

The Impact of Food Safety Knowledge and Attitude of Food Handlers on Street Food Quality: The Mediating Impact of Food Safety Practice

R.K.S.R.Rathnayake¹, A.C.I.D. Karunarathne², and W.M. A. H. Bandara³

^{1,2,3}Department of Tourism Studies, Faculty of Management, Uva Wellassa university of Sri Lanka, Badulla, Sri Lanka

¹rasanjaliofficial@gmail.com, ²chandi@uwu.ac.lk, ³asankahemantha825@gmail.com

Abstract

Street food is a growing segment of gastronomic tourism. The quality of street food continues to the stage in society as a source of foodborne diseases. Therefore, this study examined the quality level of street foods in Sri Lanka and how street food handler's knowledge and attitude of food safety effects on food quality when food safety practices play the mediating role. Data were collected using a structured questionnaire from 200 street food handlers from the Colombo district of Sri Lanka using convenience sampling technique and analyzed using descriptive statistical analysis and structural equation modeling. Research findings revealed that the current level of street food quality in Sri Lanka is at a satisfactory level and the knowledge, attitude and practices on food safety of street food handlers also proven to be positive. Moreover, food safety knowledge, attitude and practices positively impacted on street food quality and food safety practices mediate the association. Therefore, the values of Sri Lankan street foods should be promoted in order to avoid criticism of street foods. Training and development programs should be implemented by responsible parties while strengthening the rules and regulations related to food quality to improve the status of street foods as there is still room for improvements. The results of this study will be useful to public health professionals, government agencies, destination promoters, food tourism promoters, future researchers and all other parties interested in street food.

Key words: Street foods, Food safety knowledge, Food safety attitude, Food safety practice, Food quality

I. INTRODUCTION

Street foods have a great capability to cater to domestic and foreign tourists as well as residents of the country. Street food refers as *food and*

beverages sold by the vendors on the street or in public areas. 2500 million people around the world daily eat street foods (Perera, Nawarathne and Kulathunga, 2018). Recently, street food has emerged as a trending topic in Sri Lanka since street food vendors are filling nearly 50 per cent of food requirements of the urban population in developing countries (Perera, Nawarathne and Kulathunga, 2018).

Although street food is a growing segment of gastronomy tourism, the quality of street food always comes to the stage in society as foodborne diseases are affecting one in three people in developing countries and increase deaths (Ahamad, 2015). Many researchers around the world have focused on the street food handlers' food safety knowledge, food safety attitude, and food safety practice since food handlers are playing a major role in food quality (Omemu and Aderoju, 2008). However, few baseline studies have provided evidence for the lack of street food quality and street food handlers' knowledge and practices on food safety are not at an adequate level in urbanized areas such as Colombo and Kandy in Sri Lanka (Karunapema, 2021; Wickrematilake, 2022). Hence, researchers need to find out the level of street food quality in Sri Lanka and how is food handlers' food safety knowledge, attitude and practices impact on street food quality. The negative side of street foods is low food quality and high food contamination because of poor food safety conditions and a lack of understanding of food handlers on food safety in developed and developing countries (Cortese and Cavalli, 2016).

II. LITERATURE REVIEW

Millions of people are satisfying their hunger daily with a wide variety of street foods and street foods are playing a significant role in the diet of poor people in metropolitan areas. Many low-income families in developing countries would not be able

to meet their nutritional needs without street foods (Riet, 2002). Street foods have become an attraction to a country that promotes tourism as it is carrying a message about a region's culture and traditions, authenticity and history to other nations. Not only street foods but also street food handlers and their foods have become cultural icons and tourist attractions (Mudunkotuwa and Arachchi, 2020). Not only do people with less education engage in the street food trade, but also graduates. Smart investors are turning to the street food sector as a way to make more money at a lower cost (Iriguler and Ozturk, 2016). As a multiethnic nation in Asia, Sri Lanka has rich food cultures that can delight the world. There are different street food traditions in Sri Lanka that are unique to the destination of origin and sale. Since there is no seasonality for street foods, they can be promoted among locals and foreigners throughout the whole year (Mudunkotuwa and Arachchi, 2020). According to Karunapema (2021) and Wikrematilake (2022), street food handlers' knowledge and practices are not in a sufficient level in most urbanized areas in Sri Lanka such as Colombo and Kandy.

Food safety knowledge is the degree of understanding on food safety practices and food safety problems. Food handlers should have information on the way to guaranteeing food quality and preventing food poisoning by correct food manufacturing, preserving and serving methods (Oraedu, 2016). Previous researchers have used knowledge of personal hygiene, cross-contamination and temperature control as dimensions to measure the food handlers' food safety knowledge (Taha et al., 2020). Attitude is a broad impression or assessment of a person that may be good or bad/right or wrong about something (Mudunkotuwa and Arachchi, 2020). Self – improvements and food safety concerns have been mostly utilized as determinants to measure the food safety attitude of food handlers by previous researchers in different sectors (Ko, 2013). Food well-being has also recently been used to measure the attitudes of food handlers in the street food sector (Tuglo *et al.*, 2021). Food safety practices are a crucial element to guarantee that manufactured foods are safe for consumption. There are four factors to determine the street food handlers' food safety practice level according to the literature, they are food hygiene practices, personal hygiene practices, environmental hygiene practices and storage practices (Rosmawati, Manan, Izani and Nurain, 2015).

The inability to maintain food quality is one of the biggest reasons for business failure, since food quality can influence food businesses' image positively. Previous researchers had revealed diversified attributes to measure food quality such as the presentation of the food, temperature of the food, taste of the food, freshness of the food and healthy options as the most significant food quality determinants (Namkung and Jang, 2008). The KAP (Knowledge, Attitude and Practice) model determines a person's attitude and knowledge toward a practice. Many researchers have measured street food handlers' KAP on food safety in modified forms adding new variables such as "Risk perception", "Training", "Commitment". There is a possibility to modify KAP model using "food quality" (Taha et al., 2020).

From one country to another and one circumstance to another KAP model is yielding varied results on food handlers' food safety knowledge, attitude and practices. For examples; although Griffith and Clayton (2005) had stated that food safety knowledge improvements positively affect food safety practices while attitude restrains improvements of food safety practices of caterers in UK, Baser (2016) has found that there is no relationship between food safety knowledge and food safety practices and there is a positive relationship with food safety attitude and food safety practices among hotel food handler in Turkey; when a study in Indonesia had found that poor food safety knowledge leads to poor food safety practices and food contamination of mobile food handlers (Ismail et al., 2016), a study in Nepal has found that improvements in food safety knowledge and food safety attitude have not affected on food safety practices since local food handlers are influenced by other factors such as poor infrastructure, lack of resources, negative economic and social factors (Pokhrel et al., 2016). Hence, it is very important to use KAP model in different contexts for critical evaluations. Based on discussions of relevant literature, it is apparent that street food quality is a pertinent factor to study modifying KAP model. The research hypotheses were generated based literature as follows;

H₁: Food safety knowledge positively impacts on food safety practice.

H₂: Food safety attitude positively impacts on food safety practice.

- H₃: Food safety knowledge positively impacts on food quality.
- H₄: Food safety attitude positively impacts on food quality.
- H₅: Food safety practice positively impacts on food quality.
- H₆: Food safety practice mediates the association between food safety knowledge and food quality.
- H₇: Food safety practice mediates the association between food safety attitude and food quality.

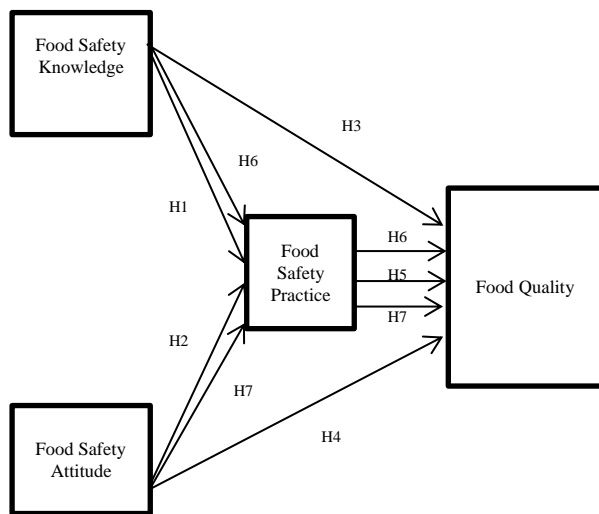


Figure 01: Developed Conceptual Framework

III. PROBLEM SPECIFICATION

Since most of studies dispensed a general idea that street food handlers' are the responsible party for the street food quality, numerous studies have examined the level of street food handlers' food safety knowledge, food safety attitude, and food safety practice. However, the food handlers' food safety knowledge, food safety attitude, and food safety practice how effect on food quality is an under-researched area, particularly in the context of street foods. Although the KAP model (Knowledge, Attitude, and Practice model) has been used in other sectors to evaluate how the food handlers' food safety knowledge and attitude effect on their food safety practice, there are no published studies that have used KAP model on street food handlers' food safety knowledge, attitude and practice. Hence, there is a remaining theoretical gap to address. At a time when

consuming street food and taking part in street food festivals are trending in Sri Lanka, the street food quality and food handlers knowledge, attitude and practices on food safety is said to be problematic. However, there is lack of scientific findings on street food quality and food handlers' knowledge, attitude, and practices on food safety in Sri Lanka, there is also an empirical gap to fill.

IV. METHODOLOGY

A. Research Design

Quantitative research method was used to achieve the research objectives of this study as quantitative research methods are used to test or confirm theories and hypothesis (Allwood, 2012).

B. Population and Sample

Street food is not limited to one region of Sri Lanka. However, street foods are mostly famous in urban cities and Colombo district is the most urbanized city in Sri Lanka and Colombo district has a large migratory population that considerable proportion patronage the street foods than other districts in Sri Lanka (Karunapema, 2021). Therefore, this study has been employed the Colombo district as the reference area. The population of this study would include all the street food handlers scattered throughout the Colombo district in Sri Lanka. Since the street food industry is an unstable informal sector due to an improper licensing and registration system, the number of street food handlers has not been accurately calculated (Wickrematilake, 2022). Hence, the population is unknown.

Daniel Soper's a priori sample size calculator for the structural equation model was used to determine the minimum sample size for this study. According to the result, the minimum sample size to detect an effect is 137. Therefore, this study recruited 200 street food handlers from three sites in Colombo district as the sample following the convenient sampling technique. Street food vendors in Colombo Fort area effectively fulfill the dietary needs of economically active city dwells (Liyanarachchi and Weerakkody, 2003). Pettah has been identified as a place where food tourism can be well promoted in Sri Lanka since street foods are diverse in Pettah due to people who engage in food businesses are belong to different religions, sub-cultures, castes and races (Embuldeniya and Embuldeniya, 2019). Many tourists and people who are living in the urban city of Colombo use Galle face as a venue to do

recreational activities. Galle face is home to a variety of street vending foods (Tedd, Liyanarachchi and Ranjan, 2018). Hence, street food handlers in Colombo Fort, pettah and Galle face who are engaged in very busy transactions were the sampling units of this study.

C. Data collection

Self-administrated structured questionnaire was used to collect data for the study and the survey determined the food safety knowledge (FSK), food safety attitude (FSA), food safety practice (FSP) and street food quality (FQ).

D. Data analysis

SPSS (Statistical Package for Social Science) was utilized for demographic factor analysis and descriptive statistical analysis and Smart PLS tool utilized for structural equation modeling (SEM) to achieve objectives of the study.

V. RESULTS AND DISCUSSION

A. Reliability Analysis

Table 01: Cronbach’s Alpha values

Variables	Cronbach’s Alpha	N of Items
Food quality (FQ)	0.969	7
Food safety attitude (FSA)	0.916	7
Food safety knowledge (FSK)	0.939	9
Food safety practice (FSP)	0.958	10

The items that Cronbach’s Alpha coefficient is closer to 1.00 has a better internal consistency and a reliability coefficient (Alpha value) of 0.7 or higher is considered as acceptable reliability (Tavakol and Dennick, 2011). The Cronbach’s Alpha coefficient of food safety knowledge, food safety attitude, food safety practice and food quality are all high and above 0.9 showing accepted with excellent reliability values. It indicates that the constructs are internally consistent in the questionnaire.

B. Composite Reliability (CR)

The composite reliability is mostly calculated in coincidence with structural equation modeling. Composite reliability value should be in be higher than 0.7 to be acceptable and it is a less biased measure of dependability than Cronbach’s alpha (Robert and Yeolib, 2013). According to the

results of the analysis, Table 02 shows that all the variables are acceptable according to the Composite reliability test since all the values are above 0.7. Cronbach’s coefficient alpha is the commonly used measure of the reliability of scales and tests.

C. Average Variance Extracted (AVE)

The average variance extracted (AVE) measures the variance that is captured by a construct in relation to the variance due to measurement error. An AVE of at least 0.50 is strongly advised as a general rule and for adequate convergence. A smaller than 0.50 AVE indicates that items account for more mistakes than the variance in constructs (Peterson and Kim, 2013). According to the results of the analysis, Table 3 shows that all the constructs have adequate convergence since all the Average Variance Extracted (AVE) are higher than 0.50.

Table 02: Composite Reliability

Variable	Composite Reliability (CR)
FQ	0.973
FSA	0.933
FSK	0.951
FSP	0.964

Table 03: Average Variance Extracted

Variable	Average Variance Extracted (AVE)
FQ	0.784
FSA	0.668
FSK	0.736
FSP	0.75

The average variance extracted (AVE) measures the variance that is captured by a construct in relation to the variance due to measurement error. An AVE of at least 0.50 is strongly advised as a general rule and for adequate convergence. A smaller than 0.50 AVE indicates that items account for more mistakes than the variance in constructs (Peterson and Kim, 2013). According to the results of the analysis, Table 3 shows that all the constructs have adequate convergence since all the Average Variance Extracted (AVE) are higher than 0.50.

D. Descriptive Statistics

Descriptive statistical analysis is shown in the Table 04. The mean value was interpreted as $1 \leq X < 1.79$ - Strongly agree, $1.80 \leq X < 2.59$ - Agree,

2.60 $\leq X < 3.39$ - Moderate, 3.40 $\leq X < 4.19$ - Disagree, 4.20 $\leq X < 5$ - Strongly disagree (Alonazi, White and Beloff, 2019). All the constructs of FSK is in between 1 and 1.79 except FSK6 showing that the respondents have strongly agreed with the constructs and all the constructs except FSA3 of FSA is also in between 1 and 1.79.

The mean values of all the constructs of FSP are in between 1.80 and 2.59 showing that respondents have agreed with the constructs.

Table 04: Descriptive Statistics

	Indicator	N	Mean	Std. Dev	Skewness	Kurtosis
Food Safety Knowledge	FSK1	200	1.47	.641	1.268	1.487
	FSK2	200	1.67	.967	1.478	1.140
	FSK3	200	1.41	.659	1.881	4.140
	FSK4	200	1.65	.966	1.541	1.304
	FSK5	200	1.54	.934	1.801	2.122
	FSK6	200	2.06	.875	.983	.572
	FSK7	200	1.77	.946	1.315	.913
Food Safety Attitude	FSA1	200	1.84	1.006	1.233	.596
	FSA2	200	1.97	.999	.955	.048
	FSA3	200	2.07	.951	.965	.151
	FSA4	200	1.94	1.003	.946	-.134
	FSA5	200	1.96	1.095	.855	-.625
	FSA6	200	1.62	.995	1.564	1.180
	FSA7	200	1.87	1.083	1.375	1.071
Food Safety Practice	FSP1	200	2.30	.695	1.791	1.821
	FSP2	200	2.31	.690	1.728	1.674
	FSP3	200	1.93	.646	.857	2.260
	FSP4	200	2.46	.788	1.052	-.169
	FSP5	200	2.37	.752	1.346	.976
	FSP6	200	2.11	.663	1.440	3.028
	FSP7	200	2.24	.731	1.693	2.439
	FSP8	200	2.07	.811	1.125	1.243

Food Quality	FSP9	I always check the temperature of food before storing it.	200	2.36	.729	1.616	1.437
	FQ1	Customers praise me for being concerned about the taste of food.	200	1.76	.804	1.226	1.566
	FQ2	Satisfied with the taste of my food, customers buy the food again.	200	1.69	.841	1.355	1.528
	FQ3	Customers praise me for being concerned about the attractive appearance of food.	200	2.01	.830	1.164	1.307
	FQ4	Satisfied with the appearance of my food, customers buy the food again.	200	2.19	.746	1.362	1.717
	FQ5	Customers praise me for being concerned about the nutritional value of food.	200	2.31	.811	1.490	1.688
	FQ6	Satisfied with the nutritional value of my food, customers buy the food again.	200	2.29	.799	1.515	1.944
	FQ7	Customers compliment me on trying to serve food at the right temperature.	200	2.17	.827	1.233	1.073
	FQ8	Satisfied with the temperature of my food, customers buy the food again.	200	2.32	.747	1.528	1.145
	FQ9	Customers praise me for being concerned about the freshness of the food, such as softness, crispiness and aroma.	200	2.05	.898	1.087	.669
FQ10	Satisfied with the fresh condition of my food, customers buy the food again.	200	2.03	.910	1.081	.608	

***FSK= Food Safety Knowledge, FSA= Food Safety Attitude, FSP = Food Safety Practice, FQ=Food Quality

All constructs relate to the food quality variable are also in between 1.80 and 2.59 except FQ1 and FQ2 showing that respondents have agreed with constructs. The mean values of all the indicators are less than 2.59 in all four variables. Hence, all the constructs were accepted by the respondents showing that there is high quality in street food in Sri Lanka, and street food handlers' knowledge, attitude and practice at a high level.

E. R² Value

The research model implies a 0.811 percent variance of change in Food Quality and a 0.834 percent variance of change in Food Safety Practice according to R² Value. Hence, the suggested model explains the percentage of the total variance of FQ and FSP are substantial.

F. Hypotheses Testing

All the hypotheses are accepted according to specific indirect effect since all the P values are below 0.05 and T values are above 1.96. Hence, direct impacts are positive in this study.

Table 05: R² Value

Variable	R-square
Food Quality	0.811
Food Safety Practice	0.834

Table 06: Results Analyzed with Direct Path Coefficient

Hypothesis	Hypothesized Relationship	Path Coefficient (PC)	T statistics	p values	Status
H ₁	FSK positively impact on FSP.	0.563	6.995	0.000	Accepted
H ₂	FSA positively impact on FSP.	0.377	4.376	0.000	Accepted
H ₃	FSK positively impact on FQ.	0.194	2.048	0.041	Accepted
H ₄	FSA positively impact on FQ.	0.233	2.238	0.025	Accepted
H ₅	FSP positively impact on FQ.	0.506	5.736	0.000	Accepted

*** PC = Path Coefficient (Significant value $P < 0.05$), T = T-Statistics (significant value $1.96 < T$)

Table 07: Results Analyzed with Specific Indirect Effect

Hypothesis	Hypothesized Relationship	Path Coefficient (PC)	T statistics	p values	Status
H ₆	FSP mediate the association between FSK and FQ	0.285	4.884	0.000	Accepted
H ₇	FSP mediate the association between FSA and FQ.	0.191	3.244	0.001	Accepted

*** PC = Path Coefficient (Significant value $P < 0.05$), T = T-Statistics (significant value $1.96 < T$)

G. Mediating Impact

Table 08: Mediation Impact Analysis of FSK on FQ through FSP

Direct Effect (FSK -> FSP)			Mediator Influence	Specific Indirect Effect (FSK -> FSP -> FQ)		
Coefficient	T-value	p-value		Coefficient	T-value	p-value
0.194	2.048	0.041	H ₆	0.285	4.884	0.000

*** PC = Path Coefficient (Significant value $P < 0.05$), T = T-Statistics (significant value $1.96 < T$)

Table 09: Mediation Impact Analysis of FSA on FQ through FSP

Direct Effect (FSA -> FSP)			Mediator Influence	Specific Indirect Effect (FSA -> FSP -> FQ)		
Coefficient	T-value	p-value		Coefficient	T-value	p-value
0.233	2.238	0.025	H ₇	0.191	3.244	0.001

*** PC = Path Coefficient (Significant value $P < 0.05$), T = T-Statistics (significant value $1.96 < T$)

Table 08 revealed that both the direct path ($\beta = 0.194$, T-value = 2.048, p-value = 0.041) and the indirect path ($\beta = 0.285$, T-value = 4.884, p-value = 0.000) were significant. FSP has made the relationship more strong between FSK and FQ since the significance level has increased in the indirect effect. Table 09 revealed that both the direct path ($\beta = 0.233$, T-value = 2.238, p-value = 0.025) and the indirect path ($\beta = 0.191$, T-value = 3.244, p-value = 0.001) were significant. FSP has made the relationship more strong between FSA and FQ since the significance level has increased in the indirect effect.

The present study is scientifically proven that the current level of food safety knowledge, attitude, practice and food quality of street food handlers in the Colombo district of Sri Lanka is at a satisfactory level from the perspective of street food handlers, in contrast to previous baseline studies, in which was stated that street food handlers knowledge and practices were not at a satisfactory level (Karunapema, 2021; Wickrematilake, 2022). The Basers' (2016) statements of "There is no relationship between food safety knowledge and food safety practice" can be rejected and "There is a positive relationship between food safety attitude and food

safety practices among hotel food handlers” can be proved in context of street food handler too. As Dharmarathne and Abeyesundara (2022), street food quality of Sri Lanka can be improved by increasing food safety knowledge and practices since findings proved that food safety knowledge, attitude and practices were impact on food quality and food safety practice act as a threshold in the association.

IV. CONCLUSION

This study proved that even the negative comments made by the society about the quality of street food in developing countries, the current level of street food quality is at a satisfactory level in Sri Lanka. The knowledge, attitude and practices on food safety of street food handlers also proven to be positive. Also, knowledge, attitude and practices on food safety are positively impact on street food quality and food safety practices mediate the association. Mass media and

social media should be used in an effective manner to promote quality street foods in Sri Lanka. Moreover, People involved in Sri Lankan tourism industry should take further efforts to promote tourism niches through street food considering the good quality of street food as an asset in the country. However, taking actions for further improvements of the quality of street food are very effective since the street food industry is one of the trending industries in the world which can generate the number of economic and socio-cultural benefits for a country. Government and non-government organizations can work collaboratively to increase street food handlers’ knowledge, attitude and practices of food safety in order to increase the street food quality through training programs, seminars, workshops and regular monitoring system. It is vital to introducing a new standardized procedure for licensing street food handlers.

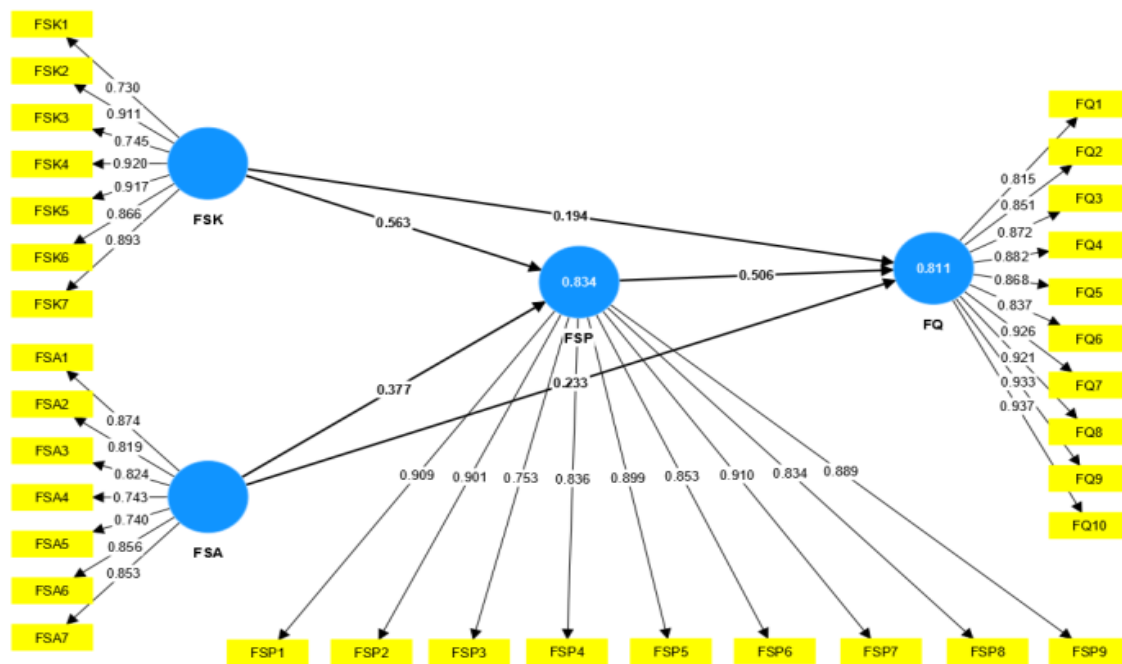


Figure 02: Smart PLS Algorithm Output

REFERENCES

Dharmarathne, G.G.N.T. and Abeyesundara, P.D.A. (2022) “Assessment of microbial quality of street foods sold in Nuegoda, Sri Lanka”, 1(1), pp.12-18.

Iriguler, F. and Ozturk, B. (2016) “Street food as a gastronomic tool in Turkey”, Researchgate.net, 12(1), pp. 49–64.

Ismail, F.H., Chik, C.T., Muhammad, R. and Yusoff, N.M. (2016) “Food safety knowledge and personal

hygiene practices amongst mobile food handlers in Shah Alam, Selangor”, Procedia-Social and Behavioral Sciences, 222(12), pp. 290-298.

Karunapema, R.P.P. (2021) “Educational Intervention Aimed at Street Food Vendors to Improve Knowledge and Practices on Food Safety and Hygiene” 1(2), pp.1-8.

- Ko, W.-H. (2013) "The relationship among food safety knowledge, attitudes and self-reported HACCP practices in restaurant employees", *Food Control*, 29(1), pp. 192–197.
- Mudunkotuwa, M.A.D.M. and Arachchi, R.S.S.W. (2020) "The Impact of Tourists' Perceived Risk on Attitude and Behavioral Intention towards Street Food : A Casse Study of Central Colombo", *Journal of Tourism Economics and Applied Research*, 4(2), pp.12-19.
- Namkung, Y. and Jang, S. (2007) "Does food quality really matter in restaurant? Its impact on customer satisfaction and behavioral intentions", *SAGE*, 8(5), pp. 12-20.
- Omemu, A.M. and Aderoju, S.T. (2008) "Food safety knowledge and practices of street food vendors in the city of Abeokuta,Nigeria", *Food control*, 19(4), pp. 1-18.
- Oraedu, E.N. (2016) "Assessment of food safety knowledge and practices among food handlers in restaurants in Nnewi Urban", *University of Nigeria*, 12(5), pp. 11-24.
- Perera, M., Nawarathne, A. and Kulathunga, K. (2018) "Determinants of street food consumption in Colombo city, Sri Lanka", *Perspective of foreign tourists*, 2(4), pp. 13-26.
- Pokhrel, B., Pokhrel, K.P., Chhetri, M.R., Awate, R.V. and Sah, N.K. (2016) "Knowledge, Attitude and Practice regarding food hygiene among food handlers: A cross sectional study.A Cross - sectional study", *Janaki Medical College*, 3(1), pp. 9–14.
- Riet, H.V.T. (2002) "The role of street foods in the diet of low - income urban residents, the case of Nairobi", *Wageningen University*, 12(1), pp. 45-53.
- Taha, S., Osaili, T.M., Vij, A. and Albloush. A. (2020) "Structural modelling of relationships between food safety knowledge, attitude, commitment and behavior of food handlers in restaurants in Jebel Ali Free Zone Dubai, UAE", *Food Control*, 7(5), pp. 41-52.
- Tuglo, L.S., Agordoh, P.D., Tekpor, D., Pan, Z., Agbanyo, G. and Chu, M. (2021) "Food safety knowledge, attitude, and hygiene practices of street-cooked food handlers in North Dayi District, Ghana", *Environmental health and preventive medicine*, 26(1), pp.1-13.