

Research Article

Evaluation of Knowledge and Practices Related to Safe Food Handling Among Bangladeshi University Students

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Abstract

Ensuring safe food handling is essential for reducing the global burden of foodborne infections. In this context, knowledge, attitudes, and practices (KAP) related to food safety play a central role in prevention, particularly among university students who are developing independent dietary and food-handling behaviors. Therefore, the present study was conducted to assess food safety KAP among university students in Bangladesh and to examine the influence of socio-demographic characteristics. To achieve this aim, a cross-sectional survey was carried out among 200 students from four public universities. Data were collected using a structured questionnaire covering demographic variables, food safety knowledge, attitudes, and self-reported practices. Subsequently, descriptive statistics were applied for analysis. The findings revealed that students demonstrated strong knowledge of basic hygiene; for instance, 97.9% recognized proper handwashing, 98.5% supported covering hair during cooking, and 92.3% acknowledged the importance of sanitizers for kitchen surfaces. However, deficiencies were noted in technical aspects, as only 42.6% correctly identified safe thawing methods, and fewer than 3% reported the use of food thermometers. Furthermore, attitudes toward food safety were generally positive, with 97.5% supporting the separation of raw and cooked foods and 93.0% emphasizing the prompt refrigeration of leftovers. In contrast, reported practices were less consistent: 73.4% washed hands before food preparation, 64.8% stored raw and cooked foods separately, and only 33.2% covered wounds while handling food. Moreover, pharmacy students demonstrated higher knowledge levels, while urban students were more likely to implement safe practices. Taken together, the results suggest that although university students in Bangladesh display sound knowledge and favorable attitudes toward food safety, their practices remain suboptimal. Consequently, interventions focusing on behavioral change, skills-based training, and improved resource availability are required to bridge the knowledge-practice gap.

Keywords

Food Safety, KAP, University Students, Hygiene, Cross-contamination, Public Health, Education

1. Introduction

Illnesses caused by contaminated food remain a persistent public health challenge across the globe, affecting both developed and developing nations. Even countries with highly regulated food safety systems, such as the “farm-to-fork”

strategy in Europe and the “farm-to-table” approach in the United States, continue to report significant numbers of infections [1, 2]. In the United States, nearly one-third of the population is affected by foodborne illnesses every year, with

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risk amplified by factors such as international food trade, industrialized food production, and mass tourism [3]. Preventive measures at the household level, including safe purchasing, cooking, preparation, and handling are widely acknowledged as effective ways to reduce the incidence of such illnesses [4, 5].

Young adults, particularly those under 30 years of age, have been identified as a group with a tendency toward poor food-handling behaviors [6-8]. Although not generally classified as high-risk for severe illness, this age group may inadvertently expose vulnerable populations such as children, pregnant women, and the elderly to infections through unsafe practices [9, 10]. Studies across multiple countries including Saudi Arabia [11], the United States [10], Turkey [11], Spain [12], Greece [2], Lebanon [3], Iran [13], Canada [14], Bulgaria [15], Pakistan [16], Ethiopia [17], Jordan [18], Kuwait [19], Oman [20], Serbia [21], and Iraq [22] highlight that while students often express awareness of hygiene, deficits in technical knowledge such as cross-contamination prevention and temperature control remain common.

Measuring food safety knowledge and practices among defined groups is a necessary first step for designing targeted interventions. Demographic variables such as gender, age, education level, household income, and field of study have been associated with variations in food-handling behaviors, though findings remain inconsistent due to differences in populations and study methodologies [11].

In Bangladesh, unsafe food-handling practices and inadequate sanitation contribute substantially to the national burden of foodborne illnesses. It is estimated that around 30 million people suffer from these infections each year, with diarrheal diseases, hepatitis, and enteric fever representing the most common outcomes [23, 24]. Research on food safety within the country has largely focused on specific occupational groups, including street food vendors [25], meat processors [26], fish farmers and restaurant staff [27], chicken vendors [28], and household food handlers [29]. Despite these efforts, little is known about the food safety knowledge, attitudes, and practices (KAP) of university students, who represent a significant segment of the population that is beginning to establish independent dietary and cooking habits.

Students in higher education often prepare their own meals and influence food practices within their families and social networks. Therefore, assessing their level of food safety awareness and behaviors is crucial for understanding potential risks and opportunities for intervention. The present study was conducted to evaluate food safety KAP among students from universities in Bangladesh. The objectives were to identify gaps between knowledge and practice, and to examine the role of socio-demographic factors in shaping food-handling behaviors. Findings from this research may guide the design of evidence-based educational interventions, support safer food-handling practices, and inform policy initiatives aimed at reducing the burden of foodborne ill-

nesses in the country.

2. Materials and Methods

Study Design and Participants A cross-sectional study was conducted to assess food safety knowledge, attitudes, and practices (KAP) among university students in Bangladesh. A total of 200 students were recruited from five faculties: Pharmacy, Agriculture, Fisheries, Chemistry, and Business Administration. Both undergraduate and postgraduate students were included. Participants were selected using convenience sampling.

2.1. Data Collection

Data were collected using a structured, self-administered questionnaire developed from previously validated tools and adapted to the local context [30, 31]. The questionnaire comprised four sections:

Sociodemographic characteristics: age, gender, religion, faculty, year of study, residence (urban/rural), and family income.

Food safety knowledge: items included personal hygiene, handwashing, cross-contamination, temperature control, food storage, and microbial hazards.

Attitudes toward food handling: assessed perceptions of hygiene, cross-contamination, and willingness to promote food safety.

Food handling practices: self-reported behaviors on handwashing, separation of raw and cooked foods, storage, use of thermometers, cleaning, and checking food expiry dates. Responses were mainly closed-ended ("Yes/No" or multiple-choice).

2.2. Ethical Considerations

Written informed consent was obtained from all participants. Participation was voluntary, and confidentiality was maintained throughout the study.

2.3. Data Analysis

Data obtained during the survey were coded, entered into Excel, and analyzed in SPSS (Statistical Package for the Social Sciences) software version 26.0. Descriptive (frequency, standard deviation, median, and mean) statistics were used to report results from the study.

3. Results

3.1. The Sociodemographic Characteristics

A total of 200 students participated in the study. The majority were aged 21–23 years (45.5%), followed by 24–26

years (29.0%) and 18–20 years (24.5%). Only 1.0% were in the 27–29 age group. Females represented 60.0% of partici-

pants, while 40.0% were male. Most respondents were Muslim (82.0%), and 18.0% were Hindu (Table 1).

Table 1. Sociodemographic profile of study participants ($n = 200$).

Demographic variables	Category	Frequency (n)	Percentage (%)
Age	18 to 20	49	24.5
	21 to 23	91	45.5
	24 to 26	58	29.0
	27 to 29	2	1.0
Religion	Islam	164	82.0
	Hindu	36	18.0
Faculty	Pharmacy	90	45
	Agriculture	32	16
	Chemistry	26	13
	BBA	22	11
	Fisheries	30	15
	B. Sc. 1st year	57	28.5
Current education level	B. Sc.2nd year	35	17.5
	B. Sc. 3rd year	41	20.5
	B. Sc. 4th year	33	16.5
	Masters'/MBA	34	17.0
Gender	Male	80	40.0
	Female	120	60.0
Income level	Lower	78	39.0
	Middle	108	54.0
	Upper	14	7.0
Permanent Residence	Rural	99	49.5
	Urban	101	50.5

Regarding academic background, the highest proportion were from the Faculty of Pharmacy (45.0%), followed by Agriculture (16.0%), Fisheries (15.0%), Chemistry (13.0%), and Business Administration (11.0%). A total of 28.5% were in the first year of B. Sc., 17.5% in the second year, 20.5% in the third year, 16.5% in the fourth year, and 17.0% were enrolled in postgraduate programs. Almost half of the students resided in urban areas (50.5%), while 49.5% were from rural areas. With respect to family income, 54.0% were from middle-income households, 39.0% from lower-income, and 7.0% from upper-income groups (Table 1).

3.2. Knowledge of Food Safety

Students demonstrated variable levels of food safety knowledge (Table 2). High proportions responded correctly on key items: proper handwashing duration (76.4%), the role of handwashing in reducing contamination (97.9%), covering hair during cooking (98.5%), cleaning kitchen counters with detergent and sanitizer (92.3%), and bacteria as the leading cause of foodborne illness (88.7%).

Table 2. Score distribution for food safety knowledge questions.

Questions on food safety-related activities	Multiple-choice responses	Responses (%)
(1) On which refrigerator shelf should raw meat be stored?	Bottom shelf	54.9
	Top shelf	31.3
	Middle shelf	13.8
(2) Which group of people is least at risk of food poisoning?	Teenagers	76.4
	Don't know	13.8
	Old people	8.7
	Pregnant women	1.0
(3) What should be used to clean fruits and vegetables?	Under cold running water	48.2
	Normal water	35.4
	Water and soap	3.1
	Hot water	13.3
(4) What tool should be used to determine if food is properly cooked?	By checking the central temperature of cooking pot	45.6
	Concentration of food	10.3
	By seeing the food color	15.4
	Measuring the cooking time	28.7
(5) For how long should leftovers be reheated?	Until they are boiling hot	40.0
	Don't know	27.7
	Reheating is not necessary	5.1
	Heat it to the temperature you prefer	27.2
(6) How many seconds should you scrub your hands with soap when washing them?	10 seconds	14.9
	20 seconds	76.4
	30 seconds	6.7
(7) Proper handwashing lowers the chances of food contamination.	Don't know	2.1
	True	97.9
	False	2.1
(8) What is the correct method for cleaning kitchen utensils?	With soapy water	77.9
	With water only	7.7
	With hot water	14.4
(9) If you have a hand injury, what precaution should be taken during food preparation?	Cover the wound with bandage and put a glove on top of it	88.2
	Use the hand as it is	5.1
	Cover the wound with a cloth	6.7
	Use another cutting board to cut vegetables	69.7
(10) After using a cutting board for meat, how should it be prepared before cutting vegetables?	Don't know	12.8
	Wipe the board with a paper towel	14.4
	Use the board as it is	3.1
(11) Are you aware that wearing jewelry while preparing food should be avoided?	Yes	75.4
	No	20.0

Questions on food safety-related activities	Multiple-choice responses	Responses (%)
(12) What is the safest method to thaw frozen meat?	Maybe	4.6
	In refrigerator	42.6
	In room temperature	19.5
	In cold water	7.2
	Don't know	30.8
(13) What steps should be followed to wash your hands before cooking or eating?	Wash hand with soap	88.7
	Wipe with a towel	.5
	Using cold water only	8.2
(14) Which microorganism is the leading cause of foodborne diseases?	Cleaning is not needed	2.6
	Bacteria	88.7
	Viruses	2.1
	Fungi	6.2
	Parasites	3.1
(15) Which individuals should avoid cooking for others due to health concerns?	Diarrhea, fever, sore throat or flue	63.6
	Skin allergies	15.4
	Headache	.5
	All of the above	20.5
(16) What is the ideal freezer temperature for safe food storage?	-18° C	30.8
	-4° C	24.6
(17) Freezing food eliminates harmful bacteria. True or False?	TRUE	69.2
	FALSE	30.8
(18) What is the most effective way to clean kitchen counters and stoves?	Brush with soap/detergent and using sanitizer	92.3
	With water only	4.6
	By weeping with a cloth only	3.1
	Every week	84.1
(19) How frequently should you trim your nails?	In every 2 weeks	10.3
	In every 4 weeks	.5
	Don't know	5.1
(20) Covering hair during cooking helps prevent food contamination.	TRUE	98.5
	FALSE	1.5
(21) How often should clothes be washed to ensure good personal hygiene?	Daily	65.6
	weekly	17.4
	within 2-3 days	16.9
(22) How often should clothes be washed to ensure good personal hygiene?	Yes	39.5
	No	20.0
	Maybe	40.5
(23) Do you know the present condition of cleanliness in your hall's dining and cooking area?	Yes	88.7
	No	11.3
(24) Are you aware that microorganisms, temperature,	Yes	90.3

Questions on food safety-related activities	Multiple-choice responses	Responses (%)
and humidity contribute to food spoilage?	No	9.7
(25) Do you know that food contamination can spread through food-to-food, equipment-to-food, and person-to-food contact?	Yes	78.5
	No	21.5

In contrast, knowledge was inadequate in certain areas. Only 42.6% identified thawing frozen meat in the refrigerator as the safest method, and 30.8% incorrectly believed that freezing eliminates harmful bacteria. Just over half (54.9%) recognized that raw meat should be stored on the bottom refrigerator shelf, and only 40.0% knew that leftovers should be reheated until boiling hot (Table 2). Overall, participants demonstrated good knowledge on hygiene-related aspects but fair to poor knowledge regarding temperature control and safe storage practices.

3.3. Attitudes Toward Food Handling

Respondents generally exhibited favorable attitudes to-

ward food safety. A large majority agreed that raw meat should be kept separate from cooked food (97.5%), that wearing gloves during preparation reduces contamination (91.5%), that leftover food should be refrigerated within two hours (93.0%), and that food handlers should wash their hands after using the toilet (93.0%). Furthermore, 86.5% agreed that good personal hygiene reduces the risk of foodborne illness, and 82.5% recognized that artificial or painted nails may contaminate food. However, certain misconceptions were observed (Table 3). Only 59.5% agreed that most bacteria and germs are spread through hands, and 75.0% supported using sanitizers on food contact surfaces. Willingness to promote food safety among others was also relatively lower (74.0%) compared with personal compliance (Table 3).

Table 3. Score distribution to food handling attitude questions.

Questions on food safety-related activities	Agree (%)	Disagree (%)	Neutral (%)
(1) Do you agree that raw meat should always be handled separately from cooked food?	97.5	0.00	2.5
(2) Wearing gloves during food preparation helps minimize contamination.	91.5	1.5	7.0
(3) Do you prefer wearing jewelry while working in the kitchen?	5.5	61.0	33.5
(4) Good personal hygiene can reduce the risk of foodborne diseases	86.5	1.5	12.0
(5) Leftover food should be refrigerated within 2 hours.	93.0	7.0	0.00
(6) Artificial, long, or painted nails may contaminate food.	82.5	3.0	14.5
(7) Do you think smoking is acceptable during food preparation?	5.0	91.5	3.5
(8) Most bacteria and germs are spread through hands.	59.5	2.0	38.5
(9) Food handlers should wash their hands properly after using the toilet.	93.0	.5	6.5
(10) Do you think food contact surfaces should always be cleaned with sanitizer?	75.0	5.5	19.5
(11) People with hand injuries should not be involved in food preparation.	78.0	2.5	19.5
(12) Covering the mouth while coughing or sneezing reduces the risk of contaminating food.	88.5	1.5	10.0
(13) Are you willing to change your unsafe food handling practices?	78.5	1.5	20.0
(14) Are you interested in improving your knowledge about food safety?	80.5	0.00	19.5
(15) Would you be willing to help others adopt better food safety habits?	74.0	0.00	26.0

Food handling practices Despite positive attitudes, self-reported practices were inconsistent. Handwashing be-

fore food preparation was reported by 73.4% of respondents, and 64.8% stored raw and cooked food separately. Nearly

half (48.2%) discarded food items after expiry dates.

Unsafe practices were also common. Only 33.2% covered cuts or wounds before handling food. Less than 1.0% reported using a food thermometer to check cooking temperatures, and only 2.5% monitored refrigerator/freezer temperatures. Egg storage practices were suboptimal, with 24.6% keeping eggs at room temperature. Cleaning practices were also inadequate, as only 31.2% cleaned kitchen counters and utensils after preparing food. Additionally, 37.7% did not check “use-by” or “best-before” dates when purchasing food items. Overall, the findings indicate a discrepancy between knowledge and practice, particularly in areas involving temperature monitoring, food storage, and hygienic preparation behaviors.

4. Discussion

This study explored food safety knowledge, attitudes, and practices (KAP) among university students in Bangladesh. The findings demonstrate that while participants possessed good knowledge of basic hygiene and expressed positive attitudes toward safe food handling, their actual practices were often inconsistent and inadequate.

4.1. Socio-demographic Influences

In this study, pharmacy students demonstrated higher knowledge compared with those from other faculties, a trend supported by Rahman et al. (2025), who found that students from health sciences exhibited greater awareness of safety measures than peers from non-health disciplines [32]. Interestingly, residence (urban versus rural) did not substantially influence knowledge, although urban students were more likely to report safe practices, particularly regarding refrigeration and food storage. Similar associations between socio-economic context and food practices have been reported in India and across South Asia [33, 37].

4.2. Knowledge of Food Safety

Most students in this study demonstrated good awareness of fundamental hygiene measures, including proper hand-washing (97.9%) and the importance of covering hair during cooking (98.5%). These findings are comparable to those reported by Afrin et al. (2024), who found that Bangladeshi students at Jahangirnagar University also showed strong knowledge of personal hygiene and microbial risks [30]. Similarly, Islam et al. (2025) observed high awareness of sanitizer use among university students, reinforcing the finding that young adults in Bangladesh are generally informed about hygiene practices [31].

Despite this, knowledge gaps were observed in critical technical areas such as temperature control and safe storage. Only 42.6% of students correctly identified thawing frozen meat in the refrigerator as the safest method, and 30.8% in-

correctly believed freezing destroys bacteria. These gaps mirror results from India, where undergraduate students demonstrated good knowledge of hand hygiene but limited understanding of refrigeration and cooking temperatures [34]. Similarly, Fries et al. (2025) highlighted that globally, students in developing countries often lack adequate training in technical aspects of food safety such as thermometer use and cold-chain management [35]. This suggests that while cultural emphasis on cleanliness reinforces basic hygiene knowledge, structured education on food microbiology and temperature safety is lacking.

4.3. Attitudes Toward Food Handling

Overall, attitudes in this study were favorable, with nearly all participants agreeing that raw and cooked foods should be handled separately (97.5%) and that leftover foods should be refrigerated promptly (93.0%). These findings are consistent with studies in Bangladesh and South Asia, which have repeatedly reported positive attitudes toward food hygiene among students [30, 36, 37].

However, misconceptions persisted. Only 59.5% acknowledged that hands are the main vehicle for transmitting pathogens, and only 75% emphasized the use of sanitizers for cleaning food-contact surfaces. Similar discrepancies have been reported by Rahman et al. (2025), who found that although Bangladeshi students acknowledged the importance of hygiene, many underestimated risks associated with cross-contamination and food-contact surfaces [32, 37]. These findings underline the partial translation of knowledge into risk perception.

4.4. Food Handling Practices

In contrast to the positive attitudes, actual practices revealed substantial shortcomings. While 73.4% of students washed their hands before food preparation and 64.8% stored raw and cooked foods separately, only 33.2% covered wounds while handling food and fewer than 3% reported using thermometers for cooking or refrigeration. This highlights a major knowledge practice gap.

Comparable results have been observed in similar contexts. Afrin et al. (2024) noted that Bangladeshi students often neglected checking food expiry dates and proper storage, despite knowing their importance. In our study, only 48.2% discarded expired items, and more than one-third ignored food labeling, reinforcing these trends [30]. Indian undergraduates also reported unsafe practices such as consuming undercooked eggs and improper thawing of meat [34]. At the global level, Fries et al. (2025) reported that students in developing countries consistently fail to implement thermometer use, a problem similarly noted in our cohort [35].

These findings collectively suggest that favorable attitudes do not guarantee safe practices. Barriers may include lack of facilities (e.g., access to thermometers, refrigeration), cultur-

al cooking traditions, or perceptions that certain measures are unnecessary. The consistency of these findings across Bangladesh, South Asia, and other developing contexts indicates that food safety knowledge is generally acceptable among educated young adults [37]. However, weak translation into safe practices remains a persistent concern. This highlights the need for interventions that go beyond awareness campaigns to focus on behavioral change strategies and skills-based training. Integrating food safety modules into university curricula, promoting experiential learning, and ensuring availability of necessary facilities (e.g., thermometers, storage units) may help bridge the knowledge–practice gap.

5. Conclusions

This study revealed that university students in Bangladesh possess good knowledge of basic hygiene and generally hold positive attitudes toward food safety. However, there is a significant gap between knowledge and actual practices, particularly in areas such as temperature monitoring, safe storage, use of thermometers, and hygienic food preparation. Pharmacy students and urban residents demonstrated relatively better awareness and practices, highlighting the influence of academic background and socio-demographic factors. These findings underscore the need for targeted interventions that go beyond awareness-raising to focus on behavioral change and skills development. Incorporating structured food safety education into university curricula, promoting hands-on training, and ensuring access to essential facilities such as thermometers and proper storage units may help bridge the knowledge–practice gap and reduce the risk of foodborne illnesses among young adults.

Abbreviations

KAP	Knowledge, Attitudes, Practice
SPSS	Statistical Package for the Social Sciences

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Author Contributions

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Conflicts of Interest

The author declares no conflicts of interest.

References

- [1] Morris, J. G. (2011). How safe is our food? Emerging infectious diseases and foodborne illness. *Clinical Infectious Diseases*, 53(5), 498–502. <https://doi.org/10.1093/cid/cir454>
- [2] Lazou, T., Georgiadis, M., Pentieva, K., McKeivitt, A., & Iossifidou, E. (2012). Food safety knowledge and food-handling practices of Greek university students: A questionnaire-based survey. *Food Control*, 28(2), 400–411. <https://doi.org/10.1016/j.foodcont.2012.05.027>
- [3] Hassan, H. F., & Dimassi, H. (2014). Food safety and handling knowledge and practices of Lebanese university students. *Food Control*, 35(1), 179–189. <https://doi.org/10.1016/j.foodcont.2013.07.042>
- [4] Redmond, E. C., & Griffith, C. J. (2003). Consumer food handling in the home: A review of food safety studies. *Journal of Food Protection*, 66(1), 130–161. <https://doi.org/10.4315/0362-028X-66.1.130>
- [5] Kennedy, J., Jackson, V., Blair, I. S., McDowell, D. A., Cowan, C., & Bolton, D. J. (2005). Food safety knowledge of consumers and the microbiological and temperature status of their refrigerators. *Journal of Food Protection*, 68(7), 1421–1430. <https://doi.org/10.4315/0362-028X-68.7.1421>
- [6] Li-Cohen, A. E., & Bruhn, C. M. (2002). Safety of consumer handling of fresh produce from the time of purchase to the plate: A comprehensive consumer survey. *Journal of Food Protection*, 65(8), 1287–1296. <https://doi.org/10.4315/0362-028X-65.8.1287>
- [7] Medeiros, L. C., Hillers, V. N., Kendall, P. A., & Mason, A. (2004). Food safety education: What should we be teaching to consumers? *Journal of Nutrition Education and Behavior*, 36(2), 109–113. [https://doi.org/10.1016/S1499-4046\(06\)60151-7](https://doi.org/10.1016/S1499-4046(06)60151-7)
- [8] McArthur, L. H., Holbert, D., Forsythe, W., & Pennington-Gray, L. (2007). College students and awareness of food safety. *Journal of Food Science Education*, 6(2), 29–35. <https://doi.org/10.1111/j.1541-4329.2007.00023.x>
- [9] Abbot, J. M., Byrd-Bredbenner, C., Schaffner, D., Bruhn, C. M., & Blalock, L. (2009). Comparison of food safety cognitions and self-reported food-handling behaviors with observed food safety behaviors of young adults. *European Journal of Clinical Nutrition*, 63(4), 572–579. <https://doi.org/10.1038/sj.ejcn.1602961>
- [10] Byrd-Bredbenner, C., Maurer, J., Wheatley, V., Cottone, E., & Clancy, M. (2007). Food safety hazards lurk in the kitchens of young adults. *Journal of Food Protection*, 70(4), 991–996. <https://doi.org/10.4315/0362-028X-70.4.991>
- [11] Sanlier, N. (2009). The knowledge and practice of food safety by young and adult consumers. *Food Control*, 20(6), 538–542. <https://doi.org/10.1016/j.foodcont.2008.08.006>

- [12] Garayoa, R., Córdoba, M., García-Jalón, I., Sanchez-Villegas, A., & Vitas, A. I. (2005). Relationship between consumer food safety knowledge and reported behavior among students from health sciences in Spain. *Journal of Food Protection*, 68(12), 2631–2636. <https://doi.org/10.4315/0362-028X-68.12.2631>
- [13] Eslami, M., Zandian, H., Gholami, S., & Saeedi, R. (2015). Knowledge, attitude, and practices of food safety among women in Sanandaj, Iran. *Journal of Food Quality and Hazards Control*, 2(3), 111–116. <https://jfqhc.ssu.ac.ir/article-1-118-en.pdf>
- [14] Majowicz, S. E., Meyer, S. B., Kirkpatrick, S. I., Graham, J., & Jones-Bitton, A. (2015). Food safety knowledge, attitudes and practices of Canadian consumers. *Foodborne Pathogens and Disease*, 12(7), 539–546. <https://doi.org/10.1089/fpd.2014.1893>
- [15] Stratev, D., Odeyemi, O. A., Pavlov, A., Kyuchukova, R., Fatehi, F., & Bamidele, F. A. (2017). Food safety knowledge and hygiene practices among veterinary medicine students in Bulgaria. *Journal of Infection and Public Health*, 10(6), 778–782. <https://doi.org/10.1016/j.jiph.2017.01.006>
- [16] Zeeshan, M., Shah, H., & Durrani, Y. (2017). Food safety knowledge and practices of food handlers in small- and medium-sized restaurants of Pakistan. *Journal of Food Safety*, 37(3), e12318. <https://doi.org/10.1111/jfs.12318>
- [17] Azanaw, J., Gebrehiwot, T., & Dagne, H. (2019). Factors associated with food safety practices among food handlers: Facility-based cross-sectional study. *BMC Research Notes*, 12, 683. <https://doi.org/10.1186/s13104-019-4716-6>
- [18] Osaili, T. M., Obeidat, B. A., Hajeer, W. A., & Al-Nabulsi, A. A. (2011). Food safety knowledge and practices among college female students in north of Jordan. *Food Control*, 22(2), 269–276. <https://doi.org/10.1016/j.foodcont.2010.07.009>
- [19] Ashkanani, F., Al-Saffar, A., & Al-Kandari, D. (2021). Food safety knowledge and practices among food handlers in Kuwait. *Food Control*, 123, 107856. <https://doi.org/10.1016/j.foodcont.2020.107856>
- [20] Al Makhroumi, K., Al Kindi, R., & Al Farsi, A. (2022). Knowledge, attitudes, and practices toward food safety among Omani university students. *Journal of Food Safety*, 42(3), e12990. <https://doi.org/10.1111/jfs.12990>
- [21] Vuksanović, M., Prodanović, R., & Radovanović, R. (2022). Food safety knowledge and practices among university students in Serbia. *Food Control*, 137, 108946. <https://doi.org/10.1016/j.foodcont.2022.108946>
- [22] Khairuzzaman, M., Chowdhury, F. M., Zaman, S., Al Mamun, A., & Bari, M. L. (2014). Food safety challenges towards safe, healthy, and nutritious street foods in Bangladesh. *International Journal of Food Microbiology*, 167(3), 326–334. <https://doi.org/10.1016/j.ijfoodmicro.2013.10.019>
- [23] Noor, R., & Feroz, F. (2016). Food safety in Bangladesh: A microbiological perspective. *Stamford Journal of Microbiology*, 6(1), 1–6. <https://doi.org/10.3329/sjm.v6i1.33517>
- [24] FAO. (2016). Food safety in Bangladesh. *Food and Agriculture Organization of the United Nations*. <http://www.fao.org>
- [25] Al Mamun, M. A., Rahman, S. M. M., Turin, T. C., & Rahman, M. (2013). Street-vended food in Bangladesh: Food safety and regulatory issues. *Foodborne Pathogens and Disease*, 10(5), 399–405. <https://doi.org/10.1089/fpd.2012.1311>
- [26] Al Banna, M. H., Khan, M. S. I., & Haque, R. (2021). Factors influencing food safety knowledge and practices among meat handlers in Bangladesh. *Food Control*, 125, 108031. <https://doi.org/10.1016/j.foodcont.2021.108031>
- [27] Hashanuzzaman, M., Rahman, M., & Chowdhury, M. (2020). Food safety knowledge, attitudes and practices of fish farmers and restaurant staff in Bangladesh. *Journal of Food Safety*, 40(5), e12818. <https://doi.org/10.1111/jfs.12818>
- [28] Hossen, M. I., Ferdous, Z., & Ahmed, S. (2020). Knowledge, attitudes, and practices of food safety among chicken vendors in Bangladesh. *Food Science & Nutrition*, 8(6), 2859–2868. <https://doi.org/10.1002/fsn3.1553>
- [29] Tarannum, M. (2021). Food sanitation practices, attitudes, and knowledge among household food handlers in Bangladesh. *Journal of Food Safety and Hygiene*, 7(2), 51–59. <https://doi.org/10.18502/jfsh.v7i2.6598>
- [30] Afrin, S., Salma, N., Yeasmin, S., & Promy, S. T. (2024). Perceptions and perspectives towards safe food handling and its practices: A case study at Jahangirnagar University. *Journal of Health, Population and Nutrition*, 43, 65. <https://doi.org/10.1186/s41043-024-00692-3>
- [31] Islam, M. E., Chowdhury, M., Hassin, F., & Rahman, M. H. (2025). Alcohol-based hand sanitizer use among university students in Bangladesh: Knowledge, practices, and influencing factors. *International Journal of Public Health*, 70, 102010. <https://www.researchgate.net/publication/394224286>
- [32] Rahman, M. H., Islam, M. E., & Chowdhury, M. (2025). Knowledge and practices of health safety among Bangladeshi students. *International Journal of Public Health*, 70, 100912.
- [33] Das, I., Singh, P. K., & Seth, S. (2025). Climate change and its impact on the supply chain and food security. <https://www.researchgate.net/publication/389272404>
- [34] B, S. S., & Devi, K. M. (2025). A descriptive study to assess the knowledge on ill effects of junk food among undergraduate students at Kanyakumari, Tamil Nadu. *Journal of Integrative Health Research*, 2(1), 1–5. [https://jihr.in/PdfTableAdd/VOL2/JIHR%202025%202\(1\)%201-5%20V2%20I1.pdf](https://jihr.in/PdfTableAdd/VOL2/JIHR%202025%202(1)%201-5%20V2%20I1.pdf)
- [35] Fries, R., Meemken, D., & Nastasijevic, I. (2025). Veterinary public health: Veterinary medicine's current challenges in a globalised world. *Frontiers in Veterinary Science*, 12, 1564614. <https://doi.org/10.3389/fvets.2025.1564614>
- [36] Odgers-Jewell, K., Nelson, A., Brown, R., & Hunter, N. (2024). Students' experiences of placements in urban Indigenous health contexts: Developing a culturally responsive workforce. *BMC Medical Education*, 24, 6432. <https://doi.org/10.1186/s12909-024-06432-9>

- [37] Islam, M. W., Hasan M. M, Zannat S. N., Resmi, S. I. (2025). Knowledge, Attitudes, and Practices of Food Safety Among University Students in Bangladesh: Insights from a Cross-sectional Study. *American Journal of BioScience*, 13(5), 108-117.