

A Study on Knowledge, Attitude and Practice on Food Safety & Hygiene among the Students of a Private University of Delhi, NCR

¹Neha Malhotra, ²Rajashree Shankar, ³Akanksha Pal, ⁴Sana Ahmed, ⁵Neha Taneja, ⁶Aanchal Anant Awasthi, ⁷Rajiv Janardhanan

¹Laboratory of Disease Dynamics & Molecular Epidemiology, Amity Institute of Public Health, Amity University, Noida, Uttar Pradesh, India

²Laboratory of Disease Dynamics & Molecular Epidemiology, Laboratory of Health Data Analytics & Visualization Environment, Amity Institute of Public Health, Amity University, Noida, India

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***Corresponding author:** Neha Taneja, Assistant Professor, Amity Institute of Public Health, Amity University, Noida- UP, 201304, Tel: 8527175587, E-mail: ntaneja@amity.edu

Abstract

Background: In India, food safety and hygiene are a growing concern with emerging incidents of food contaminants which if remains unnoticed can lead to various health hazards, illness, outbreaks and even death.

Objective: To study knowledge, attitude and practice (KAP) towards food safety and hygiene among students of a private university of Delhi, NCR.

Method: A Cross-Sectional study design using self-administered, pre-tested questionnaire containing a total of 40 questions was conducted among 500 private university students in Delhi, NCR. Information was collected from various disciplines through self-administered survey forms. For assessing the knowledge, a score of 1 and 0 was given to every correct and incorrect answers respectively. For assessing Attitude and Practice each correct response was awarded a score of 2, for neutral response a score of 1 and for incorrect response a score of 0 was awarded. Quartiles were generated for each component. Based on quartiles, knowledge, attitude and practice were divided into adequate and inadequate.

Result: The study participants included 31.6% males and 68.4% females. 29% participants belonged to postgraduate course and 71.1% from undergraduate course. Regarding food safety & hygiene, 74.8% participants had adequate knowledge, 53% had adequate attitude and 46% had adequate practice.

Conclusion: Continuous education is necessary to increase the awareness among young adults in the near future; they will be the ones directly handling food and play an important role to help maintain a hygienic and clean environment.

Keywords: Food safety; Food hygiene; Food Borne Disease; Knowledge; Attitude; Practice

Introduction

Foodborne diseases encompass a wide spectrum of illnesses and are a growing public health problem worldwide. They are the result of ingestion of food stuffs contaminated with microorganisms and chemicals. The contamination of food may occur at any stage in the process from food production to consumption (farm to fork) and can result from environmental contamination, including pollution of water, soil or air[1]. CDC estimates that each year 48 million people get sick from a foodborne illness, 128,000 are hospitalized, and 3,000 die[2]. Food borne illnesses are a major cause of morbidity and mortality worldwide with significant public health impact[3]. The global burden of food borne diseases in 2010 was 33 million Healthy Life years lost (DALY) with about 600 million food borne illnesses and 420,000 deaths of which foodborne diarrhoeal diseases, the most frequent cause of food borne illnesses contributed about 230,000 deaths[4]. Food safety and Food hygiene are an important determinant for illnesses caused due to food contamination. Food hygiene are the conditions and measures

necessary to ensure the safety of food from production to consumption[5]. Majority of food handlers do not have adequate knowledge regarding food handling and food safety measures but are still brought into industry as food handlers. The food handlers are the main people working in the college cafeteria and are also responsible for preparation and maintenance of food. Food handlers are the essential agents in the production of meals and can become a source for food contamination if necessary, care is not taken[6]. Students eat food from college cafeteria, for this reason, it becomes imperative to target students at college level and to assess their knowledge, attitude and practice[7]. Thereby targeting student and other public in general the burden of foodborne illnesses can be subsequently brought down and major steps can be taken in order to improve quality of food served and prepared and prevalence towards foodborne illnesses can be reduced as well. Hence, the study was conducted to assess knowledge, attitude and practice towards food safety and hygiene among private university students of Delhi, NCR.

Materials and Methods

Study Design and Target Population

A cross sectional study was conducted among 500 private university students of Delhi, NCR belonging to various study disciplines between September and October, 2019.

Sample Size Calculation

We assumed 50% knowledge about food safety and hygiene among university students. Considering 5% level of significance and 5% margin of error, the computed sample size was 384. After taking 30% as non-response rate, the final sample size came out to be 500.

Development of Study Tool (Questionnaire)

A self-administered, pre-tested questionnaire for this study was prepared to assess KAP on food safety and hygiene. The idea for preparing questionnaire was taken from studies previously conducted on food safety and hygiene among university students. We modified the questions as per our study's requirement and designed a self-administered KAP questionnaire. The questionnaire was pretested within the university premises among various students. The questionnaire included four parts. The first part of the questionnaire obtained information about the socio-demographic characteristics of the respondents. Second part consisted of 10 questions covering aspects of knowledge about food safety and hygiene. Respondents were asked to choose among three options – Yes, No and Don't Know wherein we have clubbed Don't Know & No. For assessing the knowledge, Yes was assigned a score of 1 and No & Don't Know was assigned a score of 0. The third and fourth part consisted of 10 questions each covering the aspects of Attitude and Practice. Respondents were asked to choose among four options- Strongly Agree, Agree, Neutral and Don't Agree wherein we have clubbed Strongly Agree and Agree based on which, scores were assigned as 2, 1 & 0 respectively. Quartiles were generated for each component. Based on quartiles, knowledge, attitude and practice were divided into adequate and inadequate. Informed consent taken from the study participants.

Ethical Consideration

Ethical consent taken from the institution.

Inclusion Criteria: Students who gave informed consent to participate in the study.

Exclusion Criteria: Students suffering from acute and chronic gastrointestinal infections.

Statistical Analysis of Data

The data was analysed using SPSS version-23 for windows. The categorical variables were illustrated using descriptive statistics for frequency, percentage and p-value computed using Chi square test. A p value < .05 was considered statistically significant.

Result

The study participants predominantly consisted of females (68.4%). Majority belonged to age group 20-23 (59%). 71% study participants were undergraduate and 29% were postgraduates. 58.2% belonged to Health and Allied Sciences Table 1.

Table 1: Socio-Demographic variables of study participants		
VARIABLES	NO. OF PEOPLE (n)	PERCENTAGE
SEX		
Female	342	68.4%
Male	158	31.6%
AGE		
16-19	155	31%
20 & above	345	69%
RELIGION		
Hindu	419	83.8%
Others	81	16.2%
CATEGORY		
General	433	86.6%
Others	67	13.4%
COURSE		
Post-Graduation	145	29%
Under-Graduation	355	71%

YEAR OF STUDY		
First year	208	41.6%
Second year	97	19.4%
Third year	133	26.6%
Fourth year	24	4.8%
FIELD OF STUDY		
Health & Allied Sciences	291	58.2%
Others	209	41.8%
RESIDENCE		
With parents	227	45.4%
Hostel & PG	273	54.6%
EDUCATION OF FATHER		
Graduation	279	55.8%
Postgraduation	221	44.2%
EDUCATION OF MOTHER		
Graduation	313	62.6%
Postgraduation	187	37.4%

Responses Towards Knowledge Based Questions

Table 2 shows that 94.8% participants thought that lack of good food hygiene is a cause of disease. 90% participants thought that there is a need for regular medical check-up. 82% participants were aware that food borne disease are infectious and toxic. Majority of study participants have heard about food hygiene (95.2%). Based on the scores generated 74.8% of study participants showed adequate knowledge.

Table 2: Distribution of study participants according to knowledge on food hygiene

KNOWLEDGE QUESTIONS	YES	NO	DON'T KNOW
K1. Have you ever heard of food hygiene?	475	10	14
	95.2%	2.0%	2.8%
K2. Do you think lack of good food hygiene is a cause of disease?	474	18	8
	94.8%	3.6%	1.6%
K3. Are you aware of any food borne disease?	444	38	18
	88.8%	7.6%	3.6%
K4. Do you think the need for regular medical check-up is a necessity?	450	33	17
	90.0%	6.6%	3.4%
K5. Are you aware that food borne disease are infectious and toxic?	410	49	41
	82%	9.8%	8.2%
K6. Is it wrong to eat canned food if the cover of the tin is bloated or tight?	336	80	84
	67.2%	16%	16.8%
K7. Raw chicken, fish and meat should not come in contact with each other?	232	72	196
	46.4%	14.4%	39.2%
K8. Other than holding your hand under tap water one should also wash it with soap before touching the food so as to get rid of bacteria?	295	148	57
	59%	29.6%	11.4%
K9. The best way to keep from getting food poisoning from fresh fruit and vegetables is to wash them with cool running water?	303	114	83
	60.6%	22.8%	16.6%
K10. Fresh vegetables tend to produce nitrite when stored in high temperature and humid places?	161	21	318
	32.2%	4.2%	63.6%

Responses Towards Attitude Based Questions

Table 3 shows that 60.0% participants strongly agreed that one should wash their hands before eating. 45.2% participants strongly agreed that unclean/uncut fingers can cause contamination of food. Also 72.4% strongly agreed that mouth

should be covered in order to avoid cross-contamination. 48.2% were concerned about current situation of food safety in college canteen. Of the total participants, 53% displayed adequate attitude.

Table 4 shows that 77.2% participants strongly agreed that it is necessary to check the expiry date on food packaging before purchasing the food item. 65.4% participants strongly agreed that it is important to ensure that the food is well cooked before consumption. 59.4% strongly agreed that food should be purchased when it is in clean and fresh condition. Out of total participants, only 46% showed adequate practice.

On bivariate analysis it was seen that education of mother had a statistically significant association with knowledge on food hygiene($p=0.033$) Table 5.

The bivariate analysis supports that women do need formal education as it will have a considerable impact on the community[10].

Table 3: Distribution of study participants according to attitude on food hygiene

ATTITUDE QUESTIONS	STRONGLY AGREE	AGREE	NEUTRAL	DON'T AGREE
A1. Before eating, one should wash their hands?	300 (60.0%)	180 (36%)	14 (2.8%)	6 (1.2%)
A2. Students do not wash their hand before eating because the wash basin is not kept clean?	81 (16.2%)	168 (33.6%)	136 (27.2%)	115 (23.0%)
A3. Students should complain to the person in charge if any insects are found in their meal?	346 (69.2%)	112 (22.4%)	25 (5.0%)	17 (3.4%)
A4. Students with unclean/uncut-finger nails can cause contamination to their food?	226 (45.2%)	226 (45.2%)	36 (7.2%)	12 (2.4%)
A5. Students should cover their mouth with napkin when they sneeze or cough, to avoid cross-contamination?	362 (72.4%)	117 (23.4%)	17 (3.4%)	4 (0.8%)
A6. You are concerned about pesticide residues in vegetables?	213 (42.6%)	227 (45.4%)	49 (9.8%)	13 (2.6%)
A7. You are concerned about heavy metal pollution of food?	25 (45.0%)	200 (40.0%)	62 (12.4%)	13 (2.6%)
A8. You are concerned about transfer of plasticizers in food containers and packing materials	213 (42.6%)	221 (44.2%)	60 (12.0%)	6 (1.2%)
A9. You are concerned about current situations of food safety in the college canteen?	241 (48.2%)	181 (36.2%)	69 (13.8%)	9 (1.8%)
A10. You are willing to improve your knowledge about food safety?	243 (48.6%)	193 (38.6%)	59 (11.8%)	5 (1.0%)

Table 4: Distribution of study participants according to practice on food hygiene

PRACTICE QUESTIONS	STRONGLY AGREE	AGREE	NEUTRAL	DON'T AGREE
P1. Is it necessary to check the expiry date on food packaging before purchasing the food item?	386 77.2%	95 19.0%	13 2.6%	6 1.2%
P2. Do you think it is important to ensure the food is well cooked before consumption?	327 65.4%	156 31.2%	16 3.2%	1 0.2%
P3. The catering management should educate and train their employees on personal hygiene and food safety regularly?	354 70.8%	123 24.6%	20 4.0%	3 0.6%
P4. Food handlers should avoid using their bare hands to rub/touch/scratch their face, hair or any part of their body in order to prevent contamination?	355 71.0%	115 23.0%	26 5.2%	4 0.8%
P5. We should wash and peel the fruit before eating?	260 52.0%	174 34.8%	60 12%	6 1.2%
P6. Do you look at the sensory characteristics of food when buying it?	189 37.8%	188 37.6%	113 22.6%	10 2.0%

P7. Always ensure purchasing food that is in clean and fresh condition?	297	167	32	4
	59.4%	33.4%	6.4%	0.8%
P8. I do not eat raw or uncooked eggs and food made from eggs?	193	139	104	64
	38.6%	27.8%	20.8%	12.8%
P9. I taste the food to see if it is safe or not?	110	141	135	114
	22.0%	28.2%	27.0%	22.8%
P10. I dry my hands with paper towel or tissue after washing it?	187	218	80	15
	37.4%	43.6%	16.0%	3.0%

Table 5: Bivariate Analysis of Social Demographic Profile with Knowledge of Food Hygiene

Variables	Number Percent	Food Hygiene			p-value
		YES	NO	DON'T KNOW	
SEX					
Female	342 (68.4%)	95.6%	1.5%	2.9%	0.460
Male	158 (31.6%)	94.4%	3.1%	2.5%	
AGE					
16-19	155 (31%)	92.9%	3.2%	3.9%	0.255
20 & above	345 (69%)	96.2%	1.4%	2.3%	
RELIGION					
Hindu	419 (83.8%)	95.5%	1.7%	2.9%	0.482
Others	81 (16.2%)	93.8%	3.7%	2.5%	
FIELD OF STUDY					
Health & Allied Sciences	291 (58.2%)	95.9%	1.7%	2.4%	0.706
Others	209 (41.8%)	94.3%	2.4%	3.3%	
RESIDENCE					
Day scholars	227 (45.4%)	95.6%	1.8%	2.6%	0.898
Others	273 (54.6%)	94.7%	2.2%	3.1%	
EDU OF FATHER					
Graduation	279 (55.8%)	96.1%	1.8%	2.2%	0.567
Post-Graduation	221 (44.2%)	94.1%	2.3%	3.6%	
EDU OF MOTHER					
Graduation	313 (62.6%)	97.1%	1.3%	1.6%	0.033
Post-Graduation	187 (37.4%)	92.0%	3.2%	4.8%	

Discussion

The cross-sectional study was suggestive of 74.8% adequate knowledge, 53% adequate attitude and 46% adequate practice on food safety and food hygiene among private university students of Delhi, NCR. Contrary findings were reported from a KAP study conducted among private university in Kedah state, Malaysia that showed 34% students having good/positive knowledge [11]. Likewise, study conducted by Hassan and Dimassi revealed contrary results too compared to ours regarding food safety knowledge[12]. While comparing our study with those of Taif University students the score of attitudes was less at 53% having positive attitude regarding food safety and hygiene[13]. Based on study done in Turkey 78.9% had knowledge that raw chicken, fish & meat should not come in contact with each other, showing contrary result to our 46.6% responding correctly[14].

As per our result of practice score it revealed at being 46%

which goes on to show in spite of good/positive knowledge and attitude towards food safety & hygiene, practice among university students remains inadequate. In comparison with another study carried by Aluh et.al the food hygiene practice by adolescents of secondary rural school in Nigeria showed good/positive results, mean score being at 82.48% and more than half of the respondents had good/positive food hygiene practice (54.4%) [15]. Regarding practice of tasting food to ascertain if it's safe to consume or not, according to study conducted in Turkey, 46.6% tasted food to check its safety, which is contrary to our score of 22%[14].

In a study conducted in Bulgaria good/positive food safety knowledge was observed which is similar to our study's results[16]. When comparing with Majmaah city among school students of different level primary, intermediate, and high, scores on attitudes were 60.84%, 55.62% and 59.67% respectively revealed similar scores[17]. In spite of differences between level

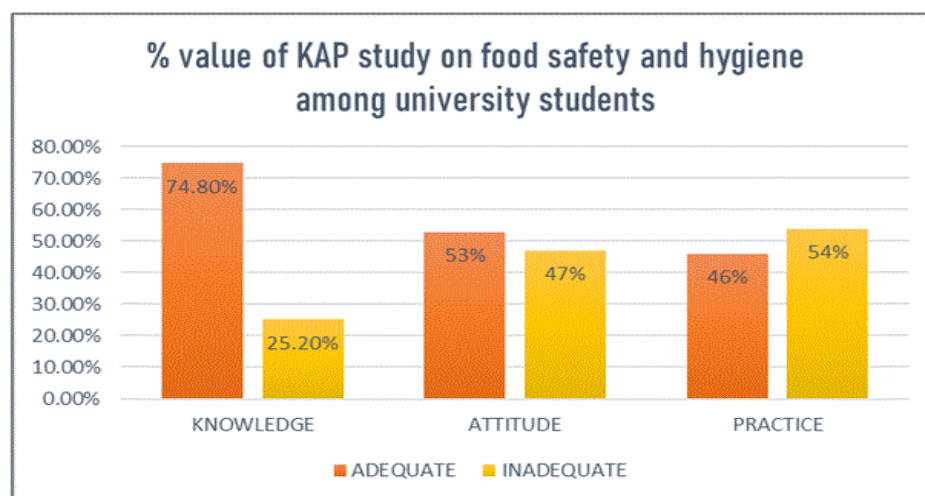


Figure 1: As per the graph, 74.8% participants had adequate knowledge, 53% had adequate attitude and 46% had adequate practice on food safety and hygiene. Redmond and Griffith and Yarrow et al said that knowledge of food safety concept does not necessarily corroborate to self-reported practices for food safety behaviours. Although, 74.80% showed positive knowledge but only 46.0% implemented adequate food safety practices Redmond and Griffith-8 & Yarrow et al-9).

of education there was no improvement in the attitude scores. However earlier studies on adults have indicated that food safety knowledge tends to increase with age and practice; younger respondents show the greatest need for additional education[18]. According to our result although 37.8% participants looked for sensory characteristics of food when buying it. Though, it is not possible to tell whether a food is contaminated with for example *E. coli*[19]. As per our study, regarding practice of ensuring food is well cooked before consumption, 65.4% strongly agreed & 31.2% agreed which is similar to the study conducted by Joseph A et.al in which 63.9% strongly agreed & 38.9% agreed[20].

In a study conducted by Courtney et al it was seen that students in faculties apart from science if given food safety education through courses or via extra-curricular activities it may be beneficial[21]. Food safety requires proper handling from production through consumption. Although standards in the United States are among the highest in the world and consumer guidance on proper food handling is available through magazines, newspapers, food labels, and other sources, mistakes still occur[22].

From the results of our study it was also observed that there is an association between Education of Mother and Food Safety knowledge of participants. The p-value 0.033 shows that the mother's education plays a role in food safety knowledge of university students. The study conducted by Nurcan, Ibrahim & Suzan revealed that educational status of mother is linked to children's eating habits[23]. In their study it was also observed that highly educated mother's children had higher scores about healthy eating attitudes. In another study conducted by Fathea El-Nmer, Amal A Salama & Dalia Elhawary it revealed that there was a highly significant correlation between father and mother's education and their children's nutritional practice[24]. The findings in the study conducted by Sa'ed Zyoud, Jawad Shalabi

et al supports the idea that females are more informed about appropriate food handling behaviors[25].

Foodborne illnesses cause both damage to individual & the economy. By focusing on food safety improvements, in addition to reducing foodborne diseases, it can help in yielding economic and social benefits- Reduced health care cost, & loss of income of the affected individual, Improvement in productivity, Decrease in burden of country's health care sector by improved public health and finally Consumer confidence in the country's food supply leading to financial stability [26].

Young adults involve into risky eating behaviors like eating raw or uncooked food of animal origin that puts them at an increased risk for foodborne diseases we recommend that educational material should be included in the curriculum of universities to enhance student's perception toward food hygiene; awareness campaigns should be conducted and media and social network applications must be actively used in order to enhance student's knowledge regarding food safety and hygiene[27].

Conclusion

Despite adequate food safety knowledge there was inadequate practice followed by participants also, mother's education level played a significant role in terms of food safety knowledge of students. However, research findings alone are unlikely to lead to the most effective health interventions—they need to be applied in tandem with health behavior change theory (Grol and others 2007; Glanz and others 2008)[28, 29].

The challenge, however, is linking theory and research and then further linking them to program planning and evaluation[30].

Foodborne disease will continue to be a matter of major concern around the world in the foreseeable future if appropriate education and awareness are not propagated widely. Students will

continue to eat from the college cafeterias and mess where the food is prepared by the food handlers who do not have sufficient knowledge about ensuring food safety. Thus, it is the need of the hour to evaluate the knowledge, attitude and practice of students towards food borne illnesses and food safety measures so that appropriate steps could be directed towards its improvement and safety. Public education will act as a key factor in improving food safety and hygiene practices and the benefit shall ensure reduction in the foodborne illnesses[31].

Limitations

Our study is subject to limitations inherent in food safety knowledge surveys, limited number of knowledges, attitude and practice questions were included. In addition, our use of multiple-choice questions, that by design provide respondents with correct answers (versus open ended formats), may have led to an overestimate rate of student's true knowledge.

Furthermore, study is limited with respect to number of respondents and it gives an insight for future studies regarding food safety and hygiene awareness.

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