

A cross-sectional study of sociodemographic characteristics, health status, and level of awareness about personal hygiene practice among the food handlers working in various food establishments in a university campus, Uttar Pradesh, India

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Background: Food handlers are the persons who handles food, regardless whether they cook the food or serve it, they are the key personals to ensure the food safety and hygiene throughout the food production, processing, preparation, handling, storage, transportation and distribution so the chance of food contamination largely depends on health status of these food handlers and their hygiene, habits, and practices of food handling. **Objectives:** The objectives of the study were to assess the health status and level of awareness about the personal hygiene practices among food handlers working in various food establishments in a university campus. **Materials and Methods:** A cross-sectional study using purposive sampling technique was conducted from May 2019 to August 2019, on all 121 food handlers working in 14 food establishments in the campus of a university, Bareilly, U.P., India. **Results:** A total of 121 food handlers working in 14 food establishments and as per the distribution of demographic profile the majority (53.0%) of food handlers were younger than 20 years, 78.5% were male worker and 21.5% were female worker. About 56.2% of workers belong to SC/ST cast, 48.8% of workers have no formal education, 96.7% of food handlers wash their hand with soap after coming from toilet, and 86.0% washing hand before handling of food, for example, cooking and serving. It was observed that more than half of the food handler (54.5%) did not vaccinated against tetanus toxoid vaccination within the past 5 years and majority of food handlers 79.3% never taken anti-typhoid vaccine in the past 3 years and 79.3% anti-worm tablets (albendazole 400 mg) in the past 6 months. **Conclusion:** The present study observed that the level of personal hygiene practice among food handlers in different food establishments was satisfactory but the immunization status among food handlers was found unsatisfactory, it is recommended that owner of food establishments should be made aware about pre-placement and periodic medical examination for the protection of their employers and consumers and there is also requirement of Information, Education, and Communication activities

time to time to increase level of awareness about their health status. The health education can also be imparted so that they can early detect signs and symptoms of any disease and commonly occurring morbidities.

KEY WORDS: Food establishments, food handlers, health status, personal hygiene

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INTRODUCTION

Food is the basic necessity of human. It is a mixture of different nutrients such as carbohydrate, protein, lipids, vitamins, and minerals. These nutrients are essential for growth, development, and maintenance of good health throughout life.^[1,2]

During the 21st century, foodborne diseases have been increased, especially in developing countries; this is because of environmental and demographic changes. Unsafe food containing harmful bacteria, virus, parasites, toxins and chemical substances which can cause more than 200 diseases. According to the World Health Organization, almost 1 in 10 people the world fall ill after eating contaminated food and 420,000 die every year, resulting in the loss of 33 million healthy life years (DALYs)^[3,4]

Food handlers are the persons who handle food, regardless whether they cook the food or serve it;^[5] they are the key personals to ensuring the food safety and hygiene throughout the food production, processing, storage, and preparation so that food handlers are the major sources of transfer microorganism to the food from their hands, nose, skin, and bowel and also from preparing contaminated food and serving it. The chance of food contamination largely depends on health status of these food handlers and their hygiene, habits, and practices of food handling.^[5]

In the campus of the university, students from various disciplines such as medical, dental and paramedical, nursing, MBA, PG, and PhD are staying and taking their food from food establishments, that is, messes and canteens. These food items could be the major source of various foodborne infections to the students if the food handlers who are preparing the food items or serving it may have any kind of diseases or if they did not follow the proper hygiene practices.^[6]

Therefore, this study was aimed at assessing personal hygiene practices of food handlers presently working in different food establishments in the university campus as well as their immunization and health status were also assessed.

Objectives

The objectives of the study were as follows:

1. To describe the sociodemographic characteristics of food handlers.
2. To assess the personal hygiene practices among food handlers.
3. To assess the immunization status of food handlers.
4. To assess the health status of food handlers.

MATERIALS AND METHODS

This cross-sectional study was used to assess the personal hygiene practices of food handlers, their immunization, and health status. A “survey method” has been used to collect data from May 2019 to August 2019. A total number of 121 mess workers/food

handlers/canteens workers were included in study, who worked during this period of time in all 14 food establishments, that is, messes and canteens in a university campus in Bareilly district of Uttar Pradesh, India. The survey was carried out by several visits of researcher till all food handlers worked during the study period were covered.

Data were collected with the help of structured and pre-tested schedule. This schedule has been design to obtain information about the sociodemographic characteristics such as age, sex, cast/category, education status, and residence. Schedule also obtained information about personal hygiene practices of food handlers and their vaccination or chemoprophylaxis status against tetanus, typhoid, worm infestation, hepatitis-B, and hepatitis-A.

During survey, the health status of food handlers was assessed for communicable diseases, such as diarrheal disease, respiratory tract infections, skin infections, and systemic disorders such as hypertension, diabetes mellitus, seizures, and anemia. Data were analyzed using Microsoft Excel^[7] 2007 and Statistical Package for the Social Sciences,^[8] version 23.0. Descriptive statistics, such as frequency distribution and percentages, were used for the analysis.

RESULTS

A total of 121 food handlers working in 14 food establishments, rendering food daily (breakfast, lunch, evening snacks, and dinner) were identified in study. The mean age of food handlers was 25 years and majority of them, that is, 53.0% were younger than 20 years, 23.1% of the age group 21–30 years, 10.7% between the age group of 31 and 40 years, and no children below the age of 15 years were found working during study period in the study areas. Out of 121 food handlers, 78.5% were male workers and 21.5% were female workers. In other demographic entities, for example, the workers form urban areas were 37.2% and from rural areas were 62.8%, and 56.2% of workers belong to SC/ST cast, 48.8% of workers have no formal education, chief/main cook service by 19.8%, waiter/service/helper service by 58.7%, and most of the food handlers, that is, 81.0% does not have any course or training and 41.3% of food handlers had been working in these food establishments for <1 year [Table 1].

During the survey, food handlers were interviewed for their personal hygiene practices also like 16.5% of food handlers using gloves during their work, habit of hand washing with soap after coming from toilet is practiced by 96.7%, and washing hand before handling of food (cooking and serving) was practiced by 86.0% of food handlers. Majority of food handlers cut their nails regularly (43.8% once in a week and 55.4% twice in a week).

In this study, the majority of food handlers, that is, 85.2% were not using gloves while handling food items in food establishments and among total workers 48.8% were illiterates and 51.2% were

literate. Gender-wise distribution for use of gloves among the total worker was observed that only 15.7% male workers and 8.0% female workers were using gloves during serving or cooking of food [Table 2].

The present study was conducted to evaluate the preventive measures taken by food handlers during their work in the food establishments and it was observed that more than half of the food handlers 54.5% did not vaccinated against tetanus toxoid vaccination in the past 5 years and majority of food handlers 79.3% never taken anti-typhoid vaccine in the past 3 years and

79.3% did not take anti-worm tablets (albendazole 400 mg) in the past 6 months. The percentage of vaccination against hepatitis-A and hepatitis-B was also very low 95.9% and 94.2%, respectively [Table 3].

The present study also evaluated the health status of food handlers which was showed that in majority of workers has suffered from anemia 19.8%, followed by febrile illness, respiratory tract infections, and diarrhea/dysentery 16.5%, 14.9, and 7.4%, respectively. About 13.2% of food handlers are also found to be infected with skin/nail infections. It is also evident that only 3.3% food handlers had pre-employment examination and 3.3% had periodic examination [Table 4].

Table 1: Distribution of sociodemographic characteristics of food handlers

| Sociodemographic characteristics of food handlers | | |
|---|----------------|------------|
| | Number (n=121) | Percentage |
| Age | | |
| <20 | 65 | 53.0 |
| 21–30 | 28 | 23.1 |
| 31–40 | 13 | 10.7 |
| 41–50 | 7 | 5.8 |
| >50 | 8 | 6.6 |
| Sex | | |
| Male | 95 | 78.5 |
| Female | 26 | 21.5 |
| Category | | |
| General | 6 | 5.0 |
| OBC | 47 | 38.8 |
| SC/ST | 68 | 56.2 |
| Education status | | |
| No formal education | 59 | 48.8 |
| Primary | 23 | 19.0 |
| Secondary education | 22 | 18.2 |
| Others | 17 | 14.0 |
| Job type | | |
| Chief/main cook | 24 | 19.8 |
| Dishwasher | 18 | 14.9 |
| Vegetable cutter | 8 | 6.6 |
| Water/service/helper | 71 | 58.7 |
| Marital status | | |
| Married | 49 | 40.5 |
| Unmarried | 72 | 59.5 |
| Residence | | |
| Urban | 45 | 37.2 |
| Rural | 76 | 62.8 |
| Training taken/course done | | |
| Yes | 23 | 19.0 |
| No | 98 | 81.0 |
| Service duration | | |
| <1 year | 50 | 41.3 |
| 1–5 years | 42 | 34.7 |
| >5 years | 29 | 24.0 |

With the increasing duration of service or due to longer duration of job, their chance of appropriate immunization against the frequently occurring diseases to them has been increased, for example, 52% among all those received tablets albendazole, worked for duration up to 5 years and among who received anti-typhoid vaccine 96% of them worked for up to 5 years. Similarly among immunized against tetanus toxoid, 58.7% were those who worked for more than 1 year. Among those who received

Table 2: Responses of food handlers regarding their personal hygiene practices

| Personal hygiene practices of food handlers | | |
|---|----------------|------------|
| | Number (n=121) | Percentage |
| Whether using gloves during work | | |
| Yes | 20 | 16.5 |
| No | 101 | 83.5 |
| Frequency of nail cutting | | |
| Once in a week | 53 | 43.8 |
| Twice in a week | 67 | 55.4 |
| Once in a 2 weeks | 1 | 8.0 |
| Washing hands after coming from toilet | | |
| With water | 4 | 3.3 |
| With soap | 117 | 96.7 |
| Washing hands before cooking/serving food | | |
| Yes | 104 | 86.0 |
| No | 17 | 14.0 |
| Using gloves | | |
| Illiterates using gloves | | |
| Yes | 2 | 1.7 |
| No | 58 | 47.9 |
| Literate using gloves | | |
| Yes | 16 | 13.2 |
| No | 45 | 37.2 |
| Men using gloves | | |
| Yes | 19 | 15.7 |
| No | 79 | 65.3 |
| Women using gloves | | |
| Yes | 1 | 8.0 |
| No | 22 | 18.2 |

tetanus toxoid, 89.1% worked more than 1 year, that is, above 5 years job duration 41.8% immunized with tetanus toxoid and 1–5 years job duration 47.3% immunized with tetanus toxoid. The association was also found to be statistically significant [Table 5 and 6].

Table 3: Immunization status of food handlers

| | Number (n=121) | Percentage |
|--|----------------|------------|
| Tetanus toxoid injection in last 5 years | | |
| Yes | 55 | 45.5 |
| No | 66 | 54.5 |
| Anti-typhoid vaccine in the past 3 years | | |
| Yes | 25 | 20.7 |
| No | 96 | 79.3 |
| Anti-worm tablet in the past 6 months | | |
| Yes | 25 | 20.7 |
| No | 96 | 79.3 |
| Have you ever vaccinated for hepatitis-B | | |
| Yes | 7 | 5.8 |
| No | 114 | 94.2 |
| Have you ever vaccinated for hepatitis-A | | |
| Yes | 5 | 4.1 |
| No | 116 | 95.9 |

Table 4: Health status of food handlers

| Disease | Number (n=121) | Percentage |
|---|----------------|------------|
| Anemia | 24 | 19.8 |
| Febrile illness | 20 | 16.5 |
| Acute respiratory infections | 18 | 14.9 |
| Diarrhea/dysentery | 9 | 7.4 |
| Hypertension | 5 | 4.1 |
| Diabetes mellitus | 1 | 8.0 |
| Skin infections/nail infections | 16 | 13.2 |
| Seizures | 1 | 8.0 |
| Pre-employment health examination | 4 | 3.3 |
| No pre-employment health examination done | 117 | 96.7 |
| Periodic health examination | 4 | 3.3 |

Table 5: Immunization status of food handlers during their jobs

| Service duration | n=121 n (%) | T.T injection in the past 5 years, n=121 n (%) | | Anti-typhoid vaccination in the past 3 years, n=121 n (%) | | Anti-worm tablets in the past 6 months, n=121 n (%) | |
|------------------|----------------|--|-------------|---|-------------|---|-------------|
| | | Yes n (%) | No n (%) | Yes n (%) | No n (%) | Yes n (%) | No n (%) |
| <1 year | 50 (41.3) | 6 (5.0) | 48 (39.7) | 12 (10.0) | 48 (39.7) | 1 (0.83) | 49 (40.5) |
| 1–5 years | 42 (34.7) | 26 (21.5) | 16 (13.2) | 12 (10.0) | 30 (24.6) | 12 (10) | 30 (24.6) |
| Above 5 years | 29 (24.0) | 23 (19.0) | 2 (1.6) | 1 (0.83) | 18 (14.9) | 12 (10) | 17 (14.1) |
| Total | 121 (100) | 55 (45.5) | 66 (54.5) | 25 (20.8) | 96 (79.2) | 25 (20.8) | 96 (79.2) |

$\chi^2=40.562, P=0.000$. This result is significant at $P<0.05$ for T.T injection and duration of service. $\chi^2=15.347, P=0.000$. This result is significant at $P<0.05$ for anti-typhoid vaccination and duration of service. $\chi^2=19.819, P=0.000$. This result is significant at $P<0.05$ for anti-worm tablets and duration of service. T.T: Tetanus toxoid

DISCUSSION

Healthy, safe, and hygienic foods are the basic requirement of human. In recent years, due to lifestyle changing, hectic work schedule has led us to consume ready to eat food. The individuals may be able to satisfy their taste and nutrition need, but pays little attention to hygiene and food safety.^[9]

In the present study, maximum number (76.1%) of food handlers were below 30 years of age and majority (78.5%) of food handlers were male. A similar study has been conducted by Mudey *et al.*,^[10] during the period of October–December 2009 in Warada, Maharashtra, shown that majority (54.37%) of food handlers were below 30 years of age and 69.38% were male workers. Kibret and Abera^[11] also reported that, in their study, the majority (91.4%) of food handlers were younger than 30 years of age, which is similar to our study.

In our study, most of the (62.8%) of food handlers belong to rural areas and have no formal education, similar findings were observed during the study by Mudey *et al.*^[10] the majority (66.86%) of food handlers were belong to rural areas and most of them (36.87%) have no formal education. Some study have contrary result from our study like a study conducted by Takalkar and Kumavat^[12] observed that majority (55.4%) of food handlers have secondary/higher secondary education; this is because in our study most of the food handlers belong to rural areas where the literacy rate is relatively lower.

In this study, majority (80.2%) of food handlers works as dishwasher/helper/service/waiter and most of them (41.3%) have work experience <1 year. A study conducted by Deshpande and Phalke^[13] in food establishments of rural medical college of West Maharashtra, observed that majority (61.33%) of food handlers works as dishwasher/helper/service/waiter, but in contrast to our study, most of the (72.0%) of food handlers have 1–5 years of experience. The job duration or work experience is less than one year in the previous work place for 41.3% food handlers which may be because of their job changing habit/dissatisfaction with the job.

Regarding the level of awareness about personal hygiene practice among food handlers, majority (83.5%) of them not used gloves during their while handling the food items in food establishments. Most of them cut their nails regularly (i.e., 55.4% twice in a week and 43.8% once a week) and use of soap

Table 6: Job duration and immunization against frequently occurring diseases among food handlers

| Job duration in food establishments | T.T vaccination status | | Anti-typhoid vaccination Status | | Tablet albendazole administered | |
|-------------------------------------|-------------------------------------|------------------------------------|-------------------------------------|------------------------------------|-------------------------------------|------------------------------------|
| | Yes <i>n</i> (%) (<i>n</i> =55) | No <i>n</i> (%) (<i>n</i> =66) | Yes <i>n</i> (%) (<i>n</i> =25) | No <i>n</i> (%) (<i>n</i> =96) | Yes <i>n</i> (%) (<i>n</i> =25) | No <i>n</i> (%) (<i>n</i> =96) |
| <1 year | 6 (10.9) | 48 (72.7) | 12 (48.0) | 48 (50.0) | 1 (4.0) | 49 (51.0) |
| 1–5 years | 26 (47.3) | 16 (24.2) | 12 (48.0) | 30 (31.3) | 12 (48.0) | 30 (31.3) |
| Above 5 years | 23 (41.8) | 2 (3.0) | 1 (4.0) | 18 (18.8) | 12 (48.0) | 17 (17.7) |
| Total | 55 (100) | 66 (100) | 25 (100) | 96 (100) | 25 (100) | 96 (100) |

$\chi^2=40.562, P=0.000$. This result is significant at $P<0.05$ for T.T injection and duration of service. $\chi^2=15.347, P=0.000$. This result is significant at $P<0.05$ for anti-typhoid vaccination and duration of service. $\chi^2=19.819, P=0.000$. This result is significant at $P<0.05$ for anti-worm tablets and duration of service. T.T: Tetanus toxoid

for hand washing after coming from toilet was practiced by 96.7% of food handlers. Majority (86.0%) of food handlers did not wash their hands before cooking/serving food.

In this study, we also assess the immunization status of food handlers, it was observed that immunization against commonly occurring diseases such as tetanus 45.5%, typhoid 20.7%, hepatitis-B 5.8%, and Hepatitis-A 4.1% is very low and unsatisfactory. In addition, chemoprophylaxis against worm infestation was also low 20.7% among food handlers. The low coverage of immunization among food handlers is because of their illiteracy and or ignorance about benefits of immunization.

During the study, we also observed the health status of food handlers about diseases such as anemia, respiratory tract infections, fever, diarrhea/dysentery, hypertension, diabetes mellitus, and seizures. There were many food handlers who suffered from more than 1 disease but majority (19.8%) of them suffered from anemia, which was similar to the study conducted by Mudey *et al.*,^[10] in which most of the (21.87%) food handlers were anemic. Of the total 121 food handlers, 72.1% were currently suffering from some or the other disease, after the anemia, next most prevalent morbidity were febrile illness, respiratory tract infections, and skin infection 16.5%, 14.9%, and 13.2%, respectively. The high level of morbidity among food handlers could probably be due to poor personal hygiene practice, low level of education, and poor immunization against major diseases such as typhoid, tetanus, hepatitis-B, and hepatitis-A.

The present study also showed that only 3.3% of food handlers had undergo pre-employment medical examination and only 3.3% had done periodic examination. The study conducted by Deshpande and Phalke^[13] in rural area of West Maharashtra, India, also shown that only 10.76% of food handlers had pre-employment examination out of 75 food handlers.

Limitations

A limitation of this study is that the sample was purposively selected. Furthermore, some sociodemographic variables such as socioeconomic status of food handlers, their working hours, and sanitary condition of food establishments have not been considered. The laboratory investigations for confirmation of diagnosis of different diseases were not done.

CONCLUSION

The present study observed that the level of personal hygiene practice among food handlers in different food establishments is satisfactory most of them washed their hands after coming from toilet with soap, before serving or cooking food, and cut nail twice in a week. However, the immunization status among food handlers was found unsatisfactory most of them have not been immunized against tetanus, typhoid, hepatitis-A, and hepatitis-B. Hence, it can be concluded that the incidence of illness and the coverage level of immunization cannot be considered satisfactory; on the basis of inferences of this study, it is recommended that owner of food establishments should be made awareness of pre-placement and periodic medical examination for the protection of their employers and consumers. Moreover, there is also requirement of health education about early signs and symptoms of common morbidities.

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