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Original Research Article

Poultry shop based hygiene practices: a knowledge, attitudes, and practices study on poultry shop personnel of selected districts of Bangladesh

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ABSTRACT

Background: Food-borne disease outbreaks remain a major global health problem, and cross-contamination from raw meat is a major cause in developed countries due to inadequate handling. The goal of this study was to assess the poultry shop personnel's knowledge, attitudes, and practices (KAP) in the selected districts of Bangladesh.
Methods: 103 poultry shop personnel were involved in this cross-sectional study.
Results: A significant association was observed between the poultry shop personnel and the knowledge ($p<0.05$), attitudes ($p<0.05$), and practices ($p<0.05$) of safe meat-handling. The 68.3% of poultry shop personnel had good, 26.9% had moderate, while only 4.8% of poultry shop personnel had poor knowledge about hygiene practices. The 5.8% of poultry shop personnel showed poor, 19.2% showed moderate and 75% of poultry shop personnel showed good attitude towards hygiene practices. But the poultry shop personnel 36.5% had poor, 44.2% had moderate and only 20% showed good practice of hygiene practices. The knowledge, attitude and practice Mean±SD score of poultry shop personnel was 7.38±2.04, 7.87±2.24 and 4.41±2.38 respectively, indicating that poultry shop personnel had good knowledge and attitude but poor practice. We also found that 42% of poultry shops and poultry shop personnel had maintained totally unhygienic workplace, 56% had moderately hygienic, and while only 2% poultry shops and poultry shop personnel had maintained fully hygienic workplace. Further, linear regression analysis revealed that KAP levels have been significantly associated with age, education, and the majority of knowledge, attitudes, and practice related questions ($p<0.05$).
Conclusions: Public health awareness about safe poultry meat handling and hygiene among poultry shop personnel, in general, should be at the front burner.

Keywords: Attitude, Hygiene, Knowledge, Practices, Poultry shop personnel

INTRODUCTION

Hygiene is defined as any application that is made and any sanitary measures that are taken to protect against environments that may affect our health. Personal hygiene is characterized as a self-care application for the maintenance of the health of individuals. Personal hygiene is extremely important to protect, maintain, and tackle health problems and it is also necessary to prevent many diseases, especially infectious diseases.[1] Animal-sourced protein requirement for human consumption is growing globally at an unprecedented rate particularly

poultry meat. The poultry sector in Bangladesh accounts for 14% of the overall value of livestock production. Poultry meat alone accounts for 37% of Bangladesh's overall meat production.[2]

In Bangladesh, an estimated 150,000 poultry farms produce 570 million tons of meat, with domestic consumption of 7 billion eggs per year. In the industry, there are at least 6 million people who work in small production where bio-security regulations are not applied and where direct exposure to poultry and poultry waste is a consequence.[3] This is actually one of the country's rapidly rising agribusinesses.[4] Approximately 18.6% of GDP is generated by the agriculture sector and one third by the poultry industry.[5] Food-borne diseases and intoxications have become significant as a health threat in recent years. The most significant cause of foodborne disease is infected raw meat. The risk of zoonotic infection is also related to contaminated meat.[6] Epidemiological studies show that poultry meat is still the primary cause of food poisoning in humans. The poultry slaughtered and dressed under conditions in Bangladesh definitely brings extremely high initial contamination loading from the slaughter process to the point where the product is sold to consumers.[7]

As meat is low in acidity, problems associated with the presence of food-borne pathogens such as *Listeria monocytogenes* and *Salmonella enteritidis* have been reported.[8] Contamination occurs often from the soil, unclean water, and intestinal contents, or from dirty knives, hands, or butcher's garments, during slaughter operations conducted in slaughter places with insufficient sanitation and unskilled personnel. All of these factors contribute to meat contamination, bacterial growth, and the potential development of toxins. Lack of basic services, insect runoff, flies, and many other factors of unhygienic lead to the risk for consumer infection.[9] Food handlers are the main source of food contamination, as stated.[10] The outbreaks of food-borne illnesses reported in the United States, for example, were related to mishandling; 79% from commercial or industrial establishments, and 20% from households.[11]

Considering the fact that international food management agencies have provided member countries with guidance on safe handling practices such as HACCP and Good Manufacturing Practices, the knowledge and perceptions of meat handlers about safe food handling remain largely unknown in most developing countries, especially Nigeria.[12] Most studies conducted on the basis of food handlers in restaurants, processed food establishments without any reported meat handlers report; while food poisoning cases due to contaminated meat have been increasing in recent years.[13,14]

The goal of this study was to assess the knowledge, attitudes, and practices (KAP) of poultry shop personnel in the selected districts of Bangladesh. Therefore, this paper is intended to establish the relationship between the poultry shop personnel's socio-demographic characteristics and their degree of KAP.

METHODS

Study site, design, and population

The study was performed in two selected districts of Bangladesh (Dhaka and Noakhali). A total of 103 poultry shop personnel participated in this cross-sectional study. Of these, there were 53 poultry shop personnel from Dhaka district and 50 poultry shop personnel from Noakhali district. The study period was November 2019 to January 2020.

Inclusion and exclusion criteria

Poultry shop personnel enrolled in the study who accepted to participate in the study were included.

Questionnaire administration

The semi-structured self-administered questionnaire aimed to obtain data on the poultry shop personnel's knowledge, attitudes, and practices of safe poultry meat handling. Four parts of the questionnaire were included. In the first part, we described their socio-demographic profiles, with respondents' ages categorized into four groups, while education levels were classified as 'None' (no formal education), 'Primary' (received only primary education), 'Secondary' (received secondary education) and, 'Higher' (received tertiary education). Also, the second part had ten questions to determine their knowledge of the safe handling of meat. In the third and fourth parts, ten questions were asked to determine their attitudes and work place practices towards the safe handling of meat.

A pre-test was carried out, after which some of the questions had been modified to improve clarity. Potential participants were informed that they could either choose to participate in the study or not. Consent was therefore obtained through their affirmative response to participation in the study.

Data analysis

Data were analyzed using IBM SPSS software version 20. Knowledge, attitudes and practices were scored with reference to answers to ten questions each. Correct responses were scored 1 and incorrect responses were scored 0 and scores ranged between 0 and 10. Scores ≥7 were taken as good knowledge, attitudes, and practices while scores from 4 to 6 were taken as moderate knowledge, attitudes, or practices. And score ≤3 were considered as poor KAP.

The linear regression test was used for determining the relationship between KAP levels and age, education, and the knowledge, attitudes, practice-related questions. Statistical significance was assessed using p values and all results were considered to be significant if p≤0.05.

RESULTS

The data in Table 1 showed that 68.3% of poultry shop personnel had good, 26.9% had moderate, while only 4.8% of poultry shop personnel had poor knowledge about hygiene practices. The 5.8% of poultry shop personnel showed poor, 19.2% showed moderate and 75% of poultry shop personnel showed good attitude towards hygiene practices. And, the poultry shop personnel 36.5% had poor, 44.2% had moderate and only 20% showed good practice of hygiene practices. There was a statistically significant difference (p<0.05) of knowledge, attitude, and practice between the three groups of poultry shop personnel.

Table 1: Distribution frequencies of knowledge, attitude and practice scores of Poultry shop personnel (n=103).

	Knowledge			Attitude			Practice		
	Good	Moderate	Poor	Good	Moderate	Poor	Good	Moderate	Poor
Frequency (%)	71 (68.3)	28 (26.9)	5 (4.8)	78 (75)	20 (19.2)	6 (5.8)	20 (19.2)	46 (44.2)	38 (36.5)
P value	0.000			0.000			0.000		

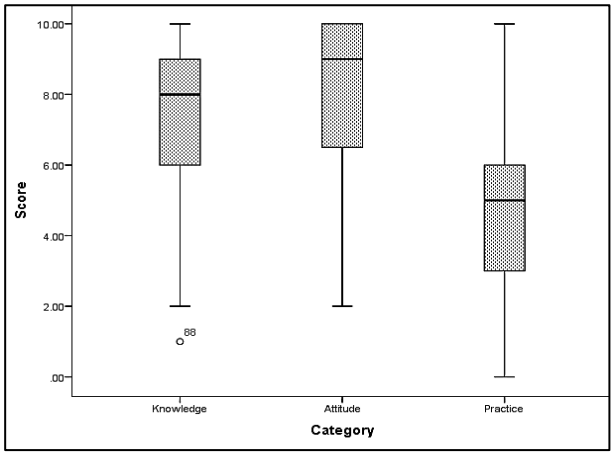

Figure 1. Distribution of the scores of knowledge, attitudes and practices. KAP profiles.

Box plots (Figure 1) of the Knowledge and attitude category showed that the knowledge and attitude mean±SD score 7.38±2.04, 7.87±2.24 respectively had higher which indicated that most poultry shop personnel had good knowledge and attitude on safe poultry meat handling. But the practice mean±SD score 4.41±2.38 had lower than the knowledge and attitude score which indicated that mostly poultry shop personnel had poor practice on safe poultry meat handling.

Figure 2, showed that 42% poultry shop and poultry shop personnel had maintained totally unhygienic workplace, 56% had moderately hygienic, and while only 2% of poultry shop personnel had maintained fully hygienic workplace.

The study was conducted among the meat shops in Dhaka and Noakhali district of Bangladesh. Most of the respondents of the study were age between 20 to 40 years. But surprisingly found that the poultry shop personnel who had higher education have less knowledge, attitude, and practice than primary and secondary level educational qualification. It was found that middle-aged poultry shop personnel (20-30 years) had good knowledge, attitude, and practice score than other aged group and the result was significant at 0.05 level (Table 2).

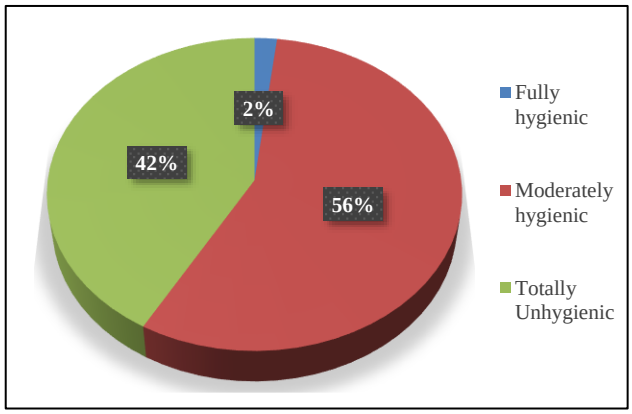

Figure 2: Eye observation of poultry shop work place and hygienic conditions (p value-0.000).

Table 3, stated that there were statistically significant associations between knowledge related questions with knowledge score of the poultry shop personnel (p<0.05). Only poultry-related disease questions didn't have any association with knowledge score (p>0.05). The percentage of good knowledge score with other knowledge related questions were higher which indicated that most poultry shop personnel had good knowledge of safe poultry meat handling.

Table 4, documented that the percentage of positive attitude among poultry shop personnel was higher and showed significant results (p<0.05). Sneezing or coughing without covering our noses or mouths could contaminate the meat, and poultry shop personnel can get ill if they have contact only with the blood of animals during work activity questions didn't have any association with knowledge score (p>0.05). Most of the questions related to the attitude of poultry shop personnel on safe poultry meat handling showed significant association with the attitude score of meat-handlers.

Table 2: Association between knowledge, attitude and practice score of poultry shop personnel with educational level and age group (n=103).

Variable	Knowledge				Attitude				Practice			
	Good (%)	Moderate (%)	Poor (%)	P value R^2	Good (%)	Moderate (%)	Poor (%)	P value R^2	Good (%)	Moderate (%)	Poor (%)	P value R^2
Educational level												
None	7 (31.8)	13 (59.1)	2 (9.1)	0.000	15 (68.2)	6 (27.3)	1 (4.5)	0.164	5 (22.7)	5 (22.7)	12 (54.5)	
Primary	39 (69.6)	14 (25)	3 (5.4)	0.174	40 (71.4	12 (21.4)	4 (7.1)	0.671	8 (14.3)	25 (44.6)	23 (41.1)	0.029
Secondary	20 (95.2)	1 (4.8)	0 (0)		18 (85.7)	2 (9.5)	1 (4.8)		7 (33.3)	11 (52.4)	3 (14.3)	0.047
Higher	4 (100)	0 (0)	0 (0)		4 (100)	0 (0)	0 (0)		0 (0)	4 (100)	0 (0)	
Age of respondents (in years)												
0-10	1 (12.5)	5 (62.5)	2 (25)		3 (37.5)	2 (25)	3		0 (0)	2 (25)	6 (75)	
10-20	14 (50)	12 (42.9)	2 (7.1)		16 (57.1)	11 (39.3)	(37.5)		2 (7.1)	9 (32.1)	17 (60.7)	
20-30	34 (89.5)	4 (10.5)	0 (0)	0.000	31 (81.6)	7 (18.4)	1 (3.6)	0.016	7 (18.4)	21 (55.3)	10 (26.3)	0.000
30-40	21 (72.4)	7 (24.1)	1 (3.6)	0.128	27 (93.1)	0 (0)	0 (0)	0.128	11 (37.9)	13 (44.8)	5 (17.2)	0.194
Above 40	-	-	-		-	-	2 (6.9)		-	-	-	

Table 3: Association between knowledge score with others knowledge level questions (n=103).

Variables	Knowledge				
	Good (%)	Moderate (%)	Poor (%)	R square	P value
Improper handling of meat could pose health hazards to consumers					
Yes	70 (72.2)	24 (24.7)	3 (3.1)		
No	0 (0)	0 (0)	0 (0)	0.174	0.000
Don't know	0 (0)	4 (66.7)	2 (33.3)		
Insects and pests could be a source of contamination to raw meats					
Yes	66 (78.6)	16 (19)	2 (2.4)		
No	1 (20)	3 (60)	1 (20)	0.207	0.000
Don't know	3 (21.4)	9 (64.3)	2 (14.3)		
Knew the symptoms associated with food poisoning					
Yes	54 (88.5)	7 (11.5)	0 (0)		
No	10 (47.6)	9 (42.9)	2 (9.5)	0.294	0.000
Don't know	6 (28.6)	12 (57.1)	3 (14.3)		
Knew the causes of food borne illness					
Yes	28 (96.6)	1 (3.4)	0 (0)		
No	22 (55)	16 (40)	2 (5)	0.094	0.002
Don't know	20 (58.8)	11 (32.4)	3 (8.8)		
Regular washing of hands during meat cutting reduces risk of contamination					
Yes	70 (70.7)	27 (27.3)	2 (2)		
No	0 (0)	0 (0)	0 (0)	0.234	0.000
Don't know	0 (0)	1 (25)	3 (75)		
High temperature or freezing is a safe method to destroy bacteria					
Yes	47 (95.9)	2 (4.1)	0 (0)		
No	1 (100)	0 (0)	0 (0)	0.306	0.000
Don't know	22 (41.5)	26 (49.1)	5 (9.4)		
People with open skin injury, gastroenteritis, and ear or throat diseases should not be allowed to handle meat					
Yes	67 (78.8)	18 (21.2)	0 (0)		
No	2 (40)	3 (60)	0 (0)	0.403	0.000
Don't know	1 (7.7)	7 (53.8)	5 (38.5)		
Washing and disinfection of working surfaces and tools are important to safety of meat					
Yes	69 (77.5)	20 (22.5)	0 (0)		
No	1 (50)	0 (0)	1 (50)	0.404	0.000
Don't know	0 (0)	8 (66.7)	4 (33.3)		

Continued.

Variables	Knowledge				
	Good (%)	Moderate (%)	Poor (%)	R square	P value
Regular rotation of disinfectants for cleaning can reduce the risk of meat contamination from working surfaces and cutting tools					
Yes	62 (80.5)	15 (19.5)	0 (0)	0.255	0.000
No	1 (33.3)	1 (33.3)	1 (33.3)		
Don't know	7 (30.4)	12 (52.2)	4 (17.4)		
Do you know about the poultry related diseases?					
Yes	65 (69.9)	24 (25.8)	4 (4.3)	0.017	0.184
No	5 (50)	4 (40)	1 (10)		
Don't know	0 (0)	0 (0)	0 (0)		

Table 4: Association between attitude score with attitude level questions (n=103).

Variables	Attitude				
	Good (%)	Moderate (%)	Poor (%)	R square	P value
Sneezing or coughing without covering our noses or mouth could contaminate the meat.					
Agree	72 (76.6)	18 (19.1)	4 (4.3)	0.040	0.886
Uncertain	5 (62.5)	1 (12.5)	2 (25)		
Disagree	0 (0)	1 (100)	0 (0)		
Wearing protective clothing and shoes could help improve work safety and hygiene practices.					
Agree	75 (87.2)	11 (12.8)	0 (0)	0.511	0.000
Uncertain	2 (11.8)	9 (52.9)	6 (35.3)		
Disagree	0 (0)	0 (0)	0 (0)		
Putting on hair cover on the head is a good practice in poultry shop					
Agree	70 (89.7)	8 (10.3)	0 (0)	0.392	0.001
Uncertain	7 (29.2)	11 (45.8)	1 (25)		
Disagree	0 (0)	1 (100)	0 (0)		
It is important to use potable water to wash working surfaces and cutting tools after disinfection.					
Agree	76 (87.4)	12 (13.6)	0 (0)	0.486	0.046
Uncertain	1 (10)	5 (50)	4 (40)		
Disagree	0 (0)	3 (40)	2 (60)		
We should not use non-potable water for meat processing.					
Agree	77 (83.7)	14 (15.2)	1 (1.1)	0.406	0.005
Uncertain	0 (0)	3 (50)	3 (50)		
Disagree	0 (0)	3 (60)	2 (40)		
Poultry shop personnel can only contaminate meat when they are ill					
Agree	62 (96.9)	2 (3.1)	0 (0)	0.280	0.000
Uncertain	11 (32.4)	18 (52.9)	5 (14.7)		
Disagree	4 (80)	0 (0)	1 (20)		
Meat handlers can get ill if they have contact only with the blood of animals during work activity.					
Agree	58 (98.3)	1 (1.7)	0 (0)	0.276	0.132
Uncertain	14 (43.8)	13 (40.6)	5 (15.6)		
Disagree	5 (41.7)	6 (50)	1 (8.3)		
Changing or sterilizing the knives in-between meat processing could limit cross contamination of meat Regular training could improve meat safety and hygiene practice					
Agree	60 (95.2)	3 (4.8)	0 (0)	0.384	0.014
Uncertain	17 (44.7)	15 (39.5)	6 (15.8)		
Disagree	0 (0)	2 (100)	0 (0)		
We should not hand meat with an open wound					
Agree	70 (76.1)	16 (17.4)	6 (6.5)	0.001	0.044
Uncertain	7 (63.6)	4 (36.4)	0 (0)		
Disagree	0 (0)	0 (0)	0 (0)		
Regular training could improve hygiene practices					
Agree	73 (76.8)	17 (17.9)	5 (5.3)	0.025	0.003
Uncertain	4 (50)	3 (37.5)	1 (12.5)		
Disagree	0 (0)	0 (0)	0 (0)		

Table 5: Association between practice score with practice level questions (n=103).

Variables	Practices				
	Good (%)	Moderate (%)	Poor (%)	R^2	P value
Do you specific cloth for each day's work?					
Yes	2 (9.1)	13 (59.1)	7 (31.8)	0.001	7.07
No	18 (22.2)	32 (39.5)	31 (38.3)		
Do you wash your cloth after each day's work?					
Yes	19 (22.6)	45 (53.6)	20 (23.8)	0.220	0.000
No	1 (5.3)	0 (0)	18 (94.7)		
Do you replace your knives or sterilize them after meat processing?					
Yes	13 (54.2)	10 (41.7)	1 (4.2)	0.260	0.000
No	7 (8.9)	35 (44.3)	37 (46.8)		
Do you wash your hands before and after handling meat?					
Yes	19 (40.4)	20 (42.6)	8 (17)	0.263	0.000
No	1 (1.8)	25 (44.6)	30 (53.6)		
Do you use portable water to clean meat?					
Yes	20 (40.8)	26 (53.1)	3 (6.1)	0.464	0.000
No	0 (0)	19 (35.2)	35 (64.8)		
Do you use hand gloves during eviscerate, cutting or touch the poultry?					
Yes	7 (100)	0 (0)	0 (0)	0.189	0.000
No	13 (13.5)	45 (46.9)	38 (39.6)		
Do you clean de-feathering machine before and after using it?					
Yes	18 (40)	23 (51.1)	4 (8.9)	0.337	0.000
No	2 (3.4)	22 (37.9)	34 (58.6)		
Do you use portable water to wash cutting meat?					
Yes	20 (39.2)	27 (52.9)	4 (7.8)	0.439	0.000
No	0 (0)	18 (34.6)	34 (65.4)		
Do you cutting meat when you are ill especially due to gastroenteritis, cough or skin diseases?					
Yes	17 (38.6)	21 (47.7)	6 (13.6)	0.253	0.000
No	3 (5.1)	24 (40.7)	32 (54.2)		
Do you clean utensils during the closing time?					
Yes	20 (24.1)	45 (54.2)	18 (21.7)	0.308	0.000
No	0 (0)	0 (0)	20 (100)		

Table 5 showed that practice score was not satisfactory among poultry shop personnel but most questions related to practice showed significant association with practice score ($p<0.05$). Only specific cloth for each day's work question didn't have any association with practice score ($p>0.05$). The percentage of using portable water to wash cutting meat was higher among those who had good practice score.

DISCUSSION

The majority of fresh foods, particularly those from animals, are extremely vulnerable to microbial contamination and food poisoning.[15] Health status and hygiene habits of food handlers are the key determinants of food contamination.[16] Food poisoning is caused by consumption of foods infected with microorganisms or their metabolites, contamination from inadequate methods of safety, unhygienic handling of procedures, cross-contamination from food contact surfaces.[17] Our recent findings showed that the educational level of poultry shop personnel strongly correlated with the knowledge and practice score ($p<0.05$) which means that higher educated poultry shop personnel knew much about meat processing and handling than an illiterate or primary educated one. The attitude of poultry shop personnel had no correlation with educational level. But surprisingly found that the poultry shop personnel who had higher education have less knowledge, attitude, and practice than primary and secondary level educational qualification. But one study indicated that food handling practices were linked to food handler's educational status.[18] Nevertheless, greater knowledge does not always result in significant changes in food handling behaviors.[19,20]

Present findings showed that most of the respondents of the study were age between 20 to 40 years. This study showed that older meat poultry shop personnel had greater knowledge of meat handling than younger age. These results are close to the study findings, which showed that food handlers had a higher hygienic practice score than their younger colleagues at their age.[21] But other findings showed that meat handlers in lower age

groups generally demonstrated good knowledge, attitudes and healthy meat handling practices.[22]

Research conducted in six districts of Terengganu, Malaysia, showed that the majority of the personnel (38.8%) had a low level of knowledge and 91.7% had a positive attitude, while 77.7% had good performance practice.[23] Present study showed that 68.3% of poultry shop personnel had good, 26.9% had moderate, while only 4.8% of poultry shop personnel had poor knowledge about hygiene practices. The 5.8% of poultry shop personnel showed poor, 19.2% showed moderate and 75% of poultry shop personnel showed good attitude towards hygiene practices. And, the poultry shop personnel 36.5% had poor, 44.2% had moderate and only 20% showed good practice of hygiene practices. Present findings also showed that 42% of poultry shop personnel had no knowledge about the hygienic workplace, 56% had moderate knowledge about the hygienic workplace, while only 2% of poultry shop personnel had knowledge fully hygienic workplace. Further, present study shows that KAP levels have been significantly associated with the majority of knowledge, attitudes, and practice related questions ($p<0.05$).

Limitations

The data could not be validated independently due to self-reporting. Refusal of the involvement of some poultry shop personnel in the study is a possible bias

CONCLUSION

Safety and health at work are of great concern. The work-related disease is a disease which is mostly caused by the risk factors associated with the workplace. Work-related diseases have several causes, where factors in the working environment may play a role in the development of these diseases, along with other risk factors. There are a few significant factors in the global burden of disease from significant workplace threats, such as accidents, airborne pollutants, carcinogens, ergonomic stressors, noise, and other common hazards. Therefore, the other related factors from the point of personnel such as personal behaviour, age, gender, type of home, employment, type of occupation and other organizational factors influencing the health and risk factors that affect the occupational diseases of the personnel. Our analysis showed that the poultry shop personnel had less practice than the knowledge and attitude suggesting that many poultry shop personnel did not have sufficient practice of proper handling of meat. The conclusions drawn specify that the study emphasizes the increasing issue of health and safety of poultry shop personnel and recommends effective steps to develop not only knowledge and attitude but also practice among poultry shop personnel to protect themselves against hazardous and threatening occupational diseases at work.

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REFERENCES

1. Hossain M. A study on knowledge, attitude and practice about personal hygiene and disease awareness of east west university students in Dhaka City. Doctoral dissertation, East West University; 2012.
2. Alam MU, Rahman M, Islam MA, Asaduzzaman M, Sarker S, Rousham E, et al. Human exposure to antimicrobial resistance from poultry production: Assessing hygiene and waste-disposal practices in Bangladesh. Int J Hygiene Environ Health. 2019;222(8):1068-76.
3. Ansarey FH. Prospects of poultry industry in Bangladesh. In: Proceedings of the Seminar and Reception on Animal Husbandry Education and Profession in Bangladesh-A Journey of 2012. Vol. 50:62-65.
4. slam MS, Mustari S. Evaluation of productivity, disease incidence and profitability of three chicken breeds (*Gallus domesticus L*.) under smallholders' farm conditions in Rajshahi, Bangladesh. Int J Scientific Res Environ Sci. 2016;4(5):153-63.
5. Khan M, Chowdhury B, Bhuiyan M, Uddin M, Dawlatana M, Rahim M. Nutrient content of poultry feed used in different poultry farms of Bangladesh. Bangladesh J Scientific Indust Res. 2008;43(1):1-12.
6. Marcotty T, Matthys F, Godfroid J, Rigouts L, Ameni G, Gey van Pittius N, et al. Zoonotic tuberculosis and brucellosis in Africa: neglected zoonoses or minor public-health issues? The outcomes of a multi-disciplinary workshop. Ann Trop Med Parasitol. 2009;103(5):401-11.
7. Hossain M, Hoda N, Hossen MJ, Hasan MM, Rahman SME, Kabir SL. Assessment of bacterial load of poultry meat used at dining hall of Bangladesh Agricultural University campus. Asian J Med Biol Res. 2015;1(1):9-16.
8. Alin K, Siddika A. Design of food safety system for Fried Chicken plant based on HACCP system. Africa Develop Resources Res Inst J. 2014;8(2).
9. Bhattarai J, Badhu A, Shah T, Niraula S. Meat hygiene practices among meat personnel in Dharan Municipality of Eastern Nepal. Birat J Health Sci. 2017;2(2):184-90.
10. Campos AKC, Cardonha ÂMS, Pinheiro LBG, Ferreira NR, de Azevedo PRM, Stamford TLM. Assessment of personal hygiene and practices of food handlers in municipal public schools of Natal, Brazil. Food control. 2009;20(9):807-10.

11. Haapala I, Probart C. Food safety knowledge, perceptions, and behaviors among middle school students. J Nutri Educ Behavior. 2004;36(2):71-6.
12. Ur Rahman S, Mohsin, Mashkoor. The under reported issue of antibiotic-resistance in food-producing animals in Pakistan. Pak Vet J. 2019;39(3):1-6.
13. Onyeneho SN, Hedberg CW. An assessment of food safety needs of restaurants in Owerri, Imo State, Nigeria. Int J Environ Res Public Health. 2013;10(8):3296-309.
14. Isara A, Isah E. Knowledge and practice of food hygiene and safety among food handlers in fast food restaurants in Benin City, Edo State. Nigerian Postgrad Med J. 2009;16(3):207-12.
15. Soriyi I, Agbogli H, Dongdem J. A pilot microbial assessment of beef sold in the Ashaiman market, a suburb of Accra, Ghana. Afr J Food Agriculture Nutriti Development. 2008;8(1):91-103.
16. Tefera T, Mebrie G. Prevalence and predictors of intestinal parasites among food handlers in Yebu town, southwest Ethiopia. PLoS One. 2014;9(10).
17. Akabanda F, Hlortsi EH, Owusu-Kwarteng J. Food safety knowledge, attitudes and practices of institutional food-handlers in Ghana. BMC Public Health. 2017;17(1):40-9.
18. Rabbi SE, Dey NC. Exploring the gap between hand washing knowledge and practices in Bangladesh: a cross-sectional comparative study. BMC Public Health. 2013;13(1):89.
19. Ansari-Lari M, Soodbakhsh S, Lakzadeh L. Knowledge, attitudes and practices of personnel on food hygienic practices in meat processing plants in Fars, Iran. Food control. 2010;21(3):260-3.
20. Kassa H. An outbreak of Norwalk-like viral gastroenteritis in a frequently penalized food service operation: a case for mandatory training of food handlers in safety and hygiene. J Environ Health. 2001;64(5)9-12.
21. Olumakaiye MF, Bakare KO. Training of food providers for improved environmental conditions of food service outlets in urban area Nigeria. Food Nutri Sci. 2013;4(07):99.
22. Adesokan HK, Raji A. Safe meat-handling knowledge, attitudes and practices of private and government meat processing plants' personnel: implications for future policy. J Prevent Med Hygiene. 2014;55(1):10-5.
23. Abdullahi A, Hassan A, Kadarman N, Saleh A, Baraya YS, Lua PL. Food safety knowledge, attitude, and practice toward compliance with abattoir laws among the abattoir personnel in Malaysia. Int J General Med. 2016;9:79-87.

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