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A Systematic Review on Knowledge, Attitude and Practices (KAP) of Food Safety among School Children: A Global Perspective

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Abstract

Worldwide there are lack of studies demonstrating the knowledge, attitude, and practices (KAP) about food safety and hygiene, among school children. Thus, this systematic review is an attempt to summarize the findings in previous literature about food safety knowledge, attitude, and practices among school children, in a specific time period, to get an overview of the topic. This review was performed according to PRISMA protocol. Three main international databases (Google Scholar, PubMed and Scopus) were used for the search of the articles, and only the journal articles published from 2010 to 2020 were considered. Of the 102 articles referred, only 10 original research studies were selected based on the criteria for inclusion and exclusion. Only 2 out of 10 studies pointed out significant correlations between the school children's food safety knowledge, practices and attitudes. In addition, 1 out of 10 studies demonstrated significant associations between common demographics (academic performance of the children, the type of school, the area of residence, the habit of smoking and alcohol consumption and the educational background of the parents) and food safety knowledge among children. Furthermore, 8 out of 10 studies reported students to possess a poor or average knowledge of food safety while the rest of the studies showed students to possess good knowledge regarding food safety. Only 3 out of 10 studies revealed students to be engaged in safe food handling practices. It can be concluded that the assessment of food safety knowledge, attitude and practice as the most productive initiative to comprehend food safety-related insights among school children. Furthermore, this review highlights the fundamental requirement to improve children's food safety knowledge and practices through proper education.

Keywords: Food safety, Knowledge, Attitude, Practices

1. Introduction

Each and every year a considerable number of foodborne disease outbreaks and an increased number of victims are reported primarily due to the usage of contaminated food or water. Statistics from the World Health Organization reported that nearly two million people are killed annually due to diarrheal diseases and a clear majority of them represent children in developing and under-developed countries (World Health Organization [WHO], 2020). In the past decades, there has been an increase in the outbreak of many foodborne diseases worldwide due to weak and inadequate food safety regulations and the absence of proper education, training and skills among people who are involved in food preparation (Sharma, Srivastava, Banerjee, & Shaili, 2018).

Often, food becomes unhealthy for consumption once it is exposed to biological, physical or chemical hazards (Fung, Wang, & Menon, 2018; Kamboj, Gupta, Bandral, Gandotra, & Anjum, 2020; Kwol, Eluwole, Avci, & Lasisi, 2020). Every food has a vulnerability to getting contaminated at any phase during food handling. Incorrect time and temperature control associated with food during the supply chain, unsafe food processing/handling, inadequate cooking, cross contamination and improper personal hygiene practices were often described as causes for foodborne disease outbreaks (Ali & Immanuel 2017; Sani & Siow, 2014; Webb & Morancie, 2015). Severe cases of hospitalization and death that occurred as a result of food contamination highlight the danger of foodborne diseases. Furthermore, these

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extreme cases suggest that the individuals must possess adequate food safety knowledge, from childhood in order to minimize the risks associated with foodborne disease outbreaks.

School-aged children are one of the most important and sensitive social categories, who are often susceptible to food-related risks. According to some recent research, if children possess adequate food safety knowledge and proper hygienic practices, many foodborne illnesses can be prevented or minimized (Wanniarachchi, Abeysundara, & Peiris, 2021a, 2021b). Thus, having an overview of the food safety KAP of school children is important to researchers in the fields of public health and food safety.

A limited number of studies have been published about food safety KAP of school children (Wang, Wang, & Cai, 2013). Therefore, the objective of the current study is to summarize the selected findings from the previous literature about food safety KAP among school children around the world, from 2010-2020 to get an overview of the topic. Based on the gathered information, this work will assist the early career researchers in the field of public health and food safety who are interested in studying about food safety aspects of different communities within the population.

2. Materials and Methods

The review was based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) protocol (Moher, Liberati, Tetzlaff, & Altman, 2009). The present study is a systematic literature review. The articles were searched in three international databases, namely Google Scholar, PubMed and Scopus. The search was restricted to journal articles from peer-reviewed, open access, indexed journals and the language of interest was English. Articles published from 2010 to 2020 were considered for the review process. Initially, the keywords; (food safety, knowledge, attitude, and practices) were used for searching relevant articles. Through the initial search of articles, the authors found 102 articles with at least one of the above keywords including review papers and original research papers.

The review papers Included in the above set of 102 articles were disregarded while keeping the original research papers only. Further, exclusion was done to get rid of the papers whose target populations are different from school children even though they described KAP regarding food safety.

Next, as the inclusion criteria, any original research paper's title that contained at least two of the keywords (knowledge, attitude, practices) accompanied by the keyword "food safety", was encompassed in the review (Table 1). Finally, the selected articles were read completely to guarantee their suitability for our purpose.

Of the 102 articles referred, only 10 papers were selected based on the criteria for inclusion and exclusion. The final search of the articles was conducted in May 2021.

3. Results and Discussion

Table 1 depicts the summary of 10 selected previous studies about food safety KAP among school children.

3.1 Questionnaire designing and data analysis

In almost all studies, questionnaires have been created based on similar, previously validated questionnaires, the country's health and safety regulations and preventive measures and other safety guidelines introduced by the World Health Organization to ensure food safety. Of the 10 studies under consideration, 4 have paid attention completely to the three words "Knowledge, attitude and practices" (Cheng, Zhang, Ma, & Zhan, 2017; Majowicz et al., 2015; Moghaddam, Hassanzadazar, Vakili, Jafari, & Aminzare, 2020; Ovca, Jevšnik, & Raspor, 2014) while the rest of the papers paid attention at least on two of the above terms. In all the research works of interest here, data collection has been directed through questionnaires. The software used in the formal analysis and the particular tests performed to draw meaningful insights and conclusions in those 10 studies, were carefully summarized by the authors of the present study. Different software such as Stata/SE (14.0, 14.1), Epi Data Entry (Chinese version 3.1), SPSS (15.0 /16.0/17.0/ 20.0/ 22.0), SAS 9.4, Epi Info 7 software and Microsoft Excel 2016 were used. Depending on the normality or non-normality of data being handled different tests such as (Descriptive statistics, independent sample t-tests, Paired t-test, Duncan's pairwise comparison, Pearson's chi-square test, Fisher's exact test, Multivariable Poisson and logistic regression analysis, Multiple linear regressions, Cronbach's alpha, Analysis of variance, Cross tabulations, Spearman's correlation

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coefficient, Pearson correlation coefficient, Kruskal-Wallis test, Wilcoxon rank-sum, Multiple comparisons- SNK-Q test) were used by studies, as relevant to examine the relationships among and between the variables, to build statistical models and draw meaningful insights from the data (Table 1).

3.2 Characteristics of the participants

Among 10 studies under review, 2 studies have been carried out in Canada (Majowicz et al., 2015; Majowicz et al., 2017), while the other studies have been carried out in countries like China, the USA, Ghana, United Arab Emirates, Jordan, Slovenia, Iran and Malaysia. 2 out of 10 studies have chosen school children in the age group 10 to 12 years as their target population (Ovca et al., 2014; Tutu, Hushie, Asante, & Egyakwa-Amusah, 2020), while 4 studies have paid interest on children between 13-19 years of age (Cheng et al., 2017; Majowicz et al., 2015; Moghaddam et al., 2020; Norazmir et al., 2012). The rest of the studies haven't specifically mentioned the age group of the participants. About 4 out of 10 studies have employed samples greater than 1000 participants (Cheng et al., 2017; Majowicz et al., 2015, Ovca et al., 2014; Tutu et al., 2020) while others have used sample sizes of less than 1000 participants.

3.3 Food safety KAP vs demographics of school children

Altogether, 7 out of 10 studies under consideration contained a separate section in the questionnaires to provide socio-demographic characteristics of the participants (Cheng et al., 2017; Majowicz et al., 2015; Majowicz et al., 2017; Moghaddam et al., 2020; Norazmir et al., 2012; Osaili, Obeidat, Jamous, & Bawadi, 2011; Tutu et al., 2020). Food safety knowledge, as well as their practices within a population, differ by subpopulations based on demographic and geographic characteristics (Moreb, Priyadarshini, & Jaiswal, 2017). Demographic details such as gender, age, the number of siblings, the school category, grade, height and weight of the child, ethnicity, the average monthly income, the residential area, the parents' occupation and the parents' education background, etc. Have been studied for their effects on the KAP of school children (Table 1). Only 1 out of 10 studies reported, significant associations between common demographics such as academic performance of students, the type of school, the area of residence, habit of smoking and alcohol consumption and education background of parents with food safety KAP of students.

3.4 Food safety attitude of school children

A good attitude is one of the key factors in the conversion of knowledge into proper food handling practices (Da Cunha, Stedefeldt, & De Rosso, 2014). Altogether, the papers under review here contained 3 to 17 attitude-based questions. About 6 out of 10 studies have directly evaluated the school children's attitude on food safety through the questionnaire (Byrd□Bredbenner, Abbot, & Quick, 2010; Cheng et al., 2017; Majowicz et al., 2015; Majowicz et al., 2017; Moghaddam et al., 2020; Ovca et al., 2014). Of the 6 studies which addressed students' attitudes toward food safety, only one study reported students to possess a favourable attitude toward food safety. Furthermore, these studies revealed, the need for school children to receive, further education on food safety (Byrd-Bredbenner et al., 2010; Cheng et al., 2017; Majowicz et al., 2015; Majowicz et al., 2017; Osaili et al., 2011; Ovca et al., 2014).

Byrd-Bredbenner et al. (2010) revealed that many middle schoolers tend to believe that preparing food alone can cause food poisoning, owing to the reasons like lack of previous food preparation experiences, poor knowledge or due to poor food handling practices. Therefore, in such cases upgrading their knowledge as well as confidence regarding food safety-related aspects is a must to ensure food safety. Researchers pointed out, the need for a synergetic endeavor among different parties such as school children, their parents, food safety professionals and educators to improve food safety awareness among them (Getty, 2014; Horikawa, Akamatsu, Horiguchi, & Marui, 2013).

The above results are further backed up by a recent study carried out in Sri Lanka, where the majority (92.4%) of the school children were self-assured that their current level of knowledge on food safety could be further improved by the provision of proper education. The same study revealed parents, teachers and doctors as pioneer food safety educators in the Sri Lankan context (Wanniarachchi, Abeysundara, & Peiris, 2021c).

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Table 1. Summary of the selected studies carried out about food safety knowledge, attitudes and practices of school children, worldwide from 2010 – 2020.

Authors, year and country of the study	Attributes of the participants of the study	Main objective/objectives	Nature of the questions included in the questionnaire	Primary findings
Majowicz et al. (2015) Canada	(n = 2,860) high school students of four Ontario colleges Age- 13 to 18 years	• To evaluate food safety KAP of high school students in Ontario	1. Demographic details of participants 2. Questions about food safety knowledge – 4 questions 3. Questions to check attitude – 4 questions 4. Questions regarding self-reported food safety practices -7	• Overall food safety knowledge of the participants was low. • Majority of the participants (72.7%) were confident that they could cook safe, meals for both their families and themselves. • More often, students were found to follow good hygienic practices while handling food. • Necessity of further education on food safety was evident.
Cheng, Zhang, Ma and Zhan (2017) China	(n = 4,220) Students in 3 districts of Beijing. Age- 13 to 18 years	• To understand and build meaningful insights on the food safety KAP among students in Beijing	1. Demographic details 2. Questions about food safety knowledge – 7 questions 3. Questions to check attitude – 3 questions 4. Questions regarding self-reported food safety practices -3 questions	• Overall food safety knowledge of the study group was good. • Significant correlations were shown between food safety knowledge scores and demographic data such as residential area, type of school, the habit of smoking and alcohol consumption, academic performance in the class and the parents' education background. • The study highlighted the need for providing further food safety education to children for a safer tomorrow.
Norazmir et al.	(n = 339)	• To assess knowledge and practice regarding food safety among	1. Demographic details	• Overall food safety knowledge and practice of the participants were good.

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(2012) Malaysia	Secondary School children in Johor Bahru, Malaysia Age 16 to 19 years	secondary schoolers in Johor Bahru, Malaysia ● To demonstrate the relationship between food safety knowledge and practices with gender. ● To determine the correlation between food safety knowledge and practice scores.	2. Questions about food safety knowledge- 10 items 3. Questions about food safety practices -10 items	● No significant differences in food safety knowledge and practice were observed between genders. ▪ Weak and positive correlations between food safety knowledge and practice were noted.
Ovca, Jevšnik and Raspor (2014) Slovenia	(n=1272) 26 primary schools in the district Ljubljana and nearby in Slovenia Age- 10 to 12 years	● To gain meaningful insights into the experiences of children with food preparation ● To understand food safety risks and minimize getting exposed to them ● To evaluate KAP on food safety among students in Slovenia.	1. Students' experiences with food preparation and food handling -5 questions 2. Students' personal understanding of food safety risks - 6 statements 3. Third section -Food safety knowledge - 18 questions 4. Statements regarding self-reported food safety practices – 15 statements	● Children were found to engage in food preparation with limited experience. ● Poor knowledge on the impact of proper temperature control to assure microbial food safety was evident. ● Results demonstrated the necessity for students to receive further education and guidance regarding food safety.
Tutu, Hushie, Asante and Egyakwa-Amusah (2020) Ghana	(n=1343) School children in the Ga West (Upper primary and Junior high school students)	● Primarily to assess food safety knowledge and practices of the participants of the study.	1. Demographic details 2. Food safety knowledge – 9 questions	● Poor food safety knowledge was depicted among students. ● Majority of the students engaged in appropriate food safety practices. Eg. Hand washing

	Age- 10 to 12 years		3. Food safety practice – 9 questions	• Positive correlations between food safety knowledge and practices were shown. • More than half of the participants insisted to look for the cleanliness and the neatness of the surroundings first, followed by the vendor's attributes before they try food from outside.
Moghaddam, Hassanzadazar, Vakili, Jafari and Aminzare (2020) Iran	(n=640) High school children in in Khorramdarreh, Zanjan, Iran Age- 14 to 19 years	• To assess food safety KAP among high school children in Khorramdarreh, Zanjan, Iran	1. Demographic information 2. Questions to test food safety attitude-15 items 3. Questions to test safety knowledge-24 items 1. Questions to test food safety practices-10 items	• Overall, students depicted moderate knowledge of food safety. • Similarly, favourable level of food safety attitude and practice were observed among children. • Students depicted poor knowledge of the effects of temperature on food (35%) • Training regarding food safety has been recommended by the authors to be given to children as well as parents to upgrade their knowledge on food safety.
Majowicz et al. (2017) Canada	(n = 119) high school children in Ontario, Canada	• To assess food safety knowledge and attitude of high school students. • To determine whether food safety knowledge and attitude have upgraded after taking part in a training program on proper food handling.	1. Food safety knowledge questions – 7 items 2. Food safety attitude questions – 17 items 3. Demographic details and food handling experience questions- 8 items	• Poor food safety knowledge and attitude among high school students was reported. • Authors recommend in-class delivery of existing programs, as effective in order to enhance students' knowledge of food safety. • The study revealed that the assessment that 3tilize observational data to demonstrate the impact of food safety education on students' genuine food handling behavior as important.
Osaili, Obeidat, Jamous and Bawadi	(n=867)	• To investigate the association between food safety knowledge and socio-demographic and academic	1. Demographic and academic characteristics of students	• A satisfactory level of knowledge on prevention of cross-contamination and disinfection procedures was reported.

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(2011) Jordan	school children (only females)living at dorms	variables among college female students in the north of Jordan.	2. Questions to assess students' knowledge of food safety	● The participants reported poor knowledge food foodborne pathogens. ● Need to provide food safety educational interventions covering major food safety concept was observed.
Abushelaibi, Jobe, Al Dhanhani, Al Mansoori and Al Shamsi (2016) United Arab Emirates	(n=147) Students of eight public schools in the city of Al Ain, United Arab Emirates	● To assess food safety knowledge and hygienic practices among students in selected schools in Al Ain city UAE.	1. Questions to demonstrate the behavior of participants about food safety aspects. 2. Questions to assess students' knowledge and practices about food safety 3. Questions to assess participants' awareness about food contamination and hand hygiene.	● About 75% of the schools were found not to clean their refrigerators (where the food is stored) enough periodically. ● Results demonstrated that the majority of students did not practice proper hand washing after using the toilet. ● Microorganisms like *Escherichia coli* and *Staphylococcus aureus* were found in hands of school children, food handlers and teachers.
Byrd□Bredbenner, Abbot and Quick (2010) The USA	Middle school children in 5 major geographic regions of New Mexico, in the USA Parents of the above-mentioned middle schoolers (participated in baseline parent focus groups) Professionals on food safety	● To explore the responsibilities of school children during food processing and handling ● To explore the hindrances to be faced during the practicing of safe food handling and develop strategies to overcome them.	4. A qualitative research design involving mainly 3 focus groups	● Youth pointed out that food can make them sick, and explained reasons such as substance/microorganisms entering into food, and inappropriate cooking as causes for foodborne illnesses. ● Almost all the participants were keen on learning about food safety. ● Parents showed high enticement over students to learn further about food safety. ● Parents suggest food safety education be given to students at schools and in domestic settings.

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	• Parents suppose that their children have average levels of food safety knowledge, but doubted them to practice safe food handling behaviors while unsupervised.

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3.5 Food safety knowledge of school children

In almost all studies listed in Table 1, the food safety knowledge of school children has been evaluated. In order to assess food safety knowledge, areas such as microbial contamination of kitchen countertops and utensils, prevention of cross-contamination, temperature regulation to ensure microbial safety of food, common food sources of food borne-diseases, the application of proper heat treatment, monitoring food before consumption, basic disinfection procedures and knowledge about basic food safety principles and personal hygiene were tested. Of the 10 studies considered, 8 studies reported students to have poor or average food safety knowledge. Only 2 out of 10 studies demonstrated students to have good knowledge on food safety (Cheng et al., 2017; Norazmir et al., 2012). School children who participated in the studies reported poor knowledge with regard to proper temperature control on microbial growth and survival, the shelf life of food and common foodborne pathogens (Moghaddam et al., 2020; Osaili, et al., 2011; Ovca et al., 2014). Meantime, students were knowledgeable about maintaining personal hygiene while preparing food (e.g., basic hand washing), disinfection procedures, averting cross-contamination during food preparation and handling) (Abushelaibi et al., 2016; Osaili et al., 2011; Ovca et al., 2014).

Since the majority of studies did not show, adequate food safety knowledge among students, it creates a need to improve awareness among them regarding basic principles of safe food handling. School children's knowledge with regard to proper temperature control on microbial growth and survival and common foodborne pathogens needs to be improved. For this, the authors of the present study suggest, that educational programs and training programs be conducted in school settings where children are more attentive to learning with peers. And also, the responsible authorities regarding school children's education can pay attention to including the relevant content about food safety in their school curricula to make them more familiar with the content (Ovca et al., 2014).

3.6 Food safety practices of school children

Only 3 out of 10 studies reported students to be engaged in appropriate and safe food handling practices (Majowicz et al., 2015; Norazmir et al., 2012; Tutu et al., 2020). In the articles under review, 3 to 16 statements were used to evaluate food safety practices among school children. Food can become contaminated at any stage of the food handling process. The risk factors include improper time/temperature control, improper food handling practices, inadequate cooking, contaminated raw foods and poor personal hygiene etc. (Medeiros, Hillers, Kendall, & Mason, 2001). The extent to which safe food handling practices are followed, during food purchasing, handling and preparation determines the probability of such events taking place. Participants in some studies often reported some risky behavioural approaches to preventing cross-contamination, storing and reheating leftovers in day-to-day life and personal hygiene (e.g., cooking in the presence of open wounds in hands and washing hands after using the washroom) (Abushelaibi et al., 2016; Ovca et al., 2014). In most cases, these risks can be eliminated, by following proper food handling practices (Fischer & Frewer 2009).

3.7 Limitations and future perspectives

These types of studies can be associated with limitations such as non-random selection of schools when getting the contribution of children to carry out the study. Less demographically diverse samples drawn from the population of interest is another limitation (Mullan, Wong, & Kothe, 2013). This may act as a hindrance when it comes to the generalization of the results of the study for the entire population in the whole territory (Cheng et al., 2017). In this regard, many researchers tend to consider how different sampling approaches can broaden the socio-demographic diversity of the samples taken for future studies. Meanwhile, for researchers dealing with the assessment of self-reported practices, there is a bias in the participants to typically provide more favorable behaviours (Cheng et al., 2017; Osaili et al., 2011). In such cases, researchers often apply strategies like emphasizing the participants that are being anonymized, and no individual evaluation will be done via participating in the study. As suggested by research work carried out by Levine, Chaifetz and Chapman (2017), the need for instrument validation of the survey study should be emphasized through increased testing and observations.

4. Conclusions

Studies regarding food safety KAP of school children are of utmost importance as they are capable of predicting the aspects of food safety in which improvements in knowledge, attitude, and practice are necessary. Further such studies can also

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make a positive impact on food safety awareness among children. The assessment of food safety KAP of children should not limit to just answering a questionnaire, but it should follow a continuous process from evaluating them (through a survey) up to improving their knowledge (targeting under-developed areas of food safety) via proper education. Almost all the studies reviewed here lack the consideration of psychological factors which may affect their attitude and practices while handling food. Therefore, future research studies can focus on such areas to get more meaningful insights about food safety KAP among school children.

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Conflict of Interest

The authors of the present work do not report any financial or personal connections with other persons or organizations, which might negatively affect the contents of this publication and/or claim authorship rights to this publication.

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References

Abushelaibi, A., Jobe, B., Al Dhanhani, F., Al Mansoori, S., & Al Shamsi, F. (2016). An overview of food safety knowledge and practices in selected schools in the city of Al Ain, United Arab Emirates. *African Journal of Microbiology Research*, *10*(15), 511-520. doi:10.5897/AJMR2016.7917

Ali, A. I., & Immanuel, G. (2017). Assessment of hygienic practices and microbiological quality of food in an institutional food service establishment. *Journal of Food Processing & Technology*, *8*(8). doi:10.4172/2157-7110.1000685

Byrd-Bredbenner, C., Abbot, J. M., & Quick, V. (2010). Food safety knowledge and beliefs of middle school children: Implications for food safety educators. *Journal of Food Science Education*, *9*(1), 19-30. doi:10.1111/j.1541-4329.2009.00088.x

Cheng, Y., Zhang, Y., Ma, J., & Zhan, S. (2017). Food safety knowledge, attitude and self-reported practice of secondary school students in Beijing, China: A cross-sectional study. *PLoS One*, *12*(11), e0187208. doi:10.1371/journal.pone.0187208

Da Cunha, D. T., Stedefeldt, E., & De Rosso, V. V. (2014). The role of theoretical food safety training on Brazilian food handlers' knowledge, attitude and practice. *Food Control*, *43*, 167-174. doi:10.1016/j.foodcont.2014.03.012

Fischer, A. R., & Frewer, L. J. (2009). Consumer familiarity with foods and the perception of risks and benefits. *Food Quality and Preference*, *20*(8), 576-585. doi:10.1016/j.foodqual.2009.06.008

Fung, F., Wang, H. S., & Menon, S. (2018). Food safety in the 21st century. *Biomedical Journal*, *41*(2), 88-95. doi:10.1016/j.bj.2018.03.003

Getty, M. (2014). *Cooking Healthy, Eating Smart (CHES): Evaluating the feasibility of using volunteers to deliver nutrition and food safety education to rural older adults* (Master's thesis dissertation). Clemson University.

Horikawa, H., Akamatsu, R., Horiguchi, I., & Marui, E. (2013). Parental views of food-safety education in a Japanese primary school. *Health Education Journal*, *72*(4), 460-468. doi:10.1177/0017896912450243

Kamboj, S., Gupta, N., Bandral, J. D., Gandotra, G., & Anjum, N. (2020). Food safety and hygiene: A review. *International Journal of Chemical Studies*, *8*(2), 358-368. doi:10.22271/chemi.2020.v8.i2f.8794

Kwol, V. S., Eluwole, K. K., Avci, T., & Lasisi, T. T. (2020). Another look into the Knowledge Attitude Practice (KAP) model for food control: An investigation of the mediating role of food handlers' attitudes. *Food Control*, *110*. doi:10.1016/j.foodcont.2019.107025

Levine, K., Chaifetz, A., & Chapman, B. (2017). Evaluating food safety risk messages in

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popular cookbooks. *British Food Journal*, *119*(5), 1116-1129. doi:10.1108/BFJ-02-2017-0066

Majowicz, S. E., Diplock, K. J., Leatherdale, S. T., Bredin, C. T., Rebellato, S., Hammond, D., ... Dubin, J. A. (2015). Food safety knowledge, attitudes and self-reported practices among Ontario high school students. *Canadian Journal of Public Health*, *106*(8), e520-e526. doi:10.17269/CJPH.106.5213

Majowicz, S. E., Hammond, D., Dubin, J. A., Diplock, K. J., Jones-Bitton, A., Rebellato, S., & Leatherdale, S. T. (2017). A longitudinal evaluation of food safety knowledge and attitudes among Ontario high school students following a food handler training program. *Food Control*, *76*, 108-116. doi:10.1016/j.foodcont.2017.01.011

Medeiros, L., Hillers, V., Kendall, P., & Mason, A. (2001). Evaluation of food safety education for consumers. *Journal of Nutrition Education*, *33*, S27-S34. doi:10.1016/S1499-4046(06)60067-5

Moghaddam, A., Hassanzadazar, H., Vakili, M. M., Jafari, F., & Aminzare, M. (2020). The knowledge, attitude, and practices of secondary high school students regarding food safety and hygiene in Khorramdarreh, Iran. *Journal of Human Environment and Health Promotion*, *6*(2), 60-68.

Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *Annals of Internal Medicine*, *151*(4), 264-269.

Moreb, N. A., Priyadarshini, A., & Jaiswal, A. K. (2017). Knowledge of food safety and food handling practices amongst food handlers in the Republic of Ireland. *Food Control*, *80*, 341-349. doi:10.1016/j.foodcont.2017.05.020

Mullan, B. A., Wong, C., & Kothe, E. J. (2013). Predicting adolescents' safe food handling using an extended theory of planned behavior. *Food Control*, *31*(2), 454-460. doi:10.1016/j.foodcont.2012.10.027

Norazmir, M. N., Noor Hasyimah, M. A., Siti Shafurah, A., Siti Sabariah, B., Ajau, D., & Norazlanshah, H. (2012). Knowledge and practices on food safety among secondary school students in Johor Bahru, Johor, Malaysia. *Pakistan Journal of Nutrition*, *11*(2), 110-115. doi:10.3923/pjn.2012.110.115

Osaili, T. M., Obeidat, B. A., Jamous, D. O. A., & Bawadi, H. A. (2011). Food safety knowledge and practices among college female students in north of Jordan. *Food Control*, *22*(2), 269-276. doi:10.1016/j.foodcont.2010.07.009

Ovca, A., Jevšnik, M., & Raspor, P. (2014). Food safety awareness, knowledge and practices among students in Slovenia. *Food Control*, *42*, 144-151. doi:10.1016/j.foodcont.2014.01.036

Sani, N. A., & Siow, O. N. (2014). Knowledge, attitudes and practices of food handlers on food safety in food service operations at the Universiti Kebangsaan Malaysia. *Food Control*, *37*, 210-217. doi:10.1016/j.foodcont.2013.09.036

Sharma, P., Srivastava, K., Banerjee, A., & Shaili, V. (2018). Is there need to augment the food safety knowledge, safe handling practices and purchasing behaviour among medical students. *Indian Journal of Forensic and Community Medicine*, *5*(3), 168-172. doi:10.18231/2394-6776.2018.0038

Tutu, B. O., Hushie, C., Asante, R., & Egyakwa-Amusah, J. A. (2020). Food safety knowledge and self-reported practices among school children in the Ga West Municipality in Ghana. *Food Control*, *110*, 107012. doi:10.1016/j.foodcont.2019.107012

Wang, X., Wang, S., & Cai, Z. (2013). The latest developments and applications of mass spectrometry in food-safety and quality analysis. *TrAC Trends in Analytical Chemistry*, *52*, 170-185. doi:10.1016/j.trac.2013.08.005

Wanniarachchi, P. C., Abeysundara, P. D. A., & Peiris, K. G. H. S. (2021a). Selected socio-demographic factors associated with food safety knowledge and practices of school children in Colombo Education Zone, Sri Lanka. *Proceedings of the 14th International Conference of Health Sciences (ICHS)* (pp. 119-120). Sri Lanka: University of Sri Jayewardenepura.

Wanniarachchi, P. C., Abeysundara, P. D. A., & Peiris, K. G. H. S. (2021b). Assessment of the association between selected socio-demographic characteristics with food safety knowledge, attitudes and practices of school children in Colombo, Sri Lanka. *Proceedings of the 5th International Research Conference of*

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Uva Wellassa University (IRCUWU) (p. 219). Sri Lanka: Uva Wellassa University.

Wanniarachchi, P. C., Abeysundara, P. D. A., & Peiris, K. G. H. S. (2021c). Evaluation of food safety knowledge and perceptions of school children in Colombo, Sri Lanka; Implication for food safety education. *Proceedings of the 23rd Peradeniya University International Research Sessions (IPURSE)* (p. 213). Sri Lanka: University of Peradeniya.

Webb, M., & Morancie, A. (2015). Food safety knowledge of foodservice workers at a university campus by education level, experience, and food safety training. *Food Control*, *50*, 259-264. doi:10.1016/j.foodcont.2014.09.002

World Health Organization. (2020). *Food safety*. Retrieved from https://www.who.int/news-room/fact-sheets/detail/food-safe