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Original Research Article

Socio-Demographic Factors of Household Heads Associated With Knowledge of Food Safety among Residents of Butwal Sub-Metropolitan City of Nepal

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ABSTRACT

Background: Issue of food safety leading to food borne diseases has been an important public health problem. However, there is less awareness about the level of food safety at household level. The objective of this study was to assess the socio-demographic factors associated with level of knowledge about food safety among household heads of Butwal sub-metropolitan city of Nepal.
Methods: In this cross-sectional study, we enrolled a total of 162 household heads using a simple random sampling method from Butwal sub-metropolitan city, Nepal. Univariate analysis followed by adjusted multivariable logistic regression analysis was conducted to assess the independent socio-demographic factors associated with knowledge of food safety of the study participants.
Results: Of total 162 household heads, 123 (75.92%) had good knowledge about food safety. The household heads who had education level secondary and above were 6 times more likely (AOR= 6.08, 95% CI= 2.45-15.11) to have good knowledge about food safety than their counterparts of having no education and primary level of education. Although not statistically significant, higher percentage of respondents who were from service or business group had good knowledge of food safety compared to those who were only the household workers.
Conclusion: This study showed that three fourth of household heads had good knowledge of food safety. In addition, education level secondary and over was significantly associated with food safety. Measures for an improved knowledge of food safety at household level are therefore recommended.

Keywords: Food safety, knowledge, household heads, socio-demographic, Nepal.

INTRODUCTION

Food safety denotes to all those health hazards whether acute or chronic, that may make food injurious to the health of the consumer. [1] In 2017, World Health Organization (WHO) estimated almost 1 in 10 people in the world fall ill due to consumption of contaminated food and 420 000 die every year, subsequent in the loss of 33 million healthy life years (DALYs). [2] Food remains an excellent vehicle by which many pathogens such as bacteria, viruses and parasites are transmitted to healthy host leading food borne diseases that are usually

attributable to contaminated food and drinking water. [3] Foodborne diseases are not only of health concern but also of significance of public health consequences in terms of health care cost. [4,5] In addition, food safety has been impacting wide range of areas such as food exports, tourism, livelihood of food handler, and economic development both in developed and developing countries. [2,6]

Although foods are contaminated during production and distribution, a large proportion of food borne disease incidents are caused by foods improperly prepared or mishandled at home, in food service establishments or markets. [2] Nonetheless, home is a multifunctional setting and this directly impacts upon the need for better food safety since it has been documented that there is an incremental risk of infections in home. [7,8] In private homes, there is more risk of cross-contamination during food handling and food preparation, and deliberate consumption of raw and undercooked foods pose more risk of having food borne illnesses. [9] Since knowledge is the major predecessor to behavioral change, [10] it is therefore, needed to assess the knowledge of household heads to inform and educate the general public about the need to better understand and practice food safety in the home.

Some previous studies from Italy, [11] Sudan, [12] Egypt, [13] reported the deficit of knowledge of food safety at household levels. In Nepal, to the best of researchers' awareness, none of the study has been conducted in the area knowledge of food safety at household level. Only one study that assessed the knowledge and practice of meat safety in a local study reported that none of the study participants had adequate knowledge. [14] With this study background, this study aimed to assess the socio-demographic factors associated with level of knowledge about food safety among household heads of Butwal sub-metropolitan city of Nepal.

MATERIALS AND METHODS

Study design and setting

We assessed the knowledge about food safety among household heads employing a cross-sectional study design between 26 March to April 25, 2018. The study setting of our study was Butwal sub-metropolitan city (also called Butwal Upamahanagarpalika), Rupandehi, province number 5 of Nepal. Butwal is located at 83˚22' 52.70"- 83˚30' 22.61" E and 27˚39' 56.65"- 27˚44' 55"N.

Sampling

Probability simple random sampling technique was used to select study participants. The sample size of the study was determined using formula, $n=z^2* P Q/e^2$ where, n= required sample size, z= 1.96 at 5% level of significance, P= 10.8% (obtained from the study of a previously published study that reported a critically a low level of knowledge on food handling amongst food handlers, [15] Q=1-P, e= permissible error =0.05. Thus, we obtained 131 household heads as study participants. With additional 5% allowable error and possibility of missing data, we inflated the sample size of 162 in the study.

Data collection

Face to face interview was taken at participants' home in order to measure research variable using a structured and semi-structural questionnaire. Four medical graduates were enrolled as research assistants to collect data from the each household heads. They were provided two days training on data collection to ensure the quality of information collected. The questionnaires were divided into two parts: section I- Socio-demographic information and section II- Knowledge regarding food safety. Content validity of the tools and technique was maintained through the study of available review of literatures.

Data management and statistical analyses

The main outcome variable of the study- knowledge of food safety was assessed on the basis of the following sixteen major parameters of food safety (detailed in supplementary materials);

1. Meaning of food safety known

2. Answered correctly the unsuitability of re-use of cooked food.
3. Answered correct causes of food poisoning related to food safety.
4. Known about causes of diarrhea related to food safety.
5. Preventive measures of diarrhea related to food safety known.
6. Known about diseases that are related to unhygienic processing of milk.
7. Responded correctly the preventive measures to prevent meat borne diseases.
8. Known about the food adulteration.
9. Answered correctly about the correct methods of washing fruits before they are consumed.
10. Correct material needed to wash household utensils known.
11. Had knowledge about need for washing vegetables well before they are cutting.
12. Known the correct methods of keeping leftover food.
13. Time of keeping cooked foods in household known.
15. Answered correctly the basic steps for hand washing.
16. Had knowledge about not to allow their pets in the kitchen.

One score (0 or 1) was assigned for each parameter. We assigned 0 score for each incorrect answer and 1 for each correct answers. Since the scores of these parameters ranged between 0 and 1, the total possible maximum score then remained 16. We than calculated the median for knowledge and the total scores for each respondent were then split into median. If the correct answers were equal or more than the median score, knowledge was considered "Good." If the correct answers were less than the median, the knowledge was considered "Poor."

The independent variables of the study were age, sex, caste/ethnicity, education, occupation, family type and religion. Age of the respondents was categorized as, 20-29 years, 30-39 years, 40-49 years and 50-59 years. Sex was coded as male and female. Education was recorded as literate/primary and secondary and above. Ethnicity/caste was categorized on the basis caste system in Nepal and was divided into three major groups depending upon the available literature and similarities between the caste/ethnic groups: advantaged/upper caste (Brahmin and Chhetri), Adibasi/ Janajati and Dalit. [16] Educational status was categorized based on the years of education completed and was categorized as- (i) illiterate-no education, (ii) primary-1 to 5 years of education, and (iii) secondary and above (≥6 years of education). [17] Occupation of the study participants was coded as- service/business and household work. Family type was categorized as- nuclear and joint. Religion was coded as- Hindu and other (Buddhist and Christian).

Raw data were properly edited, coded and cleaned in the day of data collection in order to simplify the data entry. At first stage, the association of socio-demographic variables with level of knowledge about food safety was analyzed by univariate analyses and unadjusted odds ratios with their 95% confidence intervals (CI) were reported. Variables with p-value ≤0.1 were entered in a final multivariate logistic regression model with a backward elimination and the p-value of <0.05 was considered statistically significant. All statistical analysis was performed employing the Statistical Package for Social Sciences version 21.0 (SPSS, IBM, Armonk, NY, USA).

Ethical consideration

Administrative approval was taken from the concerned authorities. The semi-structured questionnaire was used for data collection. Ethical clearance was obtained from Sanjeevani College of Medical Sciences, Purbanchal University, Butwal, Rupandehi (approval number 300/2017/2018). An additional approval was also obtained from concerned authority of Butwal Sub-metropolitan city, Rupandehi, Nepal. The written informed consent was obtained from the respondents as well. The personal identifiers were removed from before data analysis.

RESULTS

Of total 162 household heads, 123 (75.92%) had good knowledge about food safety. Over two third (68.5%) of participants were 20-39 years of age group. Most of respondents (92%) were female, believed on Hindu religion (87 %), lived in nuclear family (95%), and belonged to upper caste group (Bramin and Chhetri) (47%) as well as Adhibasi/Janajati (40.1%) ethnicity. Similarly, almost half of the respondents (47.5%) had secondary and higher level of education and around two-third (62.3%) of them were on household works.

The multiple logistic regression analysis model was used to analyze the factors associated with knowledge of food safety (Table 2). Among seven socio-demographic variables, only education level secondary and higher had a statistically significant association with the outcome variables. The respondents who had education level secondary and above were 6.08 times more likely (AOR= 6.08, 95% CI= 2.45-15.11) to have good knowledge about food safety than their counterparts of having no education and primary level of education. Although not statistically significant, higher percentage of respondents who were from service or business group had good knowledge of food safety compared to those who were only the household workers.

DISCUSSION

Most food borne outbreak has been reported to result from improper food handling practices. Food borne illnesses mainly occur in food-service establishments and homes. [10,18] This study discovered that of total 162 household heads, 123 (75.92%) had good knowledge about food safety. Additionally, we found household heads that had education level secondary and above were 6 times more likely to have good knowledge about food safety than their counterparts of having no education and primary level of education. Although it is of local area study, this is the first study as for as we are aware that revealed status of knowledge about food safety amongst household heads in a Sub-metropolitan city in Nepal. Only one local study that was performed in Nepal in line with our study is about meat safety knowledge and practices amongst butchers stated none of the study participants had adequate knowledge and good practice. [14] Our study demonstrated comparatively higher percentages of the respondents had good knowledge about food safety than that of the studies conducted in China, [19] Italy, [11] but similar to studies performed in Jordan, [20] and Ghana. [21] Different factors such as participants' background, level of education, whether participants were recruited from urban or rural areas that are inherent to such differentiation in the existing knowledge about food safety. For instances in the above mentioned Chinese study participants were from dairy plant workers, while another study of Italy enrolled the university level students.

In line with our study, other studies, [19,21,22] have clearly shown the positive association between increased level of education and knowledge of food safety. This can be explained that higher level of education to study participants made more aware about the consequence of use of unsafe foods and preventive measures about food safety. We found that the secondary and higher level of participants' education had higher odds of having good knowledge about food safety. In Nepal, the topic of food safety and other minor common illnesses prevalent have been well discussed in secondary level of education curriculum might have also influenced our study participants to have good knowledge of food safety. Whatever possible, interventions such as counseling meeting, [23] and home-based training [24] as have been found to increase knowledge on food safety; may be recommended to improve the situation of food safety in Nepal. In addition, inclusion of food safety measures in primary and lower secondary classes, increasing information, education and communication

about food safety and food hygiene through mass media may also be recommended to reduce the problem of food safety. It has been duly discussed about the association between the work type or occupation with level of food safety knowledge in many papers. [25-27] However, these studies were directly linked with professional food handlers and our study was concerned with household heads. In our study, we found higher percentages of household heads who were from service/business group had good knowledge than those who were engaged in household work. This could be due to the fact that those who are in the service or business group people have a good level of knowledge and understanding than those who only work at household.

Although this study has explored about the food safety status and its association with educational level for the first time in Nepal, this study should be sought with some potential limitations. First, the knowledge on different food safety variables were of self-reported that could suffer from recall bias. Second, cross-sectional nature of the study does not provide the casual relationship. Third, we did not capture the information related to attitude and practice of food safety in this study. However, the study itself direct for some new areas of research in Nepalese context.

CONCLUSION

This study showed that three fourth of household heads had good knowledge of food safety. In addition education level secondary and over was significantly associated with food safety. Knowledge upgrading intervention about food safety should consider the level of education of household heads.

Authors' contribution: Conception of the study; SG and DG. Performed the statistical analysis and drafted the manuscript- SG, DG, DA, and JKS. Writing, inputs provided to the data analysis and revision of the manuscript- BBB, KG, and KTB. All authors participated in the analysis, interpretation of the results, writing and editing the manuscript. All authors accepted the final version of the manuscript.

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Appendix

Tables

Table 1: Association of Socio-demographic Characteristics of the Household Heads of with Knowledge of Food Safety by Univariate Analyses

Variables	Total, N=162 (%)	Good, n=123 (%)	Poor, N=39 (%)	COR (95% CI)	p-value
Age (in years)					0.563
20-29	51(31.5)	42 (34.1)	9 (23.1)	1 (ref)	
30-39	60 (37.0)	45 (36.6)	15 (38.5)	0.63(0.11-3.71)	
40-49	43 (26.5)	30 (24.4)	13 (33.3)	1.00 (0.18-5.5)	
50-59	8 (4.9)	6 (4.9)	2 (5.1)	1.30 (0.23-7.3	
Sex					0.930
Male	13 (8.0)	10 (8.1)	3 (7.7)	1 (ref)	
Female	149 (92.0)	113 (91.9)	36 (92.3)	0.94 (0.25-3.60)	
Caste/ethnicity					0.392
Upper caste group (Bramin and chhetri)	77 (47.5)	58 (47.2)	19 (48.7)	1 (ref)	
Adibasi/Janajati	65 (40.1)	52 (42.3)	12 (33.3)	0.60 (0.21-1.74)	
Dalit	20 (12.3)	13 (10.6)	7 (17.9)	0.46 (0.15-1.40)	
Education					0.001
Illiterate	42 (25.9)	22 (17.9)	20 (51.3)	1 (ref)	
Primary	43 (26.5)	34 (27.6)	9 (23.1)	1.75 (0.66-4.78)	
Secondary and higher	77 (47.5)	67 (54.5)	10 (25.6)	6.09 (2.48-14.97)	
Occupation					0.079
Service/business	61 (37.7)	51 (41.5)	10 (25.6)	1 (ref)	
Household work	101(62.3)	72 (58.5)	29 (74.4)	0.49 (0.22-1.08)	
Family type					0.444
Nuclear	154 (95.1)	116 (94.3)	38 (97.4)	1 (ref)	
Joint	8 (4.9)	7 (5.7)	1 (2.6)	2.30 (0.28-19.24)	
Religion					0.565
Hindu	141(87.0)	106 (86.2)	35 (89.7)	1 (ref)	
Others (Buddist and Cristian)	21 (13.0%)	17(13.8)	4 (10.3)	1.40 (0.44-4.45)	

COR; crude odds ratio; CI; Confidence Interval

Table 2: Multiple Logistic Regression Model for Knowledge of Food Safety among household Heads in Butwal Sub-metropolitan City of Nepal

Variables	COR (95% CI)	p-value	aOR (95% CI)	p-value
Education		0.001		0.001
Illiterate	1 (ref)		1 (ref)	
Primary	1.75 (0.66-4.78)		1.68 (0.62-4.57)	
Secondary and higher	6.09 (2.48-14.97)		6.08 (2.45-15.11)	
Occupation		0.079		0.090
Service/business	1 (ref)		1 (ref)	
Household work	0.49 (0.22-1.08)		0.48 (0.20-1.12)	

COR; crude odds ratio; aOR; adjusted odds ratio

Supplementary material 1: Survey Questionnaires

Knowledge of food safety among household heads of residents of Butwal Sub-metropolitan City of Nepal: A Survey Questionnaires, 2018
Name of the respondent:
Ward Number:
House Number:
Date of Interview (DD/MM/YY):
Interviewer's Name:
Result:

Result Codes

1= Completed interview 2= Refused to be interviewed 3= Other (Please specify) ……

Introduction and consent

Greetings! I am ……., and I am from Sanjeevani College of Medical Sciences, Butwal to collect data with support of Sanjeevani College of Medical Sciences, Butwal, Nepal for a research. The college is supporting to implement the project to assess the knowledge of food safety among residents of Butwal Sub-metropolitan City. Your honest and correct answer(s) are highly important. All your responses will be totally confidential. Your identity will not be disclosed and your participation in this research is completely voluntary. You may choose to stop participating at any time, or to refuse to answer any question(s). If you do not want to participate in it, or if you have any question(s), please let us know. This interview will take approximately 30-45 minutes. If you agree to participate, may I start the interview?
Respondent agrees to be interviewed----------1 Respondent does not agree to be interviewed----------2 Interview and Thank the participant ----------3 _____ Respondent's signature

Section-1: Socio Demographic Details			
Now, "I would like to ask some questions about you."			
QN	**Questions**	**Coding categories**	**Remarks**
1	How old are you?	☐ 20-29 ☐ 30-39 ☐ 40-49 ☐ 50 and above	
2	Your gender	☐ Male ☐ Female	
3	What is your highest level of education?	☐ None ☐ Primary ☐ Secondary ☐ Higher Secondary ☐ Above Higher Secondary	
4	What is your occupation?	☐ Business ☐ Housewife ☐ Student ☐ Services ☐Labour	
5	What is your religion?	☐ Hindu ☐ Buddhist ☐ Muslim ☐ Christian ☐Kirat ☐ Other (specify) ……	
6	What is you Cast/Ethnicity?	☐ Brahmin/Chhetri ☐Janajati ☐ Dalit ☐Madhesi ☐ Other (specify)……	
7	What types of family you live?	☐ Single ☐ Joint ☐ Extended	
8	What is your daily income?	☐ Below Rs. 200 ☐ Above Rs. 200	

Section-2: Knowledge about Food Safety					
Interviewer: Now, "I would like to ask questions about your knowledge on food Safety."					
QN	**Questions**	**Coding categories**			**Remarks**
		Yes	**No**	**DK**	
10	Does food safety mean better food production, processing, storage, distribution, preparation, and consumption?				
11	Do you know cooked food is not suitable for next meal because it tests different, smells bad, and appears in different color?				
12	Do you know not properly cooked food, or/and not preserve in refrigerator (cooked food), eating food that has touched by sick person could cause food poisoning?				
13	Do you know unhygienic food, water, and poor sanitation are the causes of diarrhoeal disease?				
14	Do you know proper hand washing, safe drinking water, and safe handling of food prevent many diseases including diarrhoea?				
15	Do you know unhealthy processing of milk (unhygienic) may cause various diseases including food poisoning, tuberculosis, and diarrhoea?				
16	Do you know you can prevent meat borne diseases by inspecting animals before slaughtering, protecting from flies, cooking in pressor cooker, and de-freezing?				
17	Do you know food adulteration is a reducing food quality, adding harmful substance on food, and substitute of food stuff?				
18	Do you always clean fruits by using clean water before eating them?				
19	Do you prefer detergent to wash utensils in comparison to use of Ash, Mud and salt?				
20	Do you well wash vegetables with clean water before cutting them, not after cutting them?				
21	Keeping left over food in refrigerator is the best practice and I always do that.				
22	Do you know proper preservation of food is important for examples covering and freezing?				
23	Do you know cooked food can be stored only limited time?				
24	Do you know/apply basic hand washing technique examples; apply soap, wash thoroughly, rinse and use of paper towels before and after doing anything?				
25	Do you know pets can be the sources of different diseases and you should not allow pets in kitchen?				

End of the survey. Thank you very much for the participation.

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