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Original Article

An Assessment of the Consumer's Knowledge and Attitude of Food Safety and Hygiene Practices

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ABSTRACT:

The modern countries of the World are ambitious to provide safe and hygienic food to their masses. For this purpose, they spend huge amounts of money on research and development of food safety and hygiene at production level. However, at consumer side, due attention is not paid, which may result in poor and unhygienic food handling practices by the people. This research paper aimed to hit the consumer side concerning food safety and hygiene practices. This research focused to study the 'knowledge', 'attitude', and 'practice' of food safety and hygiene at domestic level. For this purpose, a survey was conducted in Government Girls Degree College No.1, wherein the focus group was young female students studying in different programs. The primary data was collected by using an adaptive questionnaire from 188 students of which 180 questionnaires were found complete in all respect (response rate = 95.7%) and the same were used in data analysis. The results of Correlations show there is significant positive correlation of knowledge with attitude and practices. Similarly, the age, domicile, and subject play a major role in the 'KAP' study.

Key words: Knowledge, Attitude, Practice, Food Safety, Hygiene

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Introduction

Contemporary states allocate and spend decent amounts of funds each year on food safety and hygiene to protect their masses from food-related illnesses and diseases. In this regard, the developed states patronage food safety research to achieve food safety standards, which are necessary to boost the health of their nations. However, the developing/poor states still lack this regard. These preventive measures are usually aimed at reducing curative expenses. Previous studies have witnessed that food-borne illnesses are often fatal and are detrimental to the country's economy, trade, and tourism, and may lead to litigation (Greig *et al*., 2007). Many states focus on food safety and hygiene at the macro level, from raw to industrial production, distribution, and retail. But not much work has been done, so far, on the micro-level study of food safety and hygiene, particularly at the consumer level, where domestic food handlers have insufficient food safety knowledge, poor food handling, and inefficient food storage making humans vulnerable to various food-borne illnesses and diseases (Røssvoll, 2013). Domestic food handlers are usually involved in trial-and-error-based, traditional food handling practices, risking the lives of people around thereby causing health threats (Osaili *et al*., 2011). This study primarily focused on the food-handling conduct of the female students, because of their future role being the food handlers for their families.

Literature Review

Hygiene and Food Safety

Hygiene as well as food safety is achieved through several practical steps, which are based on standard procedures, and protocols (scientific), which defy orthodox food handling. These standard procedures are thoroughly applied in the acquisition of food, its handling, preparation, and storage, to assure that the food is pure, hygienic, and not harmful to the health of humans. In other words, food safety and hygiene is the degree of its suitability for the use of humans (Stratev *et al*., 2017; Luo *et al*., 2019). It has been stressed by Ferk *et al*., (2016) and other researchers that student food handlers often lack 'knowledge and attitude inter alia practice' of food safety in addition to hygiene at the domestic level, risking the health of their families.

Knowledge

Knowledge about food safety and hygiene is of paramount importance for safe, healthy, and hygienic food behavior along with food practices at the industrial and domestic level. At the industrial level, there are standard operating procedures (SOPs) followed by each worker to guarantee safe food handling. However, the developing countries have paid very little attention. However, the advanced state of the World pays great academic interest at the consumer level to deal with the issue of food safety and hygiene (WHO, 2010). The results of previous studies show that consumers in developing countries are ignorant about the temperature required for the preparation and storage of different food items. They also do not know about the pathogens and other disease-causing bacteria, harmful to human health. In this regard, the developing countries have to do a lot, to educate their masses regarding safe and hygienic food handling practices (Stratev *et al*., 2017; Luo *et al*., 2019).

Attitude

The tilt of people, handling the food, toward the implementation of healthy, safe, and germ-free food plans may reduce the chances of food-related illnesses. Thus, the attitude of food handlers is important to determine the safety and hygiene of food (Howes *et al*., 1996). In this regard, the cleanliness of food handlers, prevention of cross-contamination, acquisition of food from safer sources, proper cooking and heating of food, and storage of food at recommended temperature are some important factors, that determine the attitude of food handlers regarding the food safety and hygiene (Luo *et al*., 2019).

Practice

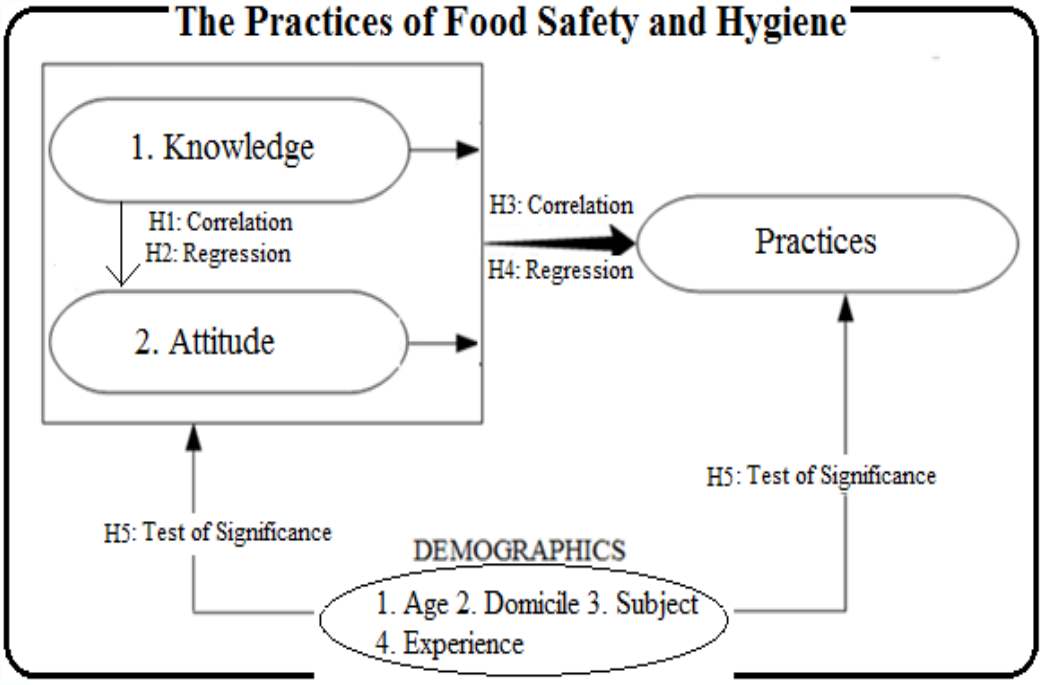
The practices of food handlers to ensure safety and hygiene involve the implementation of certain protocols during the preparation, storage, and consumption of food items. These protocols are related to the selection and acquisition of food items for the preparation of meals, their washing and cleaning before cooking/storage, standardized processing with proper temperature control, appropriate serving of meals, proper dumping of dregs, storage of food as per specification, and reheating for reuse of food. According to Marais *et al*. (2008), these protocols are necessary to ensure contamination-free food and to minimize the likelihood of food-related diseases. Food safety practices are categorized into objective and subjective measures. Objective measures are based on facts and they are systematic and scientific. They aimed to point out and reduce possible risks concomitant to every food item. However, on the other hand, subjective measures are less scientific and usually based on the customs of the society. However, in reality, both subjective and objective measures of food safety are interconnected and are equally important (Stratev *et al*., 2017; Luo *et al*., 2019).

Demographic Considerations

Literature is evident that different demographics have been studied while taking into account food safety and hygiene. Sun et al., (2014) conducted a study on the role of gender, education, grade, and specialization. Similarly, Bramlett and Harrison (2012) studied gender, education, and experience in a similar kind of research. In this context, researchers have considered the age, domicile, subject, and food management experience as most relevant among the students.

Figure 2.1

Schematic Model of Theoretical Framework



Method

This section gives an overview of the methods used in conducting the study i.e., approach, population, pilot study, and determination of sample size. The study followed positivism (Frankel & Wallen, 2006) which is the blend of 'doxology' and 'epistemology' commonly used in academic studies. The study employed a cross-sectional survey method to collect primary data from the samples. The population of the study was finite consisting of 1500 female students at Government Girls Degree College No.1 Dera Ismail Khan. A pilot study was conducted to collect data from 30 respondents to determine the sample size by using the below formula: Sample-size formula = $((SD^2/ ((Z^2/E^2) + (SD^2/N)))$

Table 1
Sample Size Estimation

St. Dev. (SD)	0.23
Size of Pop. (N)	1500
St. Error (SE)	0.033
Z-score	1.96
Sample Size (estimated)	188

This research used stratified simple random sampling. The entire population was classified into three different strata based on the subject's enrollment, i.e., arts, science, and food science followed by disproportionate random sampling and selected 63 samples from each stratum. The response rate was 95.7% as we were able to collect 180 properly filled questionnaires as per given details:

Table 2
Stratification and Sampling

S.No.	Subject	Size of Strata	Size of Sample	Questionnaires Returned	Return Rate
1.	Arts	994	63	61	96.8%
2.	Science	434	63	63	100%
3.	Food Science	72	62	56	86.1%
	TOTAL	1500	188	180	95.74 (overall)

Findings

Quantitative Data Analysis

The study used both descriptive and hypothesis-testing tools. As for testing hypotheses are concerned, correlation and multiple regression analyses were performed. The study also used t-test and ANOVA to check the significant mean difference between two and more than two groups based on the descriptive statistics.

Reliability

Reliability analyses were performed using Cronbach's alpha to know the accuracy and internal reliability of the instrument suggested by Gay (1996: 145). Table 6 presents Cronbach's alpha score for the research variables of this study.

Table 6
Reliability Statistics

S. No.	Variable-wise reliability	Items	Cronbach's Alpha
1.	Knowledge	13	.897
2.	Attitude	10	.816
3.	Practice	12	.853
	Overall reliability	35	.910

The minimum threshold recommended by Nunnally (1967) is 0.7. It can be seen from Table 6 that all values for knowledge, attitude, and practice are > 0.7, thus it was assumed the instrument has inter consistency and reliability in collecting data.

Validity

Cronbach and Meehl, (1955) recommended performing various validity tests for example, content validity, concurrent validity, construct validity, and predictive validity. Yet, we have followed Creswell (2005) and employed only the content validity of the instrument.

Sampling Adequacy and Test of Sphericity

The study used the Kaiser-Meyer-Olkin (KMO) test to check the adequacy of the sample (Kaiser, 1974), according to Kaiser, 0.5 or > values of the KMO test suggest that the sample size of the research is adequate. Table 7 gives the result for sample adequacy and test of Sphericity test; all values meet the threshold that implies that the sample size for this study is adequate. Likewise, Bartlett's test is applied to check the multicollinearity between the variables. The results are given in Table 7 i.e., 0.000 scores of p-values confirm that all variables are fairly correlated with each other.

Table 7
KMO and Bartlett's Test

	Component	Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	Bartlett's Test of Sphericity
Items	1		
Knowledge1	.616		
K2	.876		
K3	.721		
K4	.690		Approx. Chi-Square = 1300.864
K5	.682		
K6	.719	.749	707.720
K7	.781		
K8	.779		Df = 78
K9	.775		
K10	.594		P= .000
K11	.775		
K12	.769		
K13	.751		
Attitude1	.540		
A2	.677		Approx. Chi-Square = 902.447
A3	.750		707.720
A4	.698		

A5	.595		Df = 45
A6	.732		
A7	.588	.832	P= .000
A8	.529		
A9	.688		
A10	.752		
Practice1	.752		
P2	.764		
P3	.751		Approx. Chi-Square = 904.273
P4	.754		707.720
P5	.777		Df = 66
P6	.729		P= .000
P7	.647	.708	
P8	.773		
P9	.712		
P10	.573		
P11	.519		
P12	.667		

Extraction Method: *Principal Component Analysis*
a. *1 component extracted.*

Hypotheses Testing

Two hypotheses were proposed and tested through correlation, regression analysis, and tests of significance i.e., t-tests and ANOVA.

H_1: Knowledge of food safety & hygiene is significantly associated with the attitude towards food safety & hygiene of respondents.

H_2: Knowledge and attitude are significantly associated with practices of food safety & hygiene of respondents.

Table 8
Correlations Summary

		Knowledge	Attitude
Attitude	Pearson Correlation (r)	.536**	1
	p-value	.000	
	N	180	180
Practice	Pearson Correlation (r)	.599**	.712**
	p-value	.000	.000
	N	180	180

**. Correlation is significant at the 0.01 level (2-tailed).

The result in Table 8 highlights that knowledge' is significantly and positively associated with attitude at p-value .000 and 'r' value .536. Likewise, knowledge has also a significant association with the practice of food safety & hygiene at p-value .000 and 'r' value .599. Similarly, the result also shows that attitude is also positively and significantly associated with practice at p-value .000 and 'r' value .712. The figure (r = .712) demonstrates the highest association between attitude-practice followed by knowledge-practice' little less (r = .599), and between 'knowledge-attitude' (r = .536) little low. Yet, the association is significant statistically. Thus, H_1 and H_2 are substantiated.

H_3: Knowledge of food safety & hygiene' predicts the attitude towards food safety and hygiene of the respondents.
H_4: Knowledge and attitude both predict the practices of food safety & hygiene of the respondents.

Table 9
Summary Statistics

	Predictors	Research Variables			
	Criterion	Attitude	P	Practice	P
	R^2	.287 (28.7%)		.573 (57.3%)	
1	Knowledge	.472 (β)	.000	.286 (β)	.000
2	Attitude	--		.585 (β)	.000

The prediction results are presented in Table 9, we can see that R^2 value .287 suggests that attitude is 28.7% affected by knowledge. The beta value for Knowledge is .472 (47.2%) highlighting the individual effect of knowledge on attitude. Moreover, the collective effect of knowledge and attitude on the practice of food safety and hygiene is given in the second column, where R^2 value .573 demonstrates the overall influence of knowledge and attitude on practice. This implies that knowledge and attitude cause 57.3% variation in the practice. Likewise, the individual effect of knowledge and attitude each is evident from the β value i.e., .286 (28.6%) for knowledge and .585 (58.5%) for attitude. Therefore, we accept our hypotheses H_3 and H_4.

H_5: The demographics of respondents affect the mean score of research variables.

Table **10**
Summary Statistics (Demographics Tests)

		AGE	DOMI	SUB	EXP	Total
1	Knowledge (K)	.000	.003	.000	.305	3
2	Attitude (A)	.018	.011	.000	.139	3
3	Practice (P)	.006	.011	.000	.221	3
	9 out of 12	3	3	3	0	9

Table 10 illuminates the demographic effects for age, domicile, subject, and experience of the respondents. T-test ANOVA was performed to check the significance of the mean difference between more than two grouping variables. The cells hold p-values for each of the tests. The result suggests that age, domicile, and subject shows significant mean difference in knowledge, attitude, and practice. However, no evidence of significant mean differences was observed for experience. During the test of significance, 9 out of 12 tests of significance were verified as true on H_5 hence it was partially accepted i.e., 75% support.

Discussions and Conclusion

Throughout the globe, nations are facing food safety and hygiene. Around 600 million people globally i.e., 1:10 are affected by poor and unhygienic food (WHO, 2007). The WHO report further demonstrates that approximately 420,000 deaths per year. The knowledge, attitudes, and practices (KAP) concerning food safety and hygiene are getting the attention of researchers, especially among the young students who lack enough knowledge and hence get affected by impure and unhygienic food practices. According to Stratev *et al*. (2017) and Ferk *et al*. (2016), this is bringing food-borne diseases. Our results reported a strong association between knowledge, food safety, and hygiene of the respondents i.e., knowledge .536 (table 8). This means that knowledge has an instrumental role in attitude development simply means increased knowledge increases the level of awareness i.e. attitude. Moreover, knowledge and attitude towards food safety and hygiene also showed a significant and positive association with practice for hygiene and food safety i.e., knowledge and practice is .599 and attitude and practice is .712 significant p-value 0.05 level (table 8). Additionally, we can see that the study found a greater association between attitude and practice i.e.,

.712 as compared to knowledge and practice i.e., .599. It is also evident from the results in Table 9 that knowledge significantly predicts attitude i.e., $R^2 = 0.287$ or 28.7%. As far as the individual impact of knowledge is concerned, the value of $\beta = .472$ or 47.2% suggests that if one standard deviation change is introduced in the knowledge, it will result in a .472 standard deviation in the attitude (table 9). Therefore, the study concluded that respondent's knowledge is a critical factor in the development of the required attitude. Likewise, the study reported that knowledge and attitude collectively affect the practice of hygiene and food safety as evidenced by the values of 57.30% ($R^2 = .573$). Furthermore, the study also found the individual effect of knowledge on practice i.e., 28.6% ($\beta = .286$), and attitude on practice i.e., 58.5% ($\beta = .585$). The study also recorded the significant role of the demographics of the respondents respectively for knowledge, attitude, and practice with p-values .000, .018, and .006. The Domicile of the respondents was a more powerful predictor for knowledge, attitude, and practice with respective p-values .003, .011, and .011y. Similar results were reported of the subject for knowledge, attitude, and practice i.e., p-values .000, .000, and .000y. However, the study did not find any significance of the food-handling experience on all three research variables, i.e., p-values .305, .139, and .221 (Table 10).

Recommendations

The study recommends that hygiene and food safety should be included in the curriculum at graduate and undergraduate level academic programs. All the food-handlers domestic or industrial need to be given adequate training in safe and hygienic food handling practices. The use of print and electronic media, especially social media could create awareness and educate the food handlers about food safety practices. Food manufacturers might be forced to implement smart packaging and intelligent packaging to maintain hygienic and safe food. Furthermore, manufacturers should make use of brochures and pamphlets at food chains for consumer education. Finally, yet importantly, governments should frame policies by devising certain SOPs for strict compliance to ensure the provision of hygienic food to people.

Deceleration of Interest

The author declares that there was no clash of interest.

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