International Journal of Community Medicine and Public Health
Sinha S et al. Int J Community Med Public Health. 2023 Jun;10(6):2192-2196
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: https://dx.doi.org/10.18203/2394-6040.ijcmph20231702

Original Research Article

Effectiveness of educational intervention on KAP of food handlers and barriers to implementation of food safety: a cross sectional comparative study

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Received: 04 May 2023
Accepted: 16 May 2023

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ABSTRACT

Background: With an estimated 600 million cases of foodborne illnesses annually, unsafe food is a threat to human health and economies globally. World Health Organization (WHO) emphasizes that the future of food safety is to transform knowledge into action for people and communities. Hence, this study was undertaken to evaluate the effectiveness of an educational intervention package on Knowledge, Attitude and Practice (KAP) of food handlers and to evaluate the barriers to implementation of food safety.
Methods: This was an educational intervention before and after comparison study. All food handlers employed in food establishments located in the premises of a tertiary care hospital were included in the study. The educational intervention comprised of interactive lectures and documentaries. The responses of the participants were recorded on pre-validated questionnaires and KAP scores were calculated before and after the educational intervention. Chi square test and paired t-test were used to assess statistical significance.
Results: The mean age of food handlers was 38+2 years. Majority were educated up to 12th standard. There was a significant improvement in the KAP scores pre- and post- intervention. Among the barriers recognised in ensuring food safety, the most common were manpower management and absence of basic amenities for hand washing.
Conclusions: The study concludes that while educational intervention has a significant role in improving the KAP of food handlers, a holistic approach in prevention of food borne illnesses should include active participation from the stakeholders and clientele besides providing periodic training to the food handlers.

Keywords: Comparative study, Food handlers, Food safety, KAP, Training

INTRODUCTION

Nutrition and health are fundamentally entwined. Food sanitation rests directly upon the state of personal hygiene and habits of the personnel working in the food establishments.[1] Ingestion of food contaminated with hazardous chemicals and microbes results in a wide spectrum of food borne illnesses. The food can get contaminated at any stage from the initiation of production to its consumption ("farm to fork") and can result from environmental contamination including pollution of air, water and soil.[2] Food safety is of paramount importance in the health set up as occurrence of food and water borne illnesses causes morbidity in the population in addition to wastage of essential manhours. The factors, which contribute to the spread of food borne diseases, are lack of appreciation of food safety measures, absence of periodic evaluation system and outdated food

safety policies.[3] A food handler is defined 'as a person who directly engages in the handling of food or who handles surfaces likely to come into contact with food.[4] Thus, all individuals working in food establishments such as cooks, waiters, bartenders, catering managers etc, form an important link to ensuring food safety among the population. Lack of knowledge and unhygienic practices of food handlers are an important factor contributing to the incidence of food borne diseases.

The most frequently reported food handler errors are handling of food either during an active disease or carrier state, bare hand contact with food, failure to wash hands and insufficient cleaning of kitchen tools and equipment.[5] The Food Safety and Standards Act (FSSA), 2006 has laid down a well-defined protocol to be followed by food handlers in all food establishments. These protocols become even more important in a hospital setting, as we follow a mass catering system where one food handler is expected to prepare food for at least 150-200 persons at a time. Educating, training and promoting positive attitude of food handlers has shown to significantly improve the status of food hygiene knowledge, attitudes and practices (KAP).[6]

A well-informed food handler by way of safe food practices would be an essential link in provision of food safety. Hence, this study was undertaken to evaluate the effectiveness of an educational intervention programmed on the Knowledge, Attitude and Practice (KAP) of food handlers employed in food establishments located within the premises of a tertiary care hospital and to assess the barriers to implementation of food safety practices.

METHODS

It was a cross sectional analytical study. The study was conducted at a tertiary care hospital where multiple training sessions of 1 hour each for a duration of 6 weeks were organized for food handlers employed in all food establishments located within the premises of a tertiary care hospital. All food handlers who attended the training at the hospital were included in the study. The study was conducted over a period of 6 weeks i.e. 02 January 2023 to 11 February 2023. A total of 70 food handlers were interviewed during the study as per inclusion criteria.

Inclusion criteria

All food handlers who attended the training sessions were included in the study. Separate timings for food establishments were maintained as per the workload during the day so as not to affect the day to day functioning of the establishment.

Exclusion criteria

Food handlers not consenting to be a part of the study were excluded from the study.

Method of collection of data

This comparative study was conducted for all food handlers employed in food establishments located within the premises of a tertiary care hospital. A pre validated questionnaire was designed based on FSSAI guidelines on safe food practices.[7] Interactive training sessions of one hour each for a duration of six weeks on safe food practices were conducted in the Department of Community Medicine. The KAP scores of food handlers were assessed before and after the educational intervention. The questionnaire consisted of ten questions each on Knowledge, Attitude and Practice and the respondents were required to choose from either 'Yes', 'No' or 'don't know'. The correct answers were rewarded '1' mark and wrong and 'don't know' answers were awarded '0' mark. A score of more than 50% was considered to be satisfactory.

The educational intervention (in the form of training sessions) on food safety practices was based on the instructions related to safe food practices included in the FSSAI guidelines. The training sessions comprised of information regarding food and water borne diseases, importance of hand hygiene, desirable food processing, cooking and storage practices, role of environmental cleanliness and safe water in prevention of food borne illnesses. The training sessions were planned to include the following:

Lecture on "food safety practices" followed by an interactive session wherein queries and difficulties faced by food handlers at their work place, that affect their quality of work, were addressed. Videos for sensitization of food handlers on food safety titled "Five keys to safer food" and "Food safety and hygiene training" were also screened. At the end of the interactive sessions, food handlers were requested to pen down their feedbacks w.r.t barriers faced at the work place that hinder in provision of quality services. The endline data was recorded two weeks after the intervention.

Statistical analysis

Data was analyzed using SPSS Ver 17.0. Frequency analysis was used to understand the socio-economic and demographic information of the food handlers. Chi square test and paired t test were performed to assess statistical significance.

RESULTS

The mean age of food handlers was 38+2 years. Majority (78%) were educated up to 12th standard. At baseline, majority (64%) had a fair knowledge regarding factors affecting food safety. Almost all food handlers had knowledge regarding importance of hand hygiene and use of apron, cap and gloves while handling food items. The major areas of concern w.r.t knowledge of food handlers were information regarding preparation and storage of

food (both raw and cooked). Only 7% had the knowledge regarding correct storage techniques while 90% food handlers thought that cooked food stored at room temperature could be re-heated after 2-4 hours and served to prevent wastage of food. The attitude of food handlers varied towards the various components of food handling. While majority of the food handlers had a positive attitude w.r.t the role of hand washing practices in prevention of food borne diseases, only 14% felt that correct technique of storage, cutting and washing of vegetables was relevant in prevention of food borne illnesses. Most (81%) of the food handlers were uncertain regarding storage of dairy and meat items and handling food while being sick (59%). A mere 3% of food handlers considered importance of cleaning the meat cutting equipment periodically, adequately and correctly as a measure to prevent food borne illnesses.

Almost all (99%) food handlers washed hands before work. However, only 60% did so with soap meant for hand washing. About 30 % of the food handlers washed hands with soap/detergent used for cleaning the utensils. 80% of the food handlers were washing vegetables, although none of them were washing vegetables with bleaching powder solution and 97% stored dry ration in gunny bags within the premises of the cooking area. About half (49.2%) of the food handlers were following incorrect food safety practices.

Table 1: Evaluation of composite scores of food handler's knowledge, attitude and practice (KAP) pre- and post-intervention.

KAP	Pre-test (mean±SD)	Post-test (mean± SD)	t value	Sig. (2 tailed)
Knowledge	11.14±1.37	12.26±2.27	12.086	0
Attitude	6.97±0.83	9.09±1.05	13.939	0
Practices	6.74±0.83	8.80± 0.90	20.686	0
Total KAP	24.86±2.29	29.34±3.57	23.46	0

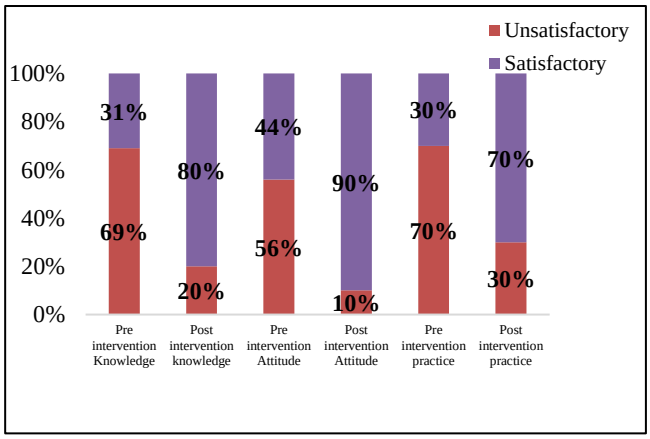

Figure 1: Food handlers KAP with respect to food safety pre- and post-intervention.

A significant improvement in the KAP scores was observed pre- and post-intervention. (Table 1) Few important observations to note were that there was a significant rise in the knowledge of food handlers w.r.t storage (pre-test; satisfactory 13%, post-test; satisfactory 97%) and re-heating of food (pre-test; satisfactory 27% post-test; satisfactory 86%). Also, their knowledge regarding agents, symptoms and complications of food borne illnesses showed significant improvement pre- and post-intervention. Their attitude towards food safety changed in a positive direction especially with regard to importance of personal and environmental cleanliness in prevention of food borne illnesses. On assessment of food safety practices, it was noted that there was a significant improvement in practices post intervention. Among the barriers to ensuring food safety, majority (94%) of the food handlers expressed a need for better time and manpower management (90%) in the form of provision of additional cooks in accordance with the number of clienteles they need to cater for. Also, active participation from stake-holders in the form of provision of soap, construction of space for hand washing away from the cooking area, installation of chimneys is desirable. A need for educating the clientele regarding importance of environmental cleanliness and food hygiene would aid the food handlers in improving their quality of service.

Table 2: Feedback given by food handlers on barriers to provision of quality services at the work place.

Barriers	N (%)
Improper manpower management	63 (90)
Non availability of soap and separate area for hand washing	52 (74)
Non availability of sources of potable water supply within the cookhouse premises	24 (34)
Time management	66 (94)
Inadequate participation of stakeholders and clientele in day to day working of the cook house.	48 (69)

DISCUSSION

The public health sector is committed to production and storage of food products in clean and sanitary food establishments to prevent the occurrence of food and water borne illnesses. However, the information and reporting system is replete with instances of outbreaks

every year in the country involving a varying number of populations. Lack of adequate food hygiene can lead to foodborne diseases.[8] A study conducted by Todd EC et al in Michigan, USA investigating 816 foodborne outbreaks found that all outbreaks had worker involvement of some kind, and the majority of the food handlers were infected.[9] Hence, training of food handlers becomes an exercise of paramount importance in achieving food safety. This study highlighted that there was a significant increase in the knowledge score of food handlers following the educational intervention (in the form of interactive training sessions) including knowledge regarding the correct technique of preparation, cooking, storage and distribution of food. In a study done by Park et al on evaluation of food safety and training of food handlers in restaurant operations, it was found that there was a significant improvement in their knowledge score (increasing from 49.3 before the training to 66.6 after training). The study also stressed that more job-specific and hands-on training materials for restaurant employees should be developed. The continuous implementation of food safety training and integration of employee appraisal program with the outcome of safety training was needed to ensure food safety.[10]

Attitude is a predisposition to respond positively or negatively towards a certain idea. The major components of attitude are cognition, conation, affect and evaluation. We observed that after the educational intervention and provision of knowledge, there was a rise in the score for attitude of food handlers towards safe food practices from 44% to 90%. According to a study done by Mendagudali et al, knowledge allied to attitudes may act as precursor of behaviour change.[11] A study done by Siti Murnirah Che Has et al found that education played an important role in positive transformation of attitudes post training.[12] Kevin R. Roberts et al found that while food safety training might improve knowledge, it might not always translate to improved behaviors. Such problem in transformation of knowledge to attitudes has been linked to a number of factors including trainee characteristics, training design, and work environment.[13] Hence, in our study as the status of education was similar in all the study participants, we made the training design inclusive to encourage participation from all the food handlers which had a positive influence on their attitudes pre- and post-intervention.

In our study, there was a significant rise in the practice score pre- and post- intervention especially in areas concerning safe handling and storage of food. Similar findings were seen in a study conducted by Hezekiah Kehinde et al. It was observed that most of the food handlers with training had excellent and acceptable practices in the majority of food safety aspects such as cleaning the working area (61.1%), hand washing (58.3%), the use of potable water during food preparation (88.9%), and food storage at appropriate temperature (94.4%).[14] An important finding in the study conducted by Milton A et al was that a larger time duration between the training and administration of questionnaire affects the responses of the participants due to recall bias leading to inconclusive findings.[15] This shortcoming was overcome in our study by administering the questionnaire to food handlers within 2 days of completion of training.

It was found in our study that the most important barriers to provision of quality services were inadequate manpower (90%) and improper time management (94%). In a study conducted by Monica A Wandolo et al it was concluded that among the barriers to implementation of food safety, the important factors were lack of knowledge (32%), set standards (31%), attitude (31%), time (28%), motivation (27%), experience (26%), facilities (23%) and inadequate equipment (23%).[16] Our study found that, in most of the food establishments a single cook was preparing meals for 100-120 people leading to over-burdening and lapse of food security measures. A study conducted by Harry J. Kirejczyk on updated cook staffing model to reflect workloads generated by current field feeding operations, group rations and kitchens found that a total of 12 cooks were required to efficiently prepare meals for a total of 775 personnel (one per 65 personnel).[17] Information, Education and Communication (IEC) is used to generate awareness. It means process of working with individuals and communities in order to develop strategies that help in promoting positive behavior's that are appropriate to their settings. While barriers related to IEC were addressed in our study by means of an educational intervention, it is imperative to note that change of IEC into BCC (Behavior Change Communication) needs measures directed at enabling the environment of the individual. Some of the interventions that would help in achievement of better food safety measures by means of a more conducive environment for food handlers are provision of adequate quantities (3 sachets of 200 ml capacity each per month per food handler) of soap for hand washing, procurement of modern kitchen equipment and adequate space for storage of food items in a hygienic manner. To facilitate the food handlers in achieving optimum food safety, regular trainings (one every six months) should be conducted. These may be utilized as an opportunity to update their knowledge regarding food safety practices besides collecting their feedback on problems faced at the workplace. Also, waiters and helpers need to be trained in basic cooking skills so as to help the main cook by way of multi-tasking.

CONCLUSION

The epidemiological pattern of food borne illnesses forms a short and sharp explosive pattern, most prevalent in close community catering organisations. Food handlers form an important link in ensuring food safety for the population. In this study, an inclusive education intervention programme was found to improve the overall KAP scores of food handlers. It is imperative to note that promotion of safe food handling through systematic disease prevention and health education programmes

directed to food handlers is mandatory as a single food handler is preparing meals for a large clientele of over 100, thus directly influencing their overall health. However, the training programmes should also include the consumers as the clientele forms an important link in food safety practices.

Recommendations

While periodic training sessions would go a long way in prevention of food borne diseases by way of increasing KAP of food handlers, the onus of food safety should be equally distributed among the food handlers, stakeholders and clientele to facilitate a holistic preventive strategy.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Sinha S, Sandhu NK. Effectiveness of educational intervention on KAP of food handlers and barriers to implementation of food safety: a cross sectional comparative study. Int J Community Med Public Health 2023;10:2192-6.