

Full Length Research Paper

Knowledge in food hygiene and hygienic practices differ- in food handlers at a hospital in Nairobi, Kenya

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Accepted January 16, 2013

Improper food handling practices and lack of knowledge in food hygiene among food handlers have been implicated as a vehicle of transferring food pathogens causing disease outbreaks. The study adopted a descriptive survey design. The study population comprised of 95 food-handlers. Simple random sampling was used in sample selection. Questionnaires were used to assess their level of knowledge on hygienic practices. An observation checklist was used in capturing the non-verbal occurrences. The mean score in knowledge test indicated that the college level respondents scored 80.8%, secondary level respondents 63.4% and primary level respondents 50.8%. Pearson correlation test indicated significance between educational level and some characteristics at 0.01 and 0.05 confidence levels. The mean score in correct hygienic practices indicated that the college level of education respondents had scored 52.5%, secondary level respondents 49.2% and primary level respondents 48.2% ($p= 0.05$). The food handlers performed well in knowledge items compared to the hygienic practice which means that knowledge in food hygiene does not always result in a positive change in food handling practices. This indicates that there is need for educational programmes to improve knowledge but also to emphasize on translation to practices.

Keywords: Food Hygiene, Knowledge, Practices, Food handlers, Hospital.

INTRODUCTION

Food handlers play an important role in food safety and in the transmission of food poisoning, because they may introduce pathogens into foods during production, processing, distribution and even presentation (Angelillo *et al.*, 2000). An understanding of food safety procedures and potential factors that cause food born illness is very important for all food handlers. Cohen *et al.*, (2001) stated "only knowledgeable and skilled employees who are trained to follow the proper procedures together with management that effectively monitors employees' performances can ensure food safety".

Hands are one of the principle vehicles for the cross contamination of infectious agents onto ready to eat food. Effective hand washing is therefore of great importance in terms of successful hygienic food preparation, as it prevents the spread of infectious diseases (Restino and

Wind, 1990). A study in the U.S.A. suggested that improper food handlers' practices contributed to approximately 97% of food borne illness in food service establishments (Howe *et al.*, 1996).

Poor food hygienic practices are some of the factors that contribute to microbial food borne disease outbreaks in Kenya (Ombui *et al.*, 2001). The purpose of this study was to determine knowledge and practices among food handlers with regard to food hygiene at a hospital in Nairobi, Kenya.

METHODOLOGY

During September 2005 – February 2006, a random sample of ninety five food handlers from the four Kitchens of Kenyatta National Hospital were invited to participate in the study. Ethical approval was obtained from the hospital ethical committee and confidentiality of respondents assured. A descriptive survey design was

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adopted. Descriptive survey designs are used in preliminary and exploratory studies to allow the researcher gather information, summarize present and interpret for the purpose of clarification (Orodho, 2004). The study team included only respondents that handled food i.e. food production and service staff. Kitchen staff who did not handle food e.g. kitchen cleaners were exempted from the study. A written multiple choice questionnaire comprising of ten questions covering aspects on food handlers practices and knowledge about food hygiene was administered. An observation checklist with at least ten characteristics involving food hygienic practices was also used on food production and service staff to capture non verbal practices. The questionnaire and observation checklist was formulated from Codex alimentarius food hygiene basic texts.

Food safety Knowledge questionnaire

Food hygiene knowledge questionnaire was designed to obtain information about food handlers' knowledge on personal hygiene, food contamination, food waste management and food handlers' apparel. The questionnaire included 10 questions each with four possible answers. The score range was 0 - 10. The scores were converted to 100 points. A score below 50% was classified as poor knowledge.

Food hygienic Practices

An observation checklist with at least 10 characteristics was prepared to capture non-verbal occurrences such as cleaning of hands, physical appearance of food handlers hands, working while having discharge from eyes, nose and ear, behaviour that can lead to food contamination such as chewing, sneezing and coughing over uncovered food and using chopping board for raw and cooked food without cleaning. The score range was between 0 – 10. The scores were converted to 100 points.

Data Analysis

Descriptive statistics such as mean and percentages were used to describe the characteristics of food handlers. SPSS version 11.5 (SPSS Inc, Chicago) was used to analyze knowledge level and MS Office Excel 2007 to analyze practices of food handlers. $P < 0.05$ and $P < 0.01$ was considered as significant.

RESULTS

Food hygiene Knowledge

Ninety five questionnaires distributed were filled and returned giving a response of 100%.

Table 1 indicates that the college level education respondents performed best in all the questions used as a yardstick to measure knowledge level. For example 81% of college, 62% of secondary and 58% of the primary level respondents knew why food handlers should maintain some degree of personal cleanliness. Similarly, 78% of college level respondents knew the behaviour that does not lead to food contamination as compared to 50% of primary and 60% of secondary level. A further 70% of college level knew the requirements necessary in the growth of micro-organisms as compared to 62% of secondary and 54% of the Primary level. The majority (81%) of college level knew when food production personnel should wash their hands, followed by 71% of secondary and 46% of primary level. 81% of college level knew how nails of a person working in food production area should be kept, followed by 62% of secondary and 46% of primary. In comparison, 85% of college level knew what they should do in case of any cuts during food preparation while 69% of secondary level and 58% of primary level had knowledge on the same. 81% of college level respondents were knowledgeable on correct outfit to be worn by food handlers compared to 67% of secondary level and 50% of primary level. College level respondents (81%) were knowledgeable on the provision of sanitizing soap for cleaning hands as compared to 67% of secondary and 50% of primary level. Further, 85% of the college respondents knew what would happen if food waste accumulates in production area as compared to 45% of secondary and 46% of primary level. Lastly, 85% of college respondent knew how often a kitchen should be cleaned as compared to 69% of secondary and 50% of primary level.

The person co-relation test done (Table I) on the level of education and the knowledge items indicated that there was significant ($p < 0.05$) difference between the level of education and the knowledge items on: behaviour that does not lead to food contamination, management of cuts during food preparation, correct outfit to be worn by food handlers and provision of sanitary liquid soap for cleaning hands. There was also a significant difference between the level of education at $p < 0.01$ level on the knowledge items such as proper nail management, washing of hands, food waste accumulation in food production area and frequency of cleaning the kitchen. Results however showed no significant differences between the level of education and the knowledge items on basic requirements for microbial growth and maintenance of a high degree of personal cleanliness by food handlers.

Food hygienic practices

Observation on correct hygienic practices showed (Figure 1, 2 & 3) that 16 out of 26 (62%) of primary level

Table 1. Comparison of the number of correct responses for each food safety knowledge item for College level (N = 27), Secondary level (N = 42) and Primary level (N = 26) food handlers

Knowledge Items	College		Secondary		Primary		Sign.
	No	%	No.	%	No.	%	
1. Why food handlers should maintain high degree of personal cleanliness	22	81%	26	62%	15	58%	0.189
2. Behavior that does not lead to food contamination	21	78%	25	60%	13	50%	0.214*
3. Basic requirement for basic microbial growth	19	70%	26	62%	14	54%	0.127
4. When hands should be washed	22	81%	30	71%	12	46%	0.280**
5. Proper nail management	22	81%	26	62%	12	46%	0.274**
6. Management of cuts during food preparation.	23	85%	29	69%	15	58%	0.226*
7. Correct outfit to be worn by food handlers	22	81%	28	67%	13	50%	0.249*
8. Provision of Sanitary liquid soap for cleaning hands	22	81%	28	67%	3	50%	0.249*
9. Accumulation of food waste in production area	23	85%	19	45%	12	46%	0.297**
10. Frequency of cleaning kitchen	23	85%	29	69%	13	50%	0.282**

Correlation is sig at the 0.05 level (2 tailed)

respondents kept short nails followed by 12 out of 27 (44%) college level respondents then 18 out of 42 (43%) of secondary level. 14 out of 27 (52%) college respondents wore clean uniform followed by 11 out of 42 (26%) secondary respondents and lastly 6 out of 26 (23%) of primary level. 9 out of 27 (33%) college respondents were found not chewing gum or other substances over uncovered food compared to 13 out of 42 (31%) secondary respondents and 3 out of 26 (12%) of primary level. 5 out of 26 (19%) of primary level were found to wear head gear compared to 3 out of 27 (11%) of college level and 1 out of 42 (2%) of secondary level respondents, the rest never covered their heads. Coughing / sneezing over uncovered food was a rare practice, however it was noted in 4 out of 27 (15%) of college level, 7 out of 42 (17%) of secondary level and 6 out of 26 (23%) of primary level respondents. Cleaning of hands after using the toilet and before handling food was observed mostly on college level respondents who were 7 out of 27 (26%) followed by primary respondents 6 out of 26 (23%) and lastly 5 out of 42 (12%) of secondary respondents. 10 out of 26 (39%) of primary level were observed as having discharge from the eyes while working in the kitchen, 6 out of 27 (22%) of college level, and then 6 out of 42 (14%) of secondary level

respondents. Discharge from the nose was noted mostly on primary level respondents at 9 out of 26 (35%) then 12 out of 42 (29%) of secondary level and lastly 7 out of 27 (22%) of college level respondents. Discharge from the ear was also not common where 5 out of 27 (19%) of college level, 3 out of 26 (12%) of primary level and 1 out of 42 (2%) of secondary level respondents were victims. Lastly 25 out of 42 (60%) of secondary level, 16 out of 27 of college level (59%) and 13 out of 26 (50%) of primary level respondents were found to be using the same chopping board for raw and cooked food without cleaning. There was a significant difference in food hygienic practice scores between the three levels of education. The college level had an average score of 52.5%, secondary level 49.2% and primary respondents 48.2% out of 100% possible points.

Characteristic key

A- Having long nails, **B-** Wearing clean uniforms, **C-** Chewing over uncovered food, **D-** Wearing a head gear, **E-** Sneezing/ coughing over uncovered food, **F-** Washing hands after visiting toilet and before handling food, **G-** Working while having discharge from the eye, **H-** Working

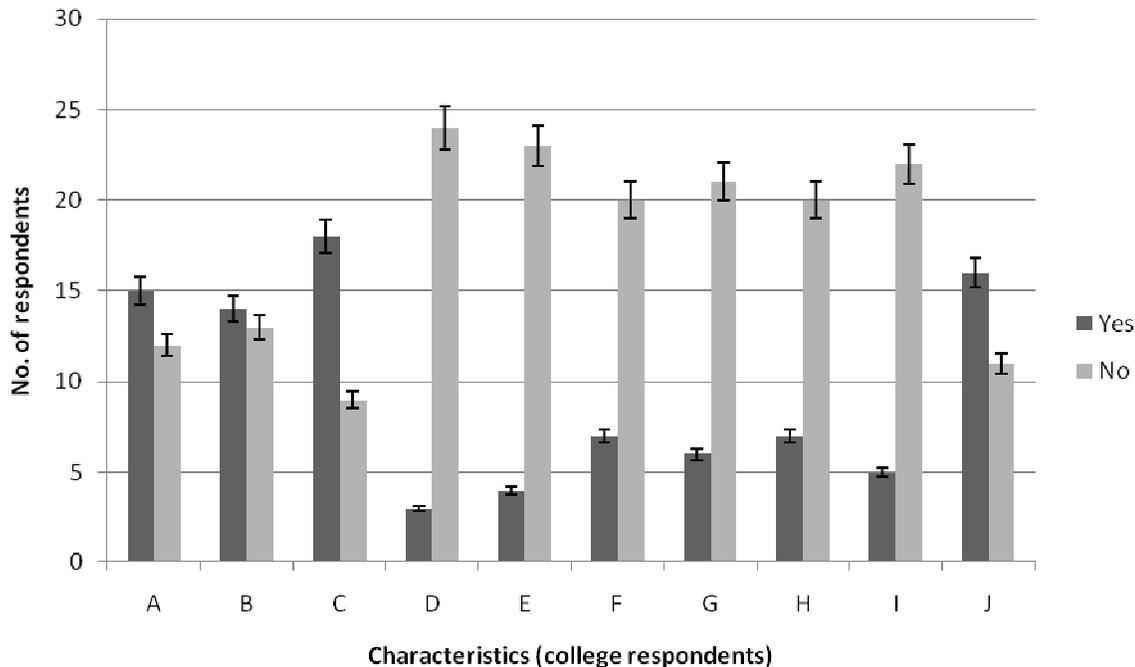


Figure 1. Hygienic practices among college level of education respondents ($p=0.05$)

while having discharge from the nose, I- Working while having discharge from the ear, J- Using same chopping board for raw and cooked food without cleaning

DISCUSSION

During the past decade multiple studies analyzed food hygiene and food safety knowledge and behaviour within specific populations (Gettings and Kiernan, 2001), but rarely among hospital food handlers (Oteri and Ekanemi, 1989). A study in USA suggested that improper food handling practices contributed to approximately 97% of food borne illness in food-service establishments (Howe *et al.*, 1996). Consequently, in order to reduce food borne illness it is crucial to gain an understanding of the interaction of prevailing food safety beliefs, knowledge and practices of food handlers (World Health Organization, 2000). A number of studies (Howe *et al.*, 1996, Powell *et al.*, 1997) however, have indicated that although training may bring about increased knowledge of food safety this does not always result in a positive change in food handling behaviour. It has been suggested that this disparity between knowledge and practice occur because much of the existing training, particularly formal certified training, is designed using the KAP model (Rennie, 1995). This approach assumes that an individual's behaviour or practice (P) is dependent on their knowledge (K) and suggests that the mere provision of information will lead directly to a change in attitude (A) and consequently a change in behaviour. Ehiri *et al.*,

(1997) suggested that knowledge is the main precursor to behavioural change.

In our study however the college level food handlers who scored high in aptitude test (knowledge), scored poorly in implementation of the same e.g. 80% of college level respondents (Table 1) had knowledge on when hands should be washed but only 25% cleaned their hands after visiting the toilet and before handling food (Figure. 1). 80% of trained (college respondent) had knowledge on how nails should be kept to prevent food contamination (Table 1) but only 44% were found to keep their nails short (Figure. 1). About 80% of college level respondents knew the correct outfit of a food handler (Table 1) but only 11% wore headgear (Figure. 1). Still 80% of college level had knowledge on why food handlers should maintain high personal cleanliness (Table 1) but only 52% wore clean uniform (Figure. 1) the rest had uniforms with either stains, dirt or both. The most food hygiene practices abused were: wearing clean uniform, chewing over uncovered food, wearing headgear, having long nails, washing hands after visiting toilet and before handling food and using the same chopping board for raw and cooked food without cleaning. Lacking personal hygiene amongst food handlers is one of the most commonly reported practices contributing to food borne illness (Cogan *et al.*, 2002). Poor hand hygiene is also a significant contributory factor (Collins, 2001). In our study only 52% of college level respondents wore clean uniform, (Figure 1), similarly 26% of secondary level (Figure 2) and 23% of primary level (Figure.3) wore clean uniform. Dirty clothing has been implicated as a source of *Staphylococcus aureus* (Garbutt, 1998) which can easily be transferred on to

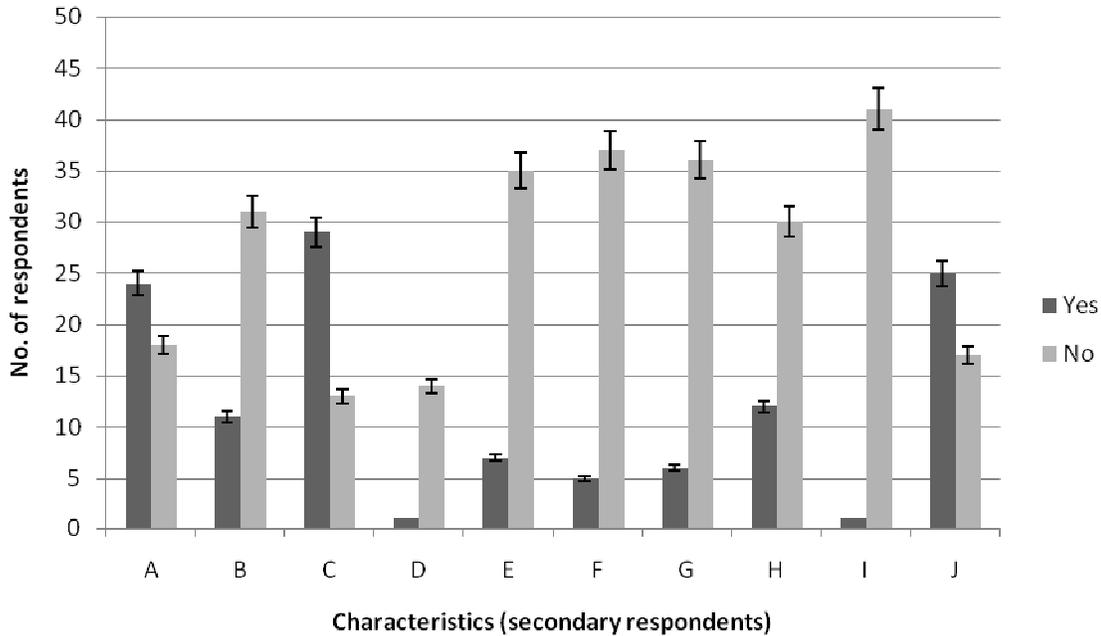


Figure 2. Hygienic practices among secondary level of education respondents ($p=0.05$)

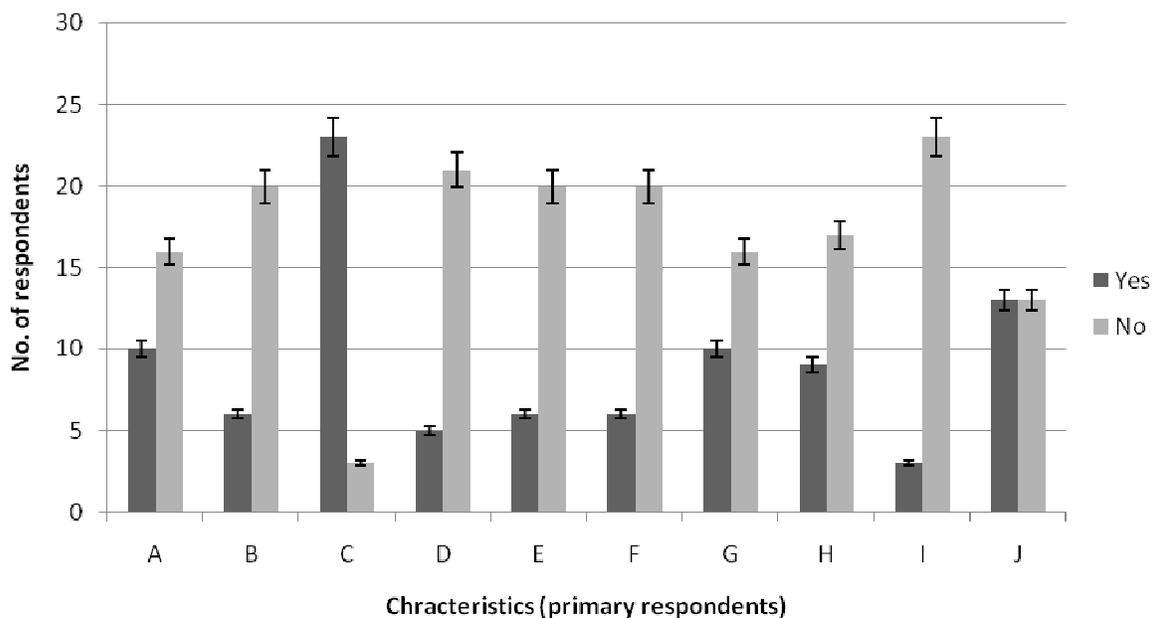


Figure 3. Hygienic practices among primary level of education respondents ($p=0.05$)

food by a food handler. Hand washing has been shown to effectively remove micro-organisms from hands and reduce the spread of food borne infections in numerous situations (Michael, 2002). Our study revealed that only 26% of college level (Figure. 1), 23% of primary level (Figure. 3), and 12% of secondary level, (Figure. 2) cleaned their hands after visiting the toilets and before

handling food. 56% of college level respondents and 57% of secondary level respondents and 38% of primary respondents kept long nails which can harbor dirt and contaminate the food being prepared. Using the same chopping board for raw foods and cooked food without cleaning can easily transfer contamination from raw to cooked food (Chen *et al.*, 2001). Only 50% of primary

(Figure. 3), 41% of college and 40% of secondary level respondents (Figure. 2) cleaned the chopping boards when preparing foods.

It is estimated that 30 – 50% of a population are nasal and throat carriers of *Staphylococcus aureus* (which are pathogenic organisms) (Garbutt, 1998). 15% are skin carriers, particularly on the hands, with the staff and patients in hospital having a carrier rate as high as 80%. Other sources are human faeces, dust and clothing (Garbutt, 1998). 98% of secondary level, (Figure. 2) 89% of college level (Figure 1) and 81.0% of primary level (Figure. 3) respondents were found working without the head gear. A food handler with uncovered head can easily contaminate food by touching the head or loose hair falling onto food. The study revealed that 69% of secondary level, 67% of college level and 88% of Primary level respondents chewed over uncovered food, thus exposing the cooked food to the risk of contamination.

CONCLUSION

This study demonstrates a limited level of knowledge on food hygiene among hospital food handlers especially of secondary and primary level of education. Results emphasize the need for educational programmes tailored to improve food handlers' knowledge of food borne diseases. It however also shows clearly that knowledge of food hygiene does not necessarily translate into practice. Food handling practices should therefore be enforced and food safety inspection guidelines developed and institutionalized.

ACKNOWLEDGEMENT

The authors wish to thank the Ethics and research committee of Kenyatta National Hospital for granting permission to carry out work at the hospital, the food production and service staff who consented in giving out the required information and the Kenyatta University for the background information on the research.

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