A Longitudinal Study to Assess the Role of Sanitary Inspections in Improving the Hygiene and Food Safety of Eating Establishments in a Tertiary Care Hospital of North India

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Abstract

Introduction: Food safety inspections serve two purposes; determine compliance with the law and gather evidence for enforcement if there is noncompliance. The present study was conducted to assess the role of regular inspections on food safety in hospital premises. Methodology: This was an intervention based before and after study. A tool was prepared based on the Food Safety and Standards Regulations (FSSR) (in India) 2011. This included major, critical, and highly critical domains. Each item in the tool scored between 1 and 3 (poor, satisfactory, and good). Based on this, each eating establishment (EE) was given a score on conformance to FSSR 2011. Monthly inspection was made over a year and corrective actions were suggested. Results: The minimum preintervention score was (41.28%), and maximum was (77.25%). There was no significant association between type of meal services and score EE (P > 0.05). Higher proportion of EEs within the hospital building had a satisfactory and good score as compared to EEs outside the hospital building but within hospital premises (P < 0.05). Postintervention, there was a significant change (increase) in the scores of EEs. There was a significant increase in mean scores of EEs under major domains namely maintenance, layout of equipment, monitoring and detection, and elimination of food sources to the pests. Under critical and highly critical domains personal cleanliness, training, and self-inspection by food business operators improved significantly. Conclusion: Regular inspections can improve the food safety standards in EEs.

Keywords: Food safety, hospital, hygiene, sanitary inspections, sanitation

INTRODUCTION

The word “hospital” originates from the Latin word “hospice.” The place or establishment where a guest is received was called the hospitium or hospitale. During the early nineteenth century, hospitals were equated to death houses. Later hospitals were expected to play a central role in the health care system with an emphasis on health promotion, while providing curative services. In 1986, the WHO introduced the concept of health promoting hospitals initiative (HPH). In Western countries, hospitals have increasingly positioned themselves as providers of health promotion services within the community. However, the concept of HPH is still new in India. So far, the HPH approach has been formally endorsed and adopted by only two hospitals in India. Nutrition/dietary/catering services are important aspects of HPH concept. This approach also necessitates that the hygiene of eating establishments (EEs), namely, messes, hospital catering services, and restaurants inside hospital premises in hospital premises are maintained. Hence, in the present context, the concept of HPH and food safety can be integrated to ensure good quality services.

Food safety, particularly in hospital is an area of extreme importance as people receiving healthcare are more vulnerable and require food which is safe and not contaminated. Food contamination can occur at any point from its journey to the procurement of raw material to it being served to the client. Safety of food can be ensured through the application of available standard guidelines, namely, good hygiene practices.

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Dudeja and Singh: Impact of sanitary inspections in improving hygiene and food safety of eating establishments

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Strategies for implementation of the Food Safety and Standards Regulations (FSSR) 2011 encompass training of food handlers and regular inspections whereby food safety can be enhanced and ensured. Many studies have been done on food safety training intervention but evidence regarding the role of regular sanitary inspections is scarce. Food safety inspections serve two purposes; determine compliance with the law and gather evidence for enforcement if there is noncompliance. Hence, the present study was conducted to assess the role of regular inspections on food safety in hospital premises.

The objectives of the study were to ascertain the determinants of degree of conformance of EE inside a tertiary care government hospital to FSSR 2011 and to study the impact of regular sanitary inspections on food safety.

**Methodology**

This was an intervention based before and after study. Prior clearance from the Institutional Ethical Committee was taken. An EE was defined as any undertaking, whether for profit or not, whether public or private, carrying out any of the activities related to cooking, distribution, or sale of cooked food or food ingredients. A list of all 36 EEs inside hospital was made with the help from administrative branch of institute. These were mainly central hospital kitchen, cafeterias for hospital employees, restaurants, kiosks, canteens, and messes. A tool was prepared based on FSSR 2011, covering all aspects of food safety in EEs. This included major, critical, and highly critical domains. Items rated under these domains are given in Table 1. Each item in the tool was given a score between 1 and 3 (poor, satisfactory and good). Based on this, each EE was given a separate total score on conformance to FSSR 2011. Since all items of tool were not applicable to all EEs, the maximum attainable score was different for each EE. Based on the maximum score and score attained, status of conformance of each EE with respect to FSSR 2011 was graded as poor, satisfactory, good, very good, and excellent. EEs were visited during working hours without prior intimation; 40–45 min was spent in inspecting and scoring each of them. If all items could not be scored EE was revisited. All items listed in questionnaire were personally seen, and scoring was endorsed. Once a month, inspection was made over a year and corrective actions were suggested.

**Results**

The minimum preintervention score obtained was (41.28%), and maximum was (77.25%). None of the EEs could score more than 80%. One-third of the EEs (12 out of 36) scored <50%. Nearly 33% of EEs were rated as poor. Very few (only 2) scored a rating of “very good” with a score between 70% and 80% [Table 2]. Physical determinants for status of conformance are given in Table 3. Significant human determinants for status of conformance were public ownership, only patients as clients (P < 0.01). Postintervention, there was a significant change (increase) in the scores of EEs (paired t-test: t = −4.89, df: 35 P = 0.000). However, there was no significant change in number of EEs in different groups before and after intervention [Table 2]. Improvement in the status of conformance of EEs to FSSR did not vary with the presence of kitchen or location of EEs. There was a significant increase in mean scores of EEs under major domains, namely, maintenance, layout of equipment, monitoring and detection, and elimination of food sources to the pests. Under critical and highly critical domains personal cleanliness, training, and self-inspection by food business operators (FBOs) improved significantly.

**Discussion**

An age old universal adage for the hospitals and doctors is “first, do no harm.” Hence, for the medical fraternity, “safety first” should be the watch word. The importance of safe food for hospitalized patients and the detrimental effect that contaminated food could have on their recovery has been emphasized by Kandela.[7]

Food Safety and Standards Authority of India (FSSAI) guidelines under the critical and highly critical domains, aspects of microbiological cross-contamination, personal cleanliness of food handlers, and temperature of food during processing have been given a weight age of 53%. Our EEs scored poorly under these domains. Similar results were seen by Deshpande and Phalke and Mariam et al. in their studies.[8,9]

**Table 1: Items under different domains**

| Major domain                  | Critical and highly critical domain |
|-------------------------------|-------------------------------------|
| Location                      | Food control and monitoring equipment |
| Maintenance                   | Facilities supply                    |
| Lay out of premises           | Sewage and waste water disposal      |
| Lay out of equipment          | Personal hygiene facilities and toilets |
| Premises and rooms design and lay out equipment | Lighting |
| Drainage and waste disposal waste storage | Aspects of hygiene control systems |
| Cleaning                      | Microbiological cross-contamination |
| Temperature control           | Incoming material requirements       |
| Air quality and ventilation   | Water and ice quality                |
| Ventilation systems for food rooms and kitchen | Storage |
| Storage                       | Traceability                         |
| Food packaging                | Personal cleanliness                 |
| Management and supervision    | Transportation                       |
| Documentation and records     | Product information and consumer Awareness |
| Product recall and withdrawal | Training                             |
| Maintenance and sanitation    | Supervision                          |
| Pest control systems preventing access | Self-inspection |
| Harborage and infestation     |                                     |
| Monitoring and detection      |                                     |
| Elimination of food sources to pests |                                     |
| Eradication of pests          |                                     |
| Waste management              |                                     |
| Establishment personal hygiene health status |                                     |
Under the major domains, the main items responsible for maximum significance to score of EEs were provided by premises, design and layout, maintenance and sanitation, and health status of food handlers. Our EEs scored despicably low in all these except for health status of food handlers. These factors are directly related to the food safety attitude and practice of FBOs.

Our findings are in agreement results of Haileselassie et al., who also found that general hygiene of food handlers, sanitary facilities, physical conditions, and environmental hygiene were major deficiencies in EEs. Similarly, Choi et al. found that violation of temperature regulations, contamination through pest control, and storage were the common reasons for poor food safety conditions of restaurants.

Normally, one would expect that smaller EEs selling only readymade prepackaged food items (tetra packs of juices, aerated cold drinks, chips, biscuits, cakes etc.) would score higher than those which cook and sell food. Paradoxically, they had a lower score on conformance with FSSR. The reason behind this was the sale of readymade snacks, namely, sandwiches, kulchas, burgers, patties, which were unhygienically prepared and transported. In addition, there was no concept of shelf life or holding time and discard policy for these items. These were being served with bare hands which could contaminate them. The food contact surfaces too were not cleaned. Hence, despite small scale operation the kiosk-based EEs also scored lower than those EEs with kitchen.

EEs which are inside the hospital building is often visited by the staff, faculty, and resident doctors. Their FBOs do have an unknown fear of being watched for quality standards and service by them. FBOs of these EEs are often heard well than those with EEs outside the building. They have adequate space and other essential facilities such as water supply, lighting, and toilets for food handlers. Hence, they scored better than those EEs which were located outside the building but within the premises.

Public EEs had a higher status of conformance as they were committed to provide good service to the clients. There appeared to be fundamental differences in the objectives of the public and private ownership. Public owned EEs had better infrastructural facilities than privately owned. On the other hand, the private ownership through contractors is centered on profit making. These focus on increasing the sales and generating higher returns.

The reasons for a better score of patient-based EEs could be ownership by hospital authorities and employment of permanent trained government employees for management. As per FSSR 2011, the two important aspects which determine food safety in an EE are its hygiene and sanitation. These two parameters depend a lot on the location of EE. Nevertheless, location is one issue which is not easy to change once established. In case the location is the major factor affecting food safety, it may not be possible to relocate all EEs. Rather the endeavor should be to keep the surroundings clean. There are varying perspectives of different stakeholders, namely, authorities, FBOs, and customers regarding location of an EE. FBOs would always want a location which would

| Status of conformance | Preintervention, n (%) | Postintervention, n (%) | Statistical interpretation |
|-----------------------|------------------------|-------------------------|---------------------------|
| <50 (poor)            | 12 (33.33)             | 10 (27.7)               | $\chi^2=1.79$             |
| 50-60 (satisfactory)  | 14 (38.88)             | 15 (41.6)               | df=3                      |
| 60-70 (good)          | 8 (22.22)              | 6 (16.6)                | $P=0.61$                  |
| 70-80 (very good)     | 2 (5.55)               | 5 (13.8)                |                           |
| Total                 | 36                     | 36                      |                           |

No eating establishment before or after intervention had a score >80 (excellent)

| Score on status of conformance | Total | Result |
|-------------------------------|-------|--------|
| <50% (poor)                   | 15    | $\chi^2=8.72$ df=2 $P=0.01$ |
| 50-60% (satisfactory)         | 21    |        |
| >60% (good and very good)     | 36    |        |

Table 2: Comparison of status of conformance of eating establishment before and after intervention

Table 3: Physical determinants of status of conformance of eating establishments to the Food Safety and Standards Regulations 2011

| Location            | Total | Result     |
|---------------------|-------|------------|
| Within the hospital building | 15    | $\chi^2=8.72$ df=2 $P=0.01$ |
| Outside the hospital building | 21    |        |
| Total               | 36    |            |

| Kitchen | Total | Result     |
|---------|-------|------------|
| Present | 8     | $\chi^2=9.09$ df=2 $P=0.01$ |
| Absent  | 21    |            |
| Total   | 36    |            |

| Type of meal        | Total | Result |
|---------------------|-------|--------|
| Full meal           | 21    | $\chi^2=2.14$ df=2 $P=0.34$ |
| Beverages and snacks| 15    |        |
| Total               | 36    |        |
attract maximum number of customers like inside outpatient department. They would prefer to run an EE collocated with other medicine outlets as it attracts more customers.

The onus of ensuring a location for EE conducive to food safety (away from open drains, garbage dumps, water logging, and excessive dust) lies with the authorities. FBOs generally ensure that the service area or the place where people sit and eat is clean. However, it was the hygiene of cooking area, which was being compromised due to cost cutting attitude of our FBOs. Small time FBOs wished to spend less and their focus was to employ same people for cooking and cleaning activities. Alongside they wanted to spend minimum time in maintenance. In addition, this is generally a hidden area from customer’s eyes. Water alone without a detergent was being used leading to the ineffective cleanliness of the area. Similar study done in Nigeria and Kenya in 2009 showed that type of premise, unclean equipment, and work responsibility was factors affecting food handling practices.

Our study demonstrated that serial sanitary inspections played an important role in improving the food safety status of EEs. However, our inspections were different from the routine short duration ones which only gather a snapshot view. Various processes related to food safety in working of these EEs were checked in detail and covered all aspects of food safety from farm to kitchen and then kitchen to fork. After each inspection, no cost/low-cost interventions were suggested to improve the food safety score of EE. These were acceptable to the FBOs too as cost was not a hindrance in their implementation.

Inspection is one way to ensure the food hygiene and safety practices in the EEs are being followed.[12,13] Regular inspection records portray the persistent challenges that may exist in the EEs. It helps the managers and employees to be more compliant with the food safety law. Irwin et al. in their study concluded that the restaurant inspections scores could be used to predict the occurrence of Food Borne Illnesses (FBI) as the inspection scores of restaurants with more reported outbreak cases were significantly lower than those with no reported outbreak cases.[14]

It has been stated that the restaurant inspections records only capture the “snapshot” of restaurant operation and do not reflect appropriateness of food handling in day-to-day operation. Frequent inspections have also shown mixed results in term of their relationship with sanitation compliances.[15,16] Kwon et al. documented that the frequency of inspection itself indicates increased need for food safety training as the increased number of inspections was due to complaints and follow-up visits.

FSSAI initiative to accredit food establishments has found no takers to get itself rated. There are a number of public misconceptions and unrealistically high expectations of the public health restaurant-inspection system. It is important to improve consumers’ understanding of inspection scores and the limitations of regulatory inspections.

**Conclusion**

Serial and thorough inspections involving detailed review and rectification of food safety process can improve the food safety and hygiene status of EEs.

**Recommendations**

Regular sanitary inspections of EEs should involve detailed study of existing food safety processes. Such visits should be followed by feasible and low-cost solutions to improve the hygiene and food safety of EEs.

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**Conflicts of interest**

There are no conflicts of interest.

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