However, 90.8% participants were having the hand-washing practice before or during food preparation in the study of Rabeya MR et al. Such kind of study was done for home cooks of rural Bangladesh where 64% were doing the same and among adult consumers in Turkey it was 82% [16, 17, 18]. It represents that individuals were well educated and were well versed with fact that maintenance of proper hygiene can prevent the food borne diseases. [5]

The safety and age of the food depend upon the temperature at which it is stored, therefore for the storage of leftover food and raw food were also assessed and 39% were strongly disagree that it should be stored in same part of refrigerator in present study. While, Reddy SG. et al, illustrated in their study that 98.5% respondents were agreed that raw and leftover food should not be

stored at same part. The guidelines by government of South Australia 2013 guides through that thawing of food in same part may result in exchange of bacteria from cooked and raw food and that will be result in food contamination and leads in food illness or diseases also flies and rodents in the kitchen swarm germs leading to age. Whereas, in study of Supriyani MP et al. it was only 47.20%. [9,12,2] Even 51.4% belief that food should be stored in air tight containers only, while 90.20% responded for the same in the Supriyani MP et al. This may be due to piece of evidence that population were aware that in open space pathogens or rodents can attack on food and make it toxic and, some food has less life shelf so they should be stored in a proper way.

Food safety training and guidelines should be taught to the local population and regarding the same context 66.7% showed a favorable response that food safety regulations related training is required with total mean 33.20 ± 3.25 . This is in line with study done in central Ethiopia by Nimona Gameda et al. with figure 64.1%. Even Research conducted in Malaysia has shown a relationship between the level of education and food processing training and the knowledge and attitudes of food handlers about food safety (Lee, Halim and Thong, 2017).[19] This depicts that periodic food safety training is a necessity so that food handlers can reveal the food safety knowledge they learned in training while handling the food and related items. This is beneficial because the knowledge gained from training can be translated into attitudinal and behavioral changes (National Restaurant Association Educational Foundation, 1992. [2, 12] Additionally, 68.10% were having an agreement for attending the food safety training in studies done in North Jakarta.

In the current study 52.4% said that food should be served hot for eating whereas 83.5% in study done by Rabeya R et al, respectively. But study did in Tamil Nadu by Chellaiyan VG et al. conclude that

26.5% people believed that food should not be consumed immediately after cooking. Regarding serving of hot food, people have thought that eating hot food will help in gaining proper nutrition and it will ease the digestion. It's been said that there would be risk to handle food with cut or injured hands and 82.9 % population said in the current study that food shouldn't be cut with injured hands. This may be due to that they had to cook for themselves and their families even in illness or due to some other demographic features. The results are in agreement with study done by Gameda N et al. in Ethiopia where 82% said the same. These finding suggest that participants were aware about higher risk of getting diseases from skin infections and food intoxication.

The findings for practice of food handling in this study had also depicted an optimistic outlook that majority of participants were maintaining personal hygiene practices i.e. 49.5%, 83.4% by always cutting their nails and washing hands before handling food items, respectively. This practice level of participants represented that they were aware about the knowledge of food safety practices and they were cultured with good regional practices. In agreement with the same study done by Fanta F et al, 2023, 74.6% maintain the personal hygiene by avoiding long nails [8] and the practice of having no long nails were 95.85% in study done by Supriyani MP et al. that might be due to the greater influence of demographic and social practices for hygiene. In present study majority of (81%) always check for expiry date of food products which indicates the higher level of education and knowledge of participants, whereas the results from research in Tamil Nadu suggests that only 19% check the manufacturing and expiry date of product, this shows a great contradiction for both the studies and the reasons may be the sample size or level of knowledge and education of the community. Moreover 50% always check for expiry date in studies of Fanta F et al. 6.7% never check for food preservation instructions and the reason may be the level of literacy and

unawareness. In the study of Reddy SG. et al., majority of (98.3%) agreed that it is important to check and throw food beyond expiry date, which was similar with this study and research conducted on 200 residential units in Singapore (97.1%).[20] N. Sanlier (2009) clarified that 10.5% of customers read storage conditions on package labels while shopping for food products.[10,18]This major similarity showed that people have knowledge that food used beyond its expiry date will results in serious health issues and illness.

Even KAP (knowledge, attitude and practice score) was compared in this study and the results represents that knowledge of literate participants is more than illiterate group at significant level which suggests that literacy rate has effect on food handling practices. A similar result was found in study of Chellaiyan GV et al. where literates had better knowledge about food safety than the illiterates. The results of this study also indicated that an increase in the level of schooling was associated with an increase in attitude score. The results differ from study of Reddy SG. et al. who did not show a significant relationship between level of schooling and attitudes but did find a relationship between schooling and the knowledge and practices of food handlers [11]. However, there is no significant mean difference observed in attitude and practice level of participants that directly states that higher education level did not affect the practice of the food handling among local population. A contradiction for this study found by Supriyani MP et al, 2018 that have p-value 0.213 with comparable education and knowledge which would be due to reason of sample size and distinct socioeconomic and demographic factors.[2] Comparison of KAP scores with gender distribution is significant with knowledge and attitude score while non-significant with practice. Consequently, the results represent that female has more knowledge of food handling then male due to continuous practice of housewives, women in kitchen or centred approach towards food handling

due to some ethical and social factors. Although participants have positive attitude with good knowledge of food handling regarding awareness of food contamination and diseases, food storage and use of protective clothing (gloves, apron etc.) but still they did not practice it in regular manner. Thus, incessant awareness is essential to raise the motivation and increase the food safety related education.

CONCLUSION

Food safety related knowledge, attitude and practice play a vital for ensuring the public health globally. Food borne diseases used are common now days by consuming intoxicated food or drink that can occur anywhere from farm to the plate and can lead to a variety of avoidable infectious diseases. This study reveals that even though knowledge and attitude towards food handling is adequate but their practices were not in appropriate approach. Incessant education and awareness related to food handling among local population and motivation is obligatory to augment the awareness 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.

Declaration by Authors

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