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Original Research Article

An Observational Cross-sectional Study to Assess Awareness of Personal Hygiene and Food Safety among Food Handlers In and Nearby Area of Tertiary Care Hospital

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ABSTRACT

Background: Food hygiene and food safety are also major issues worldwide, particularly in developing countries such as India. Significant changes in food production, handling and preparation methods, as well as in the habits of food-eating among people, have made food unsafe. Food handlers are the main contributors to food-borne outbreaks, and food establishments are the main sources of food-borne disease. So, this study assess awareness of personal hygiene and food safety among food handlers in and nearby area of tertiary care hospital.

Material and methods: This was an observational analytical cross-sectional study. The study was carried out in surrounding area near tertiary care hospital of Bhuj city and study duration was 3 months. Sample size:193.

Results: 36 out of 43 (41.86%) central canteen - mess food handlers, 30 out of 48 (34.88 %) of the restaurants food handlers and 20 out of 98 (23.26%) mobile food handlers had good knowledge of food safety. This study identifies significant gaps in food safety and personal hygiene knowledge among food handlers, particularly among mobile food handlers. Mobile handlers lagged behind in critical hygiene areas such as handwashing, medical check-ups, and food handling practices. Socio-demographic and occupational factors such as younger age, higher education, longer working hours, and possession of food licenses were positively associated with better food safety knowledge.

Keywords: food safety, personal hygiene, vaccination, food licenses

INTRODUCTION

Food is a fundamental need of man, as it is of all living things. Every human activity is first and foremost directed to the purchase of food. However, foodstuffs are often exposed to a wide range of micro-organisms that lead to human disease and have a direct, widespread and significant impact on public health.[1] These contaminations can occur at any point in the food chain from food producer to consumer.[2] The WHO has highlighted the challenges of food safety in its slogan "from farm to plate, making food safer", and has also highlighted the different ways to make food safer. Food safety and hygiene are significant concerns globally, especially in developing nations like India.

Worldwide, including in industrialized countries, about 30 percent of all new infections in the last 60 years have been caused by pathogens that are commonly transmitted through food.[3] Significant changes in food production, handling and preparation methods, as well as in the habits of food-eating among people, have made food unsafe. It would be difficult to find someone who has never been exposed to food-borne disease before.3 Food handlers are the main contributors to food-borne outbreaks, and food establishments are the main sources of food-borne disease.[4]

In any hospital & nearby area, there are many facilities for catering food to the diverse needs of patients, visitors, doctors, students and staff. Poor hygiene practices by food handlers could be a major cause of the high number of people affected and potentially lead to outbreaks of food-borne diseases. The present study therefore evaluated the awareness regarding personal hygiene practices and food safety among the food handlers in and around the tertiary care hospital.

MATERIAL AND METHODS

This was an observational analytical cross-sectional study. The study was carried out in surrounding area near tertiary care hospital of Bhuj city and study duration was 3 months.

Sample size: Our sample will be subset of accessible population (Finite population that is 350). Assuming that 50% of the subjects in the population have the factor of interest, a population size of 350 and an expected response rate of 95%, the study would require a sample size of: for estimating the expected proportion with 5% absolute precision and 95% confidence, our sample size was 184. We have adjusted for finite population that is 350 and response rate of 95% i.e., 5 % of non-response rate. Final sample size will be 193. For Sampling procedure, we used Simple random sampling without replacement. institutional ethical committee approval was obtained for this study. Inclusion criteria: Food handlers working in or near tertiary care hospital and aged 18 years or more were included in study. Exclusion criteria: Study subjects less than 18 years of age (no availability of legal guardian). Study subjects absent at the time of interview (even after 3 successive visits), and study subjects not giving consent for the study. Participant who does not come in direct contact with food were excluded from study e.g., administrative work in mess, canteen or restaurant.

Data collection tool: A standardized structural questionnaire was used which was prepared in English language and translated into the regional language. After participant information sheet, written informed consent was taken and then personal interview was conducted. The dependent variable- (outcome) was awareness score about personal hygiene and food safety among food handler. The independent variables (risk factors) included sociodemographic characteristics, occupational variables, etc.

Procedure for data management: Data collection was done by google forms and was generated in MS office Excel**.** For Data Analysis we used Epi Info™ software Version 7.2 (CDC) & IBM SPSS 30.0. All the information related to study is kept confidential and used for medical research only.

RESULT

Table 1 shows that out of the total of the 193 planned interviews, each to the central canteen - mess food handlers, restaurants food handlers and mobile food handlers, 43 out of 43, 48 out of 48 and 98 out of 102 responded showing response rates of 100%, 100%, and 96.07% respectively. So effective sample size was 189 in further data analysis. Most of the food handlers from all 3 group were in 21-30 years i.e. the central canteen - mess food handlers 19 (44.18 %), restaurants food handlers 23 (47.9%) and mobile food handlers 48 (48.97 %). The mean ages (±SD) of the central canteen - mess food handlers, restaurants food handlers and mobile food handlers were 28.63 ± 9.4, 32.48 ± 8.66 and 32.04± 8.03 years, respectively. Only 4 Female food handlers were present among the majority, canteen mess food handlers 2 (9.3%), restaurants food handlers 1 (2.1%) food handlers and among the mobile food handlers 1 (1.1%). Most of the food handlers from all group were Hindu by religion i.e. the central canteen - mess food handlers 43(100 %), restaurants food handlers 46 (95.83%) and mobile food handlers 87 (89.79 %).Most of the food handlers from all group were married i.e. the central canteen - mess food handlers 27 (62.8) , restaurants food

Table-1: Socio -demographic characteristics of responders

		Central canteen & mess n (%)	Restaurants n (%)	Food Stall n (%)	Total	Chi square	p-value
Age	**<20**	11 (25.5)	2 (4.16)	3 (3.06)	**16**	22.97	**0.0034**
	21-30	19 (44.18)	23 (47.9)	48 (48.97)	**90**		
	31-40	10 (23.25)	17 (35.41)	37 (37.75)	**64**		
	41-50	1 (2.32)	4 (8.33)	5 (5.10)	**10**		
	>50	2 (4.65)	2 (4.16)	5 (5.10)	**09**		
	Total	**43**	**48**	**98**	**189**		
Sex	**Male**	39 (90.7)	47 (97.9)	97 (98.9)	**185**	13.87	**0.0010**
	Female	2 (9.3)	1 (2.1)	1 (1.1)	**4**		
	Total	**43**	**48**	**98**	**189**		
Religion	**Hindu**	43 (100)	46 (95.83)	87 (89.79)	**176**	6.14	**0.1889**
	Muslim	0	2 (4.16)	8 (8.16)	**10**		
	Shikh	0	0 (0)	3 (2.04)	**3**		
	Total	**43**	**48**	**98**	**189**		
Marital status	**Married**	27 (62.8)	33 (68.75)	66 (67.32)	**126**	0.40	**0.8167**
	Unmarried	16 (37.2)	15 (31.25)	32 (32.65)	**63**		
	Total	**43**	**48**	**98**	**189**		
Working hours (per week)	**<35**	2 (4.65)	7 (14.58)	17 (17.34)	**16**	4.09	**0.1289**
	>35	41 (95.34)	41 (85.41)	81 (82.65)	**173**		
	Total	**43**	**48**	**98**	**189**		
Education	**None**	2 (4.65)	10 (20.83)	10 (10.20)	**22**	28.42	**0.0001**
	Primary	16 (37.2)	14 (29.1)	63 (64.2)	**93**		
	Secondary	15 (34.8)	18 (37.5)	20 (20.4)	**53**		
	Tertiary	10 (23.25)	6 (12.5)	5 (5.1)	**21**		
	Total	**43**	**48**	**98**	**189**		
Job description	**Food preparation**	10 (23.25)	10 (20.83)	13 (13.26)	**33**	41.93	**0.0000**
	Food serving	24 (55.81)	11 (22.91)	11 (11.22)	**46**		
	Both	9 (20.93)	27 (56.25)	74 (75.51)	**110**		
	Total	**43**	**48**	**98**	**189**		
Vaccination (hepatitis A & typhoid)	**Yes**	1 (2.32)	0 (0)	1 (1.02)	**2**	1.17	**0.5559**
	No	42 (97.67)	48 (100)	97 (98.97)	**187**		
	Total	**43**	**48**	**98**	**189**		
Disease	**Present**	1 (2.32)	0 (0)	3 (3.06)	**4**	1.46	**0.4797**
	Absent	42 (97.6)	48 (100)	95 (96.93)	**185**		
	Total	**43**	**48**	**98**	**189**		
Any drugs taken	**Yes**	1 (2.32)	0 (0)	1 (1.02)	**2**	1.17	**0.5559**
	No	42 (97.6)	48 (100)	97 (98.97)	**187**		
	Total	**43**	**48**	**98**	**189**		
Having food license	**Yes**	43 (100)	18 (37.5)	47 (47.95)	**108**	43.18	**0.0000**
	No	0 (0)	30 (62.5)	51 (52.04)	**81**		
	Total	**43**	**48**	**98**	**189**		
Working experience	**<5**	20 (46.51)	17 (35.41)	40 (40.81)	**77**	1.1570	**0.5608**
	5 -35	23 (53.48)	31 (64.58)	58 (59.18)	**112**		
	Total	**43**	**48**	**98**	**189**		

handlers 33 (68.75 %) and mobile food handlers 66 (67.32 %).Working hours (i.e. > 35 hrs. per week) of the central canteen - mess food handlers 41 (95.34 %) were more compared to restaurants food handlers 41 (85.41) and mobile food handlers 81 (82.65 %) .The central canteen - mess food handlers, restaurants food handlers and mobile food handlers 73 (63 primary level + 10 not educated) were less educated compare to other groups. Food preparation and food serving both is done by majorly by mobile food handlers i.e. 74 out of 98 (75 %) compared to the central canteen - mess food handlers 9 (20.93%), restaurants food handlers 27 (56.25%).Food preparation is done the central canteen - mess food handlers 10 (23.25 %), restaurants food handlers 10 (20.83 %), and mobile food handlers 13 (13.26 %).Food serving is done the central canteen - mess food handlers 24 (55.81 %), ,restaurants food handlers 11 (22.91 %), and mobile food handlers 11 (11.22 %).the central canteen - mess food handlers, restaurants food handlers and mobile food handlers One hundred and seven (35.0%) of mobile food handlers and 103 (35.8%) canteen food handlers gave a history of vaccination against either hepatitis A or typhoid. Among all food handlers only 01 from the central canteen - mess food handlers, 0 from restaurants food handlers and 03 from mobile food handlers had History of chronic disease (NCD). Among all food handlers only 01 from the central canteen - mess food handlers, 0 from restaurants food handlers and 01 from mobile food handlers had drug history. All food handlers from the central canteen – mess have food license, 30 out of 48 don't have food license in restaurants food handlers and only 47 out of 98 mobile food handlers have food license.20 out of 43 (46.51 %) the central canteen - mess food handlers, 17 out of 48 (35.41 %) restaurants food handlers and 40 out of 98 (40.81 %) mobile food handlers had 5 or more years´ work experience respectively.

Table 2 shows that, 36 out of 43 (41.86%) central canteen - mess food handlers, 30 out of 48 (34.88 %) of the restaurants food handlers and 20 out of 98 (23.26%) mobile food handlers had good knowledge of food safety. 7 out of 43 (6.80 %) central canteen - mess food handlers, 18 out of 48 (17.48 %) of the restaurants food handlers and 78 out of 98 (75.73 %) mobile food handlers had poor knowledge of food safety. A higher proportion of 78 out of 98 (75.73 %) mobile food handlers had poor knowledge of food safety compared to 7 out of 43 (6.80 %) central canteen - mess food handlers, 18 out of 48 (17.48 %) of the restaurants food handlers, p <0.01. The food safety and hygiene knowledge score (ranged from 0 to 21) for the central canteen - mess food handlers, restaurants food handlers and mobile food handlers, respectively with mean score mean ±SD of 17.28±1.42, 15.17± 2.23 and 12.12 ± 3.12, respectively.

Table-2: Overall food safety knowledge among respondents

Overall Food Safety knowledge	Canteen n(%)	Food stall n(%)	Restaurant n(%)	Chi Sq.	P Value
Good	36 (41.8)	20 (23.2)	30 (34.8)	55.8	0.001
Poor	7 (6.8)	78 (75.7)	18 (17.4)		
Mean	17.3	12.1	15.1		
SD	1.42	3.1	2.2		
Range	6	13	12		

Table 3 is showing food safety knowledge among food handlers. The food safety knowledge among 3 groups i.e. central canteen- mess, restaurant, and mobile food handlers reveals statistically significant differences across several hygiene practices. The result showed statistically significant differences ($p < 0.05$), indicating varied levels of awareness and implementation among the groups. For instance, regular cutting of hair was significantly more common among restaurant food handlers (97.92%) and mobile food handlers (96.94%) than among central canteen –mess food handlers (86.05%), with a p-value of 0.0492. Significant disparities were also observed in hand washing after blowing the nose ($p = 0.001$), with very low compliance among mobile food handlers (53.06%) compared to restaurant food handlers (83.33%) and central canteen – mess food handlers (97.67%). Similarly, hand washing after touching the hair was practiced by only 16.33% of mobile food handlers, whereas it was more common among central canteen –mess food handlers (55.81%) and restaurant food handlers (31.25%), also showing high significance ($p = 0.001$). Routine medical check-ups every 6 months were reported by 100% of central canteen –mess food handlers, but only 12.5% of restaurant food handlers and 3.06% of mobile food handlers, a highly significant

Table-3: Knowledge of Food safety

Knowledge of Food safety	Canteen Food handlers (n= 43)		Restaurants Food handlers (n= 48)		Food Stall Food handlers (n= 98)		Chi Square	P-Value
	No	Yes	No	Yes	No	Yes		
Regular bathing and wearing clean clothes	0 (0.00)	43 (100.00)	0 (0.00)	48 (100)	0 (0.00)	98 (100.00)		1.0†
Regular cutting of hair	6 (13.95)	37 (86.05)	1 (2.08)	47 (97.92)	3 (3.06)	95 (96.94)		0.049†
Washing hair regularly	7 (16.28)	36 (83.72)	2 (4.17)	46 (95.83)	6 (6.12)	92 (93.88)		0.078†
Finger nails cut when necessary	0 (0.00)	43 (100.00)	1(2.08)	47 (97.92)	17 (17.35)	81 (82.65)		1.0†
Regular washing of clothes	0 (0.00)	43 (100.00)	0 (0.00)	48 (100.00)	4 (4.08))	94 (95.92)		1.0†
Hand wash before eating food	1 (2.33)	42 (97.67)	0 (0.00)	48 (100.00)	0 (0.00)	98 (100.00)		0.47†
Hand wash after eating food	0 (0.00)	43 (100.00)	0 (0.00)	48 (100.00)	0 (0.00)	98 (100.00)		1.0†
Hand wash after visiting toilet	0 (0.00)	43 (100.00)	0 (0.00)	48 (100.00)	0 (0.00)	98 (100.00)		0.119†
Hand wash after blowing the nose	1(2.33)	42 (97.67)	8 (16.67)	40 (83.33)	46 (46.94)	52 (53.06)	33.65	0.001*
Hand wash before food preparation	0 (0.00)	43 (100.00)	1 (2.08)	47 (97.92)	10 (10.20)	88 (89.80)		1.0†
Hand wash after handling money	33 (76.74)	10 (23.26)	31 (64.58)	17 (35.42)	81 (82.65)	17 (17.35)	5.89	0.053
Hand wash after touching the hair	19 (44.19)	24 (55.81)	33 (68.75)	15 (31.25)	82 (83.67)	16 (16.33)	22.73	0.001*
Routine medical check-up	0 (0.00)	43 (100.00)	42 (87.50)	6 (12.50)	95 (96.94)	3 (3.06)	148.09	0.001*
Preparing vegetables before eating	0 (0.00)	43 (100.00)	1 (2.08)	47 (97.92)	1 (1.02)	97 (98.98)		1.0†
Treating raw food before eating	0 (0.00)	43 (100.00)	25 (52.08)	23 (47.92)	71 (72.45)	27 (27.55)	61.78	0.001*
Correct storing and preserving	0 (0.00)	43 (100.00)	12 (25.00)	36 (75.00)	64 (65.31)	34 (34.69)	59.21	0.001*
Sanitation maintain during	2 (4.65)	41 (95.35)	8 (16.67)	40 (83.33)	47 (47.96)	51 (52.04)	32.17	0.001*
Use of hand gloves for food safety	4 (9.30)	39 (90.70)	11 (22.92)	37 (77.08)	70 (71.43)	28 (28.57)	59.26	0.001*
Use of face mask for food safety	36 (83.72)	7 (16.28)	25 (52.08)	23 (47.92)	79 (80.61)	19 (19.39)	16.35	0.001*
Use of cap for food safety	7 (16.28)	36 (83.72)	27 (56.25)	21 (43.755)	91 (92.86)	7(7.14)	81.06	0.001*
* statistically significant ,† Fishers Exact								

finding (p = 0.001). When it came to treating raw food before consumption, 100% of central canteen –mess food handlers followed this practice, compared to 47.92% in restaurant food handlers and 27.55% in mobile food handlers (p = 0.001). Similar trends were observed for proper storage of raw food, sanitation during food preparation, and use of hand gloves, face masks, and caps—all of which showed significant variation (p = 0.001) and were more consistently followed by central canteen –mess food handlers. On the other hand, some practices did not show statistically significant differences among the food handler groups, such as regular bathing, wearing clean clothes, fingernail trimming, regular washing of clothes, hand washing before and after eating, after using the toilet, and before food preparation. These uniformly good practices suggest a common understanding of basic personal hygiene among all food handlers. An inconclusive result was observed in the practice of hand washing after handling money (p = 0.0526). central canteen –mess food handlers had the lowest compliance (only 23.26%), while mobile food handlers showed the highest compliance.

Association between various socio-demographic and occupational factors with food safety and hygiene knowledge among central canteen- mess, restaurant, and mobile food handlers was tabulated in Table 4. A statistically significant association was observed between age and food safety knowledge among restaurant food handlers (χ^2=11.19, p=0.024), with younger age groups. Marital status had a notable associated with knowledge in all three food handler types: central canteen –mess food handlers (p=0.04), mobile food handlers (p=0.04), and restaurant food handlers (p=0.009), where unmarried handlers showed better awareness. weekly working hours displayed a significant association among central canteen –mess food handlers (χ^2=8.49, p=0.003) and restaurant food handlers (χ^2=10.00, p=0.029).

Education status was also significantly associated across all food handler types, with higher education correlating positively with better knowledge— central canteen mess food handlers (p=0.04), mobile food handlers (p=0.02), and restaurant food handlers (p=0.0058). Vaccination status, especially for Hepatitis

Table-4: Factors associated with food safety and hygiene knowledge among respondents

		Canteen Food Handlers Knowledge of Food Safety				Food Stall Food Handlers Knowledge of Food Safety				Restaurants Food Handlers Knowledge of Food Safety			
		Good	Poor	Chi Sq	P-Val	Good	Poor	Chi Sq	P-Val	Good	Poor	Chi Sq	P-Val
Age	**<20**	2 (66.6)	1 (33.33)	4.5	0.33	2 (50.0)	2 (50.0)	3.2	0.52	1 (50.0)	1 (50.0)	11.19	0.02
	20-29	19 (86.3)	3 (13.63)			11 (29.73)	26 (70.27)			9(52.94)	8 (47.06)		
	30-39	8 (80.0)	2 (20.00)			8 (19.51)	33 (80.49)			3 (13.64)	19 (86.36)		
	40-50	3 (50.0)	3 (50.00)			4 (36.36)	7 (63.64)			4 (80.0)	1 (20.0)		
	>50	1 (75.0)	1 (25.00)			2 (40.0)	3 (60.0)			1 (50.0)	1 (50.0)		
Sex	**Female**	1 (100.)	0 (0.00)	0.01	0.98	1(00.0)	0 (0.0)	11.2	0.06	1 (50.0)	1 (50.0)	0.62	1.00
	Male	29 (74.3)	10 (25.64)			20 (21.28)	74 (78.72)			29 (61.70)	18 (38.30)		
Religion	**Hindu**	34 (82.9)	7 (17.07)	0.4	0.81	17 (19.32)	71 (80.68)	3.9	0.13	30 (65.22)	16 (34.78)	4.10	0.12
	Muslim	1 (100)	0 (0.00)			2 (22.22)	7 (77.78)			0 (0.00)	2 (100.0)		
	Sikh	1 (100)	0 (0.00)			1 (100.0)	0 (0.00)			1(100)	0(0.00)		
Marital status	**Married**	10 (45.4)	12 (54.55)	4.2	0.04	14 (23.72)	45 (76.28)	4.2	0.04	9 (27.27)	24 (72.73)	6.69	0.01
	unmarried	16 (76.1)	5 (23.81)			17 (43.58)	22 (56.42)			10 (66.67)	5 (33.33)		
Working hours (per wk)	**<35**	3 (37.5)	5 (62.5)	8.4	0.003	3 (37.5)	5 (62.5)	2.5	0.35	5 (83.33)	1 (16.67)	10.00	0.03
	>35	30 (85.7)	5 (14.28)			17 (18.19)	73 (81.11)			14 (33.33)	28 (66.67)		
Education Status	**None**	2 (100)	0 (0.00)	8.02	0.04	3 (30.0)	7 (70.0)	9.7	0.02	3 (30.0)	7(70.0)	12.51	0.01
	Primary	15 (93.7)	1 (6.25)			10 (15.88)	53 (84.12)			12 (80.0)	3 (20.0)		
	Secondary	9 (60.0)	6 (40.0)			10 (50.0)	10 (50.0)			16 (88.89)	2 (11.11)		
	Tertiary	5 (50.0)	5 (50.0)			1 (20.0)	4 (80.0)			5 (83.33)	1 (16.67)		
Job description	**Both**	7 (77.7)	2 (22.22)	0.97	0.61	13 (17.57)	61 (82.43)	1.54	0.46	16 (59.26)	11 (40.74)	0.422	0.80
	Food preparation	6 (60.0)	4 (40.0)			4 (30.78)	9 (69.23)			5 (50.0)	5 (50.0)		
	Food serving	18 (75.0)	6 (25.0)			3 (27.27)	8 (72.73)			7 (63.64)	4 (36.37)		
Vaccine Hep - A	**Don't know**	0 (0.00)	1 (100.0)	5.63	0.02	4 (9.30)	39 (90.70)	15.2	0.34	11 (64.70)	6 (35.30)	3.082	0.21
	No	20 (66.6)	10 (33.33)			16 (32.0)	34 (68.0)			11 (37.94)	18 (62.04)		
	Yes	13 (100.)	0 (0.00)			4 (80.20)	1 (20.0)			1 (50.0)	1(50.0)		
Vaccine Typhoid	**Don't know**	0 (0.00)	1 (100.0)	8.57	0.03	10 (24.39)	31 (75.61)	1.82	0.4	12 (70.59)	5 (29.41)	0.79	0.67
	No	30 (81.)	7 (18.92)			10 (20.0)	40 (80.0)			17 (58.62)	12 (41.38)		
	Yes	2 (33.3)	4 (66.67)			3 (42.86)	4 (57.14)			1 (50.0)	1 (50.0)		
Working exp	**<5 or (blank)**	12 (60.)	8 (40.0)	0.05	0.82	12 (60.0)	8 (40.0)	14.9	0.01	15 (88.24)	2 (11.76)	7.43	0.01
	>5	13 (56.5)	10 (43.48)			9 (15.52)	49 (84.48)			15 (48.39)	16 (52.61)		
Any disease	**No**	30 (75.0)	10 (25.0)	0.98	0.32	19 (20.88)	72 (79.12)	1.58	1	26 (61.90)	16 (38.10)	0.40	0.64
	Yes	3 (100.0)	0 (0.00)			1 (14.29)	6 (85.71)			4 (80.0)	1 (20.0)		
Any Drugs taking	**No**	29 (78.3)	8 (21.62)	0.81	0.37	19 (20.0)	76 (80.0)	0.5	0.49	27 (62.79)	16 (37.21)	5.06	0.28
	Yes	3 (100.0)	0 (0.00)			1 (33.33)	2 (66.67)			1 (25.0)	3 (75.0)		
Licenses for food business	**No**	3 (42.8)	4 (57.14)	0.35	0.22	12 (30.0)	28 (70.0)	11.2	0.01	12 (60.0)	8 (40.0)	0.091	0.76
	Yes	28 (68.2)	13 (31.71)			3 (5.17)	55 (94.83)			18 (64.29)	10 (35.71)		

A, displayed a significant association solely among central canteen–mess food handlers (p=0.02), whereas Typhoid vaccination revealed a comparable pattern (p=0.03). Working experience significantly affected knowledge levels in mobile food handler group l (χ^2=14.95, p=0.00001) and restaurant food handlers (p=0.006), favoring those with less than 5 years of experience. having a food business license was significantly associated to knowledge among mobile food handlers (p=0.0007). conversely, no notable association was found with sex, religion, job description, drug use, or existing illness.

These results emphasized that younger age, unmarried status, higher education, working hours, having lesser experience, and having licensure were key indicators of improved food safety knowledge among food handler groups.

Table-5: Predictors of food safety and hygiene knowledge

	S.E.	df	Sig.	Exp	95% C.I.for Exp	
					Lower	Upper
Age	0.034	1	0.004	1.101	1.03	1.17
Sex	1892	1	0.999	0	0	.
Marital status	0.547	1	0.005	4.664	1.596	13.6
Working per week	0.018	1	0.004	1.053	1.017	1.091
Education	0.248	1	0.026	0.576	0.354	0.93
Job description	0.261	1	<.001	2.545	1.525	4.24
Vaccine Hep A	0.752	1	0.023	5.511	1.263	24.04
Working experience	0.052	1	0.654	0.977	0.883	1.08
Vaccine Typhoid	0.694	1	0.379	0.543	0.139	2.11
Licenses for food business	0.41	1	0.064	2.139	0.958	4.77
Constant	1892	1	1	2008.		

After application of the binary logistic regression analysis in Table 5, some factors were identified as significant predictors of food safety and hygiene knowledge among participants: Among those, age was found to be a statistically significant predictor (p = 0.004), with an odds ratio (OR) of 1.101 (95% CI: 1.03–1.176). Those who are Marital status showed a significant association (p = 0.005) and have better knowledge compared to unmarried individuals (OR = 4.664; 95% CI: 1.596–13.633). The number of working hours per week was also associated (p = 0.004; OR = 1.053; 95% CI: 1.017–1.091), indicating that those food handlers who worked for longer working hours, were slightly more knowledgeable.

DISCUSSION

With aim to assess and compare the awareness regarding personal hygiene and food safety among food handler groups, central canteen-mess, restaurants, and mobile food handlers near a tertiary care hospital, this research was conducted.

The study revealed, majority of food handlers were in the 21–30 age group, consistent in all groups.

These findings were similar with a study by Rane et al. (2011)[5], who carried out study on that street food handlers in Mumbai, due to need of the job and ease of employment at a younger age.

Male predominance was observed among food handlers, with only 4 females in our study, which was similar with findings by Choudhury et al. (2011)[6] who observed similar observation due to a male-dominated food vending occupation in India.

Religion (Hindus) and marital status (married) was observed among majority of food handlers. Marital status was found significantly associated with better food safety knowledge in our study—a finding supported by Ncube et al. (2014)[7], who suggested that married individuals have greater responsibility, affecting their hygiene practices.

Level of Education was significantly associated with food safety knowledge. This linked with studies carried out by Muinde & Kuria et al. (2005)[8] in Kenya and by Kibret & Abera et al. (2012)[9] in Ethiopia, both indicating that higher education levels positively affect food safety awareness and practices.

In our study, mobile food handlers were less educated than central canteen – mess food handlers and restaurant food handlers, explaining their poorer food safety knowledge.

Working hours were significantly associated with food safety knowledge, especially among central canteen – mess food handlers and restaurant food handlers.

This could suggest that extended exposure and experience enhance practical hygiene awareness, which aligns with findings of Ansari-Lari et al. (2010)[10], who found similar associations in Iranian food establishments.

Interestingly, while experience was assumed to be a contributor to better knowledge, our study found that shorter experience duration was associated with better knowledge among mobile and restaurant -food handlers. This was opposite to previous findings by Mensah et al. (2002)[11], who observed that experience improves hygiene adherence.

This difference might be due to younger, newer staff undergoing more up to date food safety training. Our study caught a notable gap in food safety knowledge among mobile food handlers: only 23.26% had good knowledge, compared to 41.86% of central canteen – mess food handlers. This aligns with studies by Muinde & Kuria et al. (2005)[8] and Barro et al. (2006)[12], which highlights poor knowledge and practice among informal food handlers due to lack of formal training.

Regarding specific hygienic practices, routine medical check-ups, use of gloves and face masks, and treatment of raw food were significantly more common among central canteen –mess food handlers.

These findings show important role of institutional regulation, reflecting Rane et al. (2011)[5], who stressed hospital canteens are more likely to follow with health norms due to monitoring system.

Food license possession also correlated with good knowledge, especially among mobile food handlers. This aligns with observations by Fatima et al. (2018)[13], suggesting before issuing license, basic training and accountability is checked.

The binary logistic regression in our study confirmed that age, marital status, working hours, and licensing were significant predictors of good food safety knowledge, supporting previous studies and emphasizing the need for targeted health education among younger and less experienced food handlers.

CONCLUSION

This study identifies significant gaps in food safety and personal hygiene knowledge among food handlers, particularly among mobile food handlers. While canteen and restaurant food handlers showed relatively better awareness and practices—likely due to institutional regulations and training.

Mobile handlers lagged behind in critical hygiene areas such as handwashing, medical check-ups, and food handling practices. Socio-demographic and occupational factors such as younger age, higher education, longer working hours, and possession of food licenses were positively associated with better food safety knowledge. Surprisingly, more years of work experience did not always convert into better awareness, particularly among mobile and restaurant handlers.

The findings warrant targeted interventions such as structured training programs, regular health inspections, and mandatory licensure to improve food safety practices across all food vendor types.

Strengthening these measures in informal handlers, is mandatory to prevent foodborne illnesses and establish public health safety.

RECOMMENDATIONS

i) Conduct Regular Awareness Campaigns on hygienic food practices and their impact on health.

ii) Mandatory periodic training on food safety and personal hygiene for all food handlers is required Institutionalize routine regular Medical Check-ups (at

least biannually) for food handlers to prevent the spread of communicable diseases.

iii) There should be Compulsory Health Certification of all food handlers and Licensing of their food stalls.

iv) Prompt Monitoring and Regulation: by government, municipal and health authorities to ensure compliance with hygiene standards among all food handlers, including roadside stalls.

v) Educational Support: Promote basic education and literacy initiatives for food handlers.

vi) Use behaviour change communication (BCC) strategies to promote handwashing at critical times (after handling money, after blowing the nose, etc.) and use of gloves, masks, and hairnets.

vii) Mandatory registration and mapping of all food handlers in urban areas. plan training, licensure, and inspections more efficiently.

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