

# Relationship of Knowledge and Attitude with Food Handling Practices: A Systematic Review

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## Relationship of Knowledge and Attitude with Food Handling Practices: A Systematic Review

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### ABSTRACT

Foodborne disease is still a public health problem in several countries. Food handler's Knowledge, Attitude, and Practice (KAP) are some of the aspects that are risk factors for foodborne disease incidence. The research objective was to assess the level of knowledge, attitudes, and behavior of food handlers in maintaining food hygiene using a systematic review approach. The research method used is the PRISMA (Preferred Reporting Items for Systematic Review and Meta-Analyses) protocol approach. The research variables were sociodemography and KAP food handlers. The article search process was accessed on three electronic databases. Article inclusion criteria are quantitative research, primary data, year of publication (11 September 2015 - 11 September 2020), in English, open access articles, peer review, and full-text articles. A descriptive analysis was carried out on each research variable. The results obtained eight papers (100% sociodemography, 100% knowledge, 62.5% attitude, and 87.5% behavior). The mean of significant articles on sociodemographic variables was 18.5%, experience 59.38%, attitudes 13.33%, and 23.81%. The considerable relationship (p-value <0.05) between knowledge and attitude and food handlers' practice was 37.5% of the articles, respectively.

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## 1. INTRODUCTION

An unclean and healthy practice is one of the causes of various diseases in society [1]. One of the impacts of unsanitary practice is the emergence of foodborne illness, causing death. Food that is unsafe and contains bacteria, viruses, parasites, or chemicals, can cause 200 diseases ranging from diarrhea to cancer[2].

The World Health Organization estimates that about 600 million people worldwide have fallen ill from food in 2015. One in 10 people is affected, and 420 thousand out of 33 million lose their lives each month and each year [3]. WHO reports that there are about 2 million fatal cases of food poisoning occurring each year globally, especially in developing countries due to poor food safety and general hygiene in these countries. In 2014, Malaysia recorded 49.79 cases of food poisoning per 100,000 population. More than 50% of the total food poisoning cases are associated with improper handling of food by food handlers. Outbreaks in academic institutions account for 43% of food poisoning incidents in Malaysia[4]. The Malaysian Ministry of Health has identified training ineffective food handlers, their deliberate use of unsalted water, and poor hygiene as significant risk factors for food poisoning. Food handlers play an essential role in ensuring food safety and

preventing food poisoning[5]. Infected food handlers can pass on gastrointestinal infectious disease agents through poor personal hygiene practices [6].

In 2007-2016 the Brazilian health ministry reported 6848 incidents of foodborne disease outbreaks according to data from the National Notifiable Diseases Information System. Among the 610,465 people exposed to danger, 121,283 people fell ill, and 111 died [7]. There is little documentation for the incidence of foodborne disease in Ethiopia, but many foods are not guaranteed health in Ethiopia. In a study conducted by Metadel Adane et al., only about 53% of fares were safe for consumption in samples taken from roadside food colonizers. Another study showed that 2.5% of samples tested positive for Escherichia Coli in food taken from meat sold by food colonizers in Ethiopia [8]. Bangladesh National Hygiene Baseline Survey research as traders only know about 37% of cleanliness, potentially triggering foodborne diseases [9]. In Saudi Arabia, the foodborne disease outbreak has infected catering food vendors, amounting to 1.26% of the 1000 catering food sellers [10].

Besides, many reports have shown that foodborne illness is still a public health problem in Indonesia; based on data from the POM (2010), during the 2001-2009 period, 1,101 Extraordinary Events (KLB) of food poisoning occurred. In 2015 data on extraordinary events (KLB), the types of food that caused outbreaks of food poisoning in 2015 were household cooking as 25 incidents (40.98%), snack food as many as 14 events (22.95%), food and food services as many as 13 incidences (21.31%), and processed food as many as nine events (14.75%) [11].

Lifestyle and human consumption Practices have changed, the tendency to prepare meals at home has decreased, and food consumption outside the home has increased. Increased food consumption outside of homes, restaurants, and other eating establishments plays a role in increasing the risk of foodborne diseases[12]. Foods that are cooked on a large scale have a higher chance of being contaminated. Foodborne disease outbreaks due to contamination by food handlers are estimated to be 10 to 20%. Not paying attention to food hygiene allows pathogens to contact food, survive, increase in sufficient numbers, and impact consumers[3].

HygieneFood sanitation is an effort to maintain or control food factors, people, places, and equipment, causing illness or health problems. In good food management, several sanitation hygiene factors must be considered to maintain adequate food quality, including washing hands before contact with food and washing food with clean water. These practices positively affect and can contribute to the occurrence of diarrhea disease [13]. Also, all food processing activities must be protected from direct contact with the body. Food handlers can make some efforts to avoid contamination of food by wearing clean clothes, using disposable gloves, and using food tongs when working [14]. Another step to maintain food quality remains good by storing foodstuffs in an appropriate place because contamination can occur during the food processing or through containers and food handlers that leave food at room temperature. Several studies have concluded that the risk factors for foodborne disease incidence occur when cleaning cutlery, incompatibility with storage time temperatures, and inadequate personal hygiene [15]. Efforts to maintain food quality to stay good can also be made through training and education for food handlers because it can be an effective means of increasing knowledge and practices of food safety in food handlers [16].

Several studies have proven the relationship between the level of knowledge, attitudes, and hygiene practice in food handlers, which impact food hygiene. According to Maywati, there is a significant relationship between knowledge and street food handlers [17]. Another researcher from Hiskia et al. stated a relationship between knowledge, attitudes, and Practice with the food snack players' hygiene around the snack market in Kotamobagu city [18].

Based on this, it is necessary to study the level of knowledge, attitudes, and practice of food handlers in maintaining food quality using a systematic review approach.

## 2. METHOD

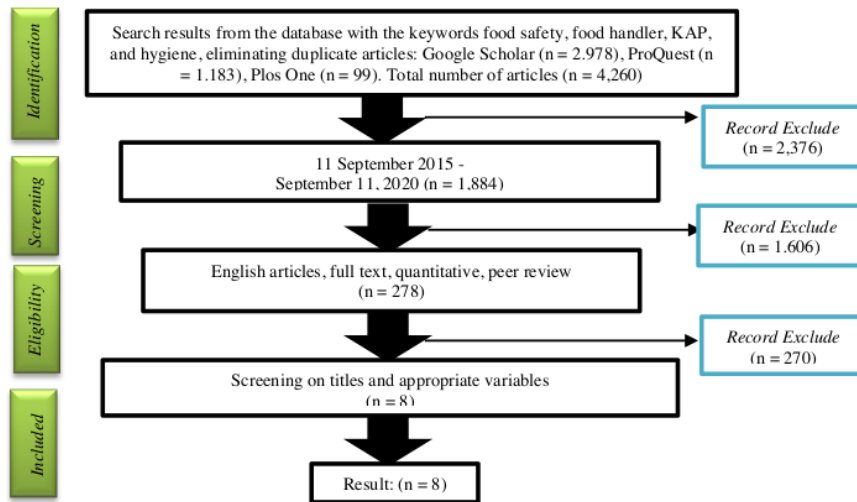
The research method uses a systematic review approach based on the PRISMA protocol (Preferred Reporting Items for Systematic Review and Meta Analyzes) [19]. PRISMA protocol is used to identify relevant research articles and include sociodemographic, Knowledge, Attitude, and Practice (KAP) variables of food handlers in maintaining food quality. The article search process was accessed on three electronic databases, namely PLOS ONE, Pro-Quest, and Google Scholar. The keywords used in the search for journal articles are food safety, food handler, KAP, and hygiene.

The feasibility study was conducted using inclusion and exclusion criteria. The inclusion criteria set are quantitative research, primary data, year of publication (11 September 2015 - 11 September 2020), in English, have gone through the peer review stage, and are full-text articles. The exclusions of this review are qualitative research, literature other than items, and literature review. Data extraction was carried out through the Identification stage by searching for articles from the database, screening to determine the time range, eligibility, and included screening in deciding the title of the items to be selected based on the inclusion criteria.

The results of the literature search were then analyzed descriptively narrative. The descriptive analysis includes; (a) analysis based on sociodemographic factors, consisting of age, sex, education, experience, marital status, and monthly income, (b) analysis based on knowledge factors consisting of personal hygiene, prevention of cross-contamination and sanitation, food handling and health problems Has an effect on food, (c) analysis based on attitude factors, which consists of views on knowledge of correct food handling, views on personal hygiene, opinions on the separation between raw food and cooked food, thoughts on a safe place for food storage, idea of the cleanliness of tools and views of work experience, (d) analysis based on practice factors, which consists of washing hands before contact with food, wearing clean masks and uniforms while working, washing food or tools with clean water, wearing gloves when contacting with ma right, store food ingredients in a suitable place, do not smoke or are not coughing and sneezing while preparing food and food handlers conducting training / training.

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**3. RESULTS AND DISCUSSION**

The selection results based on keywords and following the PRISMA protocol obtained 4,260 articles and eliminated articles' duplication. Furthermore, in the screening based on the year of publication (11 September 2015 - 11 September 2020), there were 1.884 articles. Screening of English journals, full text, and having gone through the peer review stage obtained from PLOS ONE, ProQuest, and Google Scholar, received 278 articles. An eligibility study was conducted to eliminate items that did not match the problem variables and did not match the established inclusion criteria. In the last stage, eight articles match the inclusion criteria.



**Figure 1.** Literature search results based on the PRISMA protocol

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**Table 1.** The distribution of articles is based on sociodemographic factors, knowledge, attitudes, and practice of food handlers in maintaining food quality

Variable	Frequency (article)	Percentage (%)
Sociodemography of Knowledge, Attitudes, and Practice	5	62.5%
Sociodemography of knowledge and Practice	2	25%

*Title of manuscript is short and clear, implies research results (First Author)*

Variable	Frequency (article)	Percentage (%)
Sociodemography of knowledge	1	12.5%
<b>total</b>	<b>8</b>	<b>100%</b>

Table 1 shows that articles discussing sociodemographic variables on knowledge, attitudes, and practice were found in 5 studies (62.5%). Meanwhile, articles discussing sociodemographic variables on experience and practice were examined in 2 items (25%), and articles discussing sociodemographic variables to knowledge were only discussed in 1 study (12.5%).

**Table 2.** Researcher Data, Research Location, Number of Samples, and Number of Questions in the Questionnaire on the Assessment of Sociodemographic Research Variables and KAP Food Handlers

No (Code Article)	Research	Research sites	Number of samples	Questionnaire Items on Variables			
				Sociodemographic (item)	Knowledge (item)	Attitude (item)	Practice (item)
1	D. Suryani et al., 2019 [20]	Yogyakarta, Indonesia	109	5	11	22	11
2	NA. Alqurashi et al., 2019[21]	Al Madinah, Saudi Arabia	163	5	7	NA	8
3	LI.Auad et al., 2019 [22]	Asa Norte and Sao Paolo, Brazil	40	9	10	10	10
4	AL. Doraliyana et al., 2018[23]	Selangor and Kuala Lumpur, Malaysia	134	7	21	10	6
5	J. Azanaw et al., 2019 [24]	Gondar, Ethiopia	98	6	8	NA	NA
6	MK. Alam et al., 2020[25]	Mymensingh and Gazipur, Bangladesh	116	4	14	NA	14
7	F. Ncube et al., 2020 [26]	Bindura, Zimbabwe	101	6	20	15	20
8	HK. Lee et al., 2017[6]	Kuala Lumpur, Malaysia	111	7	60	14	12

NA: Non-Available

The number of research samples used and the number of item categories on the aspects assessed by each factor are described in table 2 above. Table 2 illustrates the number of various research samples. The assessment aspect items on the elements used in this community participation research vary; only five use these four factors (codes 1, 3, 4, 7, 8), then sociodemographic factors, knowledge, and practice in 2 studies (code 2, 6), the last is sociodemographic and practice factors in 1 study (code 5).

Table 2 illustrates the distribution of samples and the factors used in the research of participating food handlers. These articles link a variety of different factors, as in Azanaw et al. [24] linking the sociodemographic aspects with knowledge in the form of basic knowledge about personal hygiene to prevent the transmission of pathogens from food handlers to customers [24]. In the NA study Alqurashi et al. [21] and MK. Alam et al., 2020[25] linking sociodemographic aspects with knowledge and practice to ensure food handlers have the skills and knowledge for food safety. [21], [25] Sociodemographic elements associated with the three KAP factors on Suryani et al. [20], Auad et al. [22], Doraliyana et al. [23], Ncube et al. [26], and Lee et al. [6] evaluate understanding, attitude and the practice of food handlers regarding the impact on food hygiene to produce good quality food. [6], [22], [23], [26] research with the four factors (sociodemography and KAP) will be beneficial to provide better insights for the development of good food handling.

### 3.1. Sociodemographic Factors

**Table 3.** The distribution of articles is meant to determine the relationship between influencing sociodemographic variables on food handlers on food quality

Factor	Research result			
	Category	Code	Frequency	% Articles
Age	Significant	-	0	0%
	No sign.	(1,2,3,4,7)	5	62.5%
	NA	(5,6,8)	3	37.5%
	Total		8	100%
Gender	Significant	(4)	1	12.5%
	No sign.	(1,3,5,7)	4	50%
	NA	(2,6,8)	3	37.5%
	Total		8	100%
Education	Significant	(7)	1	12.5%
	No sign.	(1,4,8)	3	37.5%
	NA	(2,3,5,6)	4	50%
	Total		8	100%
Experience	Significant	(2,8)	2	25%
	No sign.	(1,3,4,5,7)	5	62.5%
	NA	(6)	1	12.5%
	Total		8	100%
Marital status	Significant	(3,5)	2	25%
	No sign.	-	0	0%
	NA	(1,2,4,6,7,8)	5	62.5%
	Total		8	100%
Income per month	Significant	(3)	1	12.5%
	No sign.	(5)	1	12.5%
	NA	(1,2,4,6,7,8)	6	75%
	Total		8	100%
<b>The study means significant</b>				18.5%

Information :

Sign: Significant

NA: Non-Available

Table 3 shows some of the sociodemographic aspects examined on community participation. Many aspects can be included in this factor, but only four aspects were studied the most in almost all studies: age, gender, education, experience, marital status, and monthly income. All variables are then categorized based on p-value if  $<0.05$  means significant, and  $p > 0.05$  is not significant. After that, the sociodemographic variables were described one by one, namely starting from age, which did not affect the quality of the food handlers in each article; it was found that  $p > 0.05$  was five articles with a percentage of 62.5%, which indicated insignificantly. For p gender more than 0.05, there are four articles with a percentage of 55%, which indicates insignificance, and there is 1 article with a percentage of 12.5%, significant value  $p < 0.05$ . In the educational aspect, there is 1 article which shows the p-value is 0.05. For p experience and p marital status, there are two articles with a percentage of 25%, p-value  $<0.05$ , which indicates a significant result.

Table 3 describes the sociodemographic factors. In terms of age, it does not provide significant results or as much as 0%. On gender significant at 12.5% in articles with code (4) in article Azanaw et al. [24] explained that most food handlers are women 88%. It is significant in the education aspect that 12.5% of code (7) is in the NA article. Alqurashi et al. [21] explained that as many as 48.5% of the handlers knew the importance of cleanliness when preparing food serving, such as washing hands, wearing gloves before preparing food, cleaning knives, cutting boards, and various other equipment. This research is in line with Kurniawan et al. [27], which shows a significant relationship between the level of education and food handlers' actions in handling food. According to Ramadani et al. [28], The basic principle of sanitation needs to be done to protect consumers from harmful microorganisms and infectious diseases. Some of these aspects significantly affect the quality of the food. In the part of the experience, 25% of the code is significant (2,8). In the article, Metadel Adane et al., Explained that the inexperience of food handlers is due to the lack of knowledge possessed by food handlers.

*Title of manuscript is short and clear, implies research results (First Author)*

The article by Suryani et al. [20] said that experience did not affect food quality and safety. In the article, Alam et al. [25] explained that 85% of respondents did not attend training on food safety and meat hygiene, although most slaughterhouses and meat handling center workers (90%) expressed willingness to attend food safety or meat hygiene training. In the article Azanaw et al. [24], training can improve food handlers' overall performance in safe food handling practices. In this study, food handlers who received safety training had a higher chance of good food safety practice because trained food handlers gained good awareness through training; this morning was supported by other similar studies—an essential training program to increase knowledge about food handlers. On the aspect of marital status, it is a significant 25% with code (3.5). In the article Azanaw et al. [24], declaring marital status is another factor related to food safety practices and, according to LI.Auad et al., 2019[22], The survey results showed a significant difference in attitude scores regarding marriage ( $p = 0.029$ ), monthly income ( $p = 0.018$ ), and food safety training ( $p = 0.033$ ). There are no studies in the literature that link marital status or monthly income with higher attitudes. On the aspect of significant monthly income, 12.5% with code (3). In the MK article. Alam et al., 2020[25], worker practice is related to various socio-economic factors such as educational background, status, and enthusiasm of workers (related to their income and social status).

### 3.2. Attitude and Practice Knowledge Factor

Food handlers KAP question patterns are usually divided into several question points, namely personal hygiene, prevention of cross-contamination and sanitation, food handling, and health problems that affect food. The following are some of the article assessment results based on the food handler KAP questionnaire's main points in tabular form.

**Table 4.** The knowledge factor of food handlers on food quality

20 Factor	Category	Code	Research result	
			Freq.	% Articles
<b>personal hygiene</b>	Significant	(2,4,5,6,7,8)	6	75%
	No sign.	(3)	1	12.5%
	NA	(1)	1	12.5%
	Total		8	100%
<b>Cross-contamination prevention and sanitation</b>	Significant	(2,4,5,6,7)	5	62.5%
	No sign.	(3,8)	2	25%
	NA	(1)	1	12.5%
	Total		8	100%
<b>Food handling</b>	Significant	(2,4,5,6,7,8)	6	75%
	No sign.	(3)	1	12.5%
	NA	(1)	1	12.5%
	Total		8	100%
<b>Health problems that affect food</b>	Significant	(5,8)	2	25%
	No sign.	(1)	1	12.5%
	NA	(2,3,4,6,7)	5	62.5%
	Total		8	100%
<b>The study means significant</b>				<b>59.38%</b>

Information :

Sign: Significant

NA: Non-Available

The data from table 4 shows the distribution of aspects of the food handlers' knowledge factor. In this test analysis, what is shown is the most significant value of all existing elements; it is said to be substantial if the P-Value  $< 0.05$ . The studied factors and had the highest considerable amount were personal hygiene and food handling in 75% of the articles. Personal hygiene and food handling are the most significant aspects, followed by contamination prevention and sanitation of goods. The average number of significant research articles on this factor was 59.38% of the items. Significant results were obtained in all studies that discussed this aspect. Research that does not address this aspect is categorized as non-available (NA).

According to Siswati [29], knowledge is everything that is known that is obtained from sensory contact with a particular object. Experience results from seeing, hearing, feeling, and thinking, which is based on humans and of behaving and acting. So it can be said that knowledge about maintaining food quality should be a very influential factor for food handlers to maintain food quality. The results of research Azanaw et al.

[24], NCube et al. [26], and Alam et al. [25], the level of knowledge of food handlers related to the practice of maintaining good food quality. Research from Alqurashi et al. [21], Doraliyana et al. [23], and Lee et al. [6], shows that personal hygiene is the most influential factor in food handlers regarding food quality. Miranti and Adi's research also supports this [30] and Assidiqi et al. [31], which shows a relationship between knowledge and food-handling hygiene [30] [31]. Research Lee et al. [6] demonstrated that food handlers have a good understanding of personal hygiene but not cross-contamination and sanitation because, in Malaysia, food handler training focuses more on personal hygiene than prevention cross-contamination pathogens. However, Siti Makhampang's research shows no relationship between knowledge of health problems in food handlers. Research Auad et al. [22] stated no significant relationship between knowledge, attitudes, and Practice towards food handlers. The research is in line with Indriany's [32] Rahmayani [33] and Amalia et al. [34], i.e., there is no relationship between knowledge and practices of food hygiene and sanitation. This study shows that the knowledge factor holds the highest percentage, namely 59.38%, compared to the attitude and practice factors.

**Table 5.** Attitude factors in food handlers on food quality

Factor	Research result			
	Category	Code	Frequency	% Articles
<b>View of knowledge about proper food handling</b>	Significant	(4,7)	2	40%
	No sign.	-	0	0%
	NA	(1,3,8)	3	60%
	Total		5	100%
<b>View on maintaining personal hygiene</b>	Significant	(4)	1	20%
	No sign.	-	0	0%
	NA	(1,3,7,8)	4	80%
	Total		5	100%
<b>A view of the separation between raw and cooked foods</b>	Significant	-	0	0%
	No sign.	(4)	1	20%
	NA	(1,3,7,8)	4	80%
	Total		5	100%
<b>View of a safe place for food storage</b>	Significant	(4)	1	20%
	No sign.	-	0	0%
	NA	(1,3,7,8)	4	80%
	Total		5	100%
<b>View on tool cleanliness</b>	Significant	-	0	0%
	No sign.	(4)	1	20%
	NA	(1,3,7,8)	4	80%
	Total		5	100%
<b>View of work experience</b>	Significant	(8)	1	20%
	No sign.	(7)	1	20%
	NA	(1,3,4)	3	60%
	Total		5	100%
<b>The study means significant</b>				16.66%

Information :

Sign: Significant

NA: Non-Available

Based on the data from table 5 shows the distribution of the food handlers attitude factor. It seems that most of the aspects give the same value. In this test analysis, what is shown is the most significant value of all existing elements; it is said to be substantial if the P-Value <0.05. The aspect that has been researched and has the highest considerable significance is a proper food handling, which holds the highest percentage, namely 40%; this shows that this aspect is the most significant aspect of other factors. On the part of a view of maintaining personal hygiene, 20%, a picture of a safe place for food storage 20%, and a view of work experience 20%. The idea of the separation between raw food and cooked food 0% and 0% view of appliance cleanliness. The average research article with significant value on the attitude factor based on the assessed aspects is 16.66% of the items.

Based on data from table 5, in 5 articles that discuss aspects for attitude factors in the participation of food handlers on the quality of food produced, the most significant results were obtained in one part, namely the view of knowledge about correct food handling, amounting to 2 articles (40%) with different items. An insight into knowledge about proper food handling is contained in AL research. Doraliyana et al. [23] In food

*Title of manuscript is short and clear, implies research results (First Author)*



handlers' importances to have good food safety experience, food safety knowledge is mostly obtained through food safety training. By attending certified training, participants will find out the benefits of temperature and time control, personal hygiene, safe food handling, and the causes of the spread of foodborne diseases. Other food safety knowledge sources are from printed educational materials and new media, where food safety information can be found at fingertips [23]. About 95.5% of respondents rated that maintaining personal hygiene while working was good. Keeping nails short, covering hair with a hair cap and washing hands effectively are essential habits to prevent cross-contamination. About 94.7% of food handlers agree on the importance of food hygiene training to reduce contamination risk. Abdullah Sani and Siow found that trained food handlers' attitude score was higher than those who had never attended food safety training [35]. However, it has been reported that, although food hygiene training can increase knowledge of food safety, it is not the main factor affecting food handling practice and changing practices [36]. Approximately 89.6% agree that cleaning hands effectively can prevent disease transmission through food. 91.9% of food handlers agree that it is necessary to wash hands before putting on gloves. As many as 97.0% of respondents stated positively; they must wear gloves when touching food to reduce contamination. [37]. About 90.3% agree that it is essential to check the fridge or freezer periodically to make sure it is working correctly. Sani and Siow, stated that 56.9% of respondents also agreed that not monitoring refrigerator and freezer temperatures could harm health [35]. Food safety attitudes have a significant positive relationship with overall food safety knowledge and personal hygiene knowledge. The philosophy of food handlers towards food safety increases with increasing joyful experience and security [23]. Based on other studies, views on proper food handling are also found in the research of Ncube et al. [26] that is, obtained a significant positive correlation observed between food safety knowledge and attitudes. A good understanding of food processing will have a positive effect on food safety attitudes. Positive correlations regarding food handler knowledge, attitudes, and food safety practices are also reported in the literature Mutalib et al.; Sani & Siow; Al-Shabib, Mosilhey, & Husain [4], [35], [38]. In Brazil, de Souza, de Azevedo, & Seabra (2018) also reported a positive correlation between food safety knowledge and self-reported food-handling practices [26]. Overall, the attitude factor's average value was 16.66% lower than the average percentage of knowledge and practice.

**Table 6.** Practice factors in food handlers on food quality

Factor	Research result			
	Category	Code	Frequency	% Articles
<b>Wash hands before contact with food</b>	Significant	(6,7)	2	28.57%
	No sign.	(1,2,3,4)	4	57.14%
	NA	(8)	1	14.29%
	Total		7	100%
<b>Wear a clean mask and uniform while working</b>	NA	(6)	1	14.29%
	Total	(1,2,4)	3	42.86%
		(3,7,8)	3	42.86%
			7	100%
<b>Washing food items or utensils with clean water</b>	Significant	(6,7)	2	28.57%
	No sign.	-	0	0%
	NA	(1,2,3,4,8)	5	71.43%
	Total		7	100%
<b>Wear gloves when in contact with food</b>	Significant	(6,8)	2	28.57%
	No sign.	-	0	0%
	NA	(1,3,4,7,8)	5	71.43%
	Total		7	100%
<b>Store food ingredients in a suitable place</b>	Significant	(6,7)	2	28.57%
	No sign.	(3,4)	2	28.57%
	NA	(1,2,8)	3	42.86%
	Total		7	100%
<b>Not smoking or coughing and sneezing while preparing food</b>	Significant	(7)	1	14.29%
	No sign.	(1)	1	14.29%
	NA	(2,3,4,6,8)	5	71.43%
	Total		7	100%
<b>Food handlers doing the training</b>	Significant	(2,3,4,5,6)	5	71.42%
	No sign	(1)	1	14.29%
	NA	(7)	1	14.29%
	Total		7	100%

**The study means significant**

30.61%

Information :

Sign: Significant

NA: Non-Available

The data from table 6 shows the distribution of aspects of the food handler practice factors. In this test analysis, what is shown is the most significant value of all existing elements; it is said to be substantial if the P-Value <0.05. The widely researched aspect and has the highest considerable importance is the food handlers who have conducted 71.42% of the articles. The food handler doing the training is the most significant aspect among the other elements. Other notable parts, respectively, are washing hands before contact with food, washing food or utensils with clean water, wearing gloves when in contact with food, and storing foodstuffs in an appropriate place, wearing sterile masks and uniforms when working, and not smoking—or coughing and sneezing while preparing food. The average research article was significant on this factor of 30.61% of the items. Significant results were obtained in all studies that discussed this aspect. Research that does not address this aspect is categorized as non-available (NA). Research that does not have a p-value is also categorized as non-available (NA).

Table 6 discusses practical factors in maintaining food quality for food handlers or food managers; the usual practice is maintaining food quality. According to S. Notoatmodjo, health practice is a person's (organism) response to illness and disease stimuli, the health service system, food, and the environment. Health practice includes health prevention practice, which is a response to prevent infection [39]. Food handlers who did the previous training gave significant results in 5 of the seven articles. According to research by Al Shabib et al. [38], training and education can be effective means of increasing knowledge and practices of food safety among food handlers to prevent foodborne diseases. This finding is supported by the research of Azanaw et al. [24]. The number of food handlers who received food safety training in this study was higher than the findings of Bahir Dar (21.8%) and Mekelle (5.4%). Food handlers who receive training will better understand safe food handling practices because they may receive professional advice during the training. Exercise can improve the overall performance of the food handler in safe food handling practices, according to research Alqurashi et al. [21], indicating that 68.1% of all staff have received food safety training and 63.8% of respondents understand HACCP as a system for ensuring safe food by identifying and controlling specific hazards, indicating an emphasis on food safety training in hospitals in Madinah. It is said that exercise universally reduces food-based diseases caused by food handlers in food companies. The study also emphasizes that food safety training can effectively increase food safety knowledge. Washing hands before contact with food and washing food items or tools cleanly gave the same significant results in 2 out of 7 articles (28.57%). According to research by Retno et al. [13], the act of washing hands is the most important basic technique in preventing and controlling the transmission of infection; this is in line with the research of Purwandari et al. that the relationship between handwashing practice and the incidence of infectious diseases shows a significant relationship. [13]. Washing hands is often considered a trivial thing in society, even though washing hands can improve the community's health status. While wearing a mask and clean uniform while working, 1 in 7 articles (14.29%). In Putri et al. 's research, based on statistical tests, the relationship between food handlers' hygiene practices in maintaining personal hygiene and clothing with E. coli bacterial contamination in food was obtained P-value = 0.372 [40]. When in contact with food, wearing gloves gave significant results in 2 out of 7 articles (28.57%); in the study Alqurashi et al. [21], the majority of staff (81%) wear gloves when handling food during preparation [21]. There was a slight difference between respondents who reported that they felt uncomfortable wearing gloves during food preparation, and those who never used gloves (3.7% and 3.1%)—storing food ingredients appropriately when preparing meals gave the same significant results 1 in 7 articles (14.29%). The application of food storage is needed to improve the quality of the food itself, based on the research of Gultom et al. [15] that the storage of foodstuffs on food quality from the results of the correlation test and determination of 63.2% shows a strong relationship between the effect of food storage on food quality with a value of 0.795.

**3.3. Relationship of Knowledge and Attitude with Food Handlers Practice in Maintaining Food Quality****Table 7.** The relationship between knowledge and attitude with food handler practice maintains food quality

Variable	Article Code	p
Knowledge & attitude with Practice	4	0.005 & 0.015
	8	<0.05 & <0.05

*Title of manuscript is short and clear, implies research results (First Author)*

Knowledge with Practice	7	0.001
Attitude with Practice	1	0.031

Based on data from table 7, it shows the relationship between knowledge and practice and the relationship between attitude and practice. Knowledge and attitude variables, when associated with the practice, obtained a significant relationship in 2 articles, namely Doraliyana et al. [23] and Lee et al. [6], which shows that there is a substantial relationship with p-value <0.05. In comparison, the relationship between knowledge and practice obtained a significant relationship in 1 article, namely. NCube et al. [26] show a meaningful relationship with a p-value of 0.001. The relationship between attitude and practice has a significant relationship in 1 article, namely Suryani et al. [20], which shows a substantial relationship with a p-value of 0.031.

Based on Table 7, six articles discuss the relationship between knowledge and attitudes with practice, knowledge with practice, and the relationship between attitudes and practice in food handlers in maintaining food quality. In the research, Doraliyana et al. [23], NCube et al. [26], and Lee et al. [6]. The results show a relationship between knowledge and practice of food handlers in maintaining food quality, implying that the higher the food safety, the better the food safety practice [16]. Abdullah Sani & Siow's research [35] concluded a positive correlation between knowledge and practices of food handlers in maintaining food quality. A study by Suryani et al. [20], Doraliyana et al. [23], and Lee et al. [6] concluded that there is a relationship between the attitudes and practices of food handlers in maintaining food quality and the ways of food handlers in maintaining food hygiene will increase with increasing knowledge of food safety and positive attitudes about food safety [19]. Research conducted by Shabib et al. [38] and Amalia et al. [34] showed a significant positive correlation between the attitudes and practices of food handlers in maintaining food quality.

#### 4. CONCLUSION

In most studies, the three aspects of KAP have a positive relationship/correlation, indicating that knowledge food handlers who receive safety training have a higher chance than those who do not receive training because food handlers are trained and have good food awareness quality.

A good KAP aspect can provide direct output, namely increase the use of safe food handling practices. Therefore, it is necessary to prioritize expanding the knowledge and attitudes of food safety from food handlers, through measures such as providing basic and advanced food safety training programs. This study also provides findings from each article that can be used as a reference for further research. The author hopes that further research can reduce the limitations of this study.

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#### REFERENCES

- [1] Kusumawardhani, A. A. A. Syahati, S. I. Puspaningtyas, A. A. Rusmanto, L. S. A. Kusuma, and S. Septianingrum, "Pengetahuan, Sikap, Dan Tindakan Mencuci Tangan Yang Benar Pada Siswa Kelas 1 Dan 2 Di SDN 2 Karanglo, Klaten Selatan," *J. Kebidanan dan Kesehat. Tradis.*, vol. 2, no. 1, pp. 44–50, 2017, doi: 10.37341/jkkt.v2i1.23.
- [2] Adriyani, R., "Pemanasan Global, dan Kesehatan," pp. 1–340, 2019.
- [3] Fariba, J. J. K. Gholamreza, N. Sahamaz, H. Ehsan, and Y. Masoud, "Knowledge, attitude, and practice among food handlers of semi-industrial catering: A cross-sectional study at one of the governmental organization in Tehran," *J. Environ. Heal. Sci. Eng.*, vol. 16, no. 2, pp. 249–256, 2018, DOI: 10.1007/s40201-018-0312-8.
- [4] Abdul-Mutalib, N. A. M. F. Abdul-Rashid, S. Mustafa, S. Amin-Nordin, R. A. Hamat, and M. Osman, "Knowledge, attitude and practices regarding food hygiene and sanitation of food handlers in Kuala Pilah, Malaysia," *Food Control*, vol. 27, no. 2, pp. 289–293, 2012, DOI: 10.1016/j.foodcont.2012.04.001.
- [5] Nine Elissa Maharan, "Hubungan Hygiene Sanitasi Penjamah Makanan Dengan Angka Kuman Makanan Jajanan Sekitar Sma Negeri 3 Wonogiri," *Ikesma*, vol. 12, no. 2, pp. 132–140, 2016.
- [6] Lee, H. K., H. Abdul Halim, K. L. Thong, and L. C. Chai, "Assessment of food safety knowledge, attitude, self-reported practices, and microbiological hand hygiene of food handlers," *Int. J. Environ. Res. Public Health*, vol. 14, no. 1, 2017, DOI: 10.3390/ijerph14010055.
- [7] Camino Feltes .M. M, A. P. Arisseto-Bragotto, and J. M. Block, "Food quality, foodborne diseases, and food safety in the Brazilian food industry," *Food Qual. Saf.*, vol. 1, no. 1, pp. 13–27, 2017, DOI: 10.1093/fqs/fyx003.
- [8] Craddock, H. A, E. F. Maring, and S. K. Grutzmacher, "Foodborne illness prevention in Debre Berhan, Ethiopia: Preliminary efforts to understand household agricultural practices," *African J. Food, Agric. Nutr. Dev.*, vol. 20, no. 01, pp. 15194–15204, 2020, DOI: 10.18697/ajfand.89.17810.
- [9] Nizame, F. A et al., "Hygiene in restaurants and among street food vendors in Bangladesh," *Am. J. Trop. Med.*

- Hyg.*, vol. 101, no. 3, pp. 566–575, 2019, DOI: 10.4269/ajtmh.18-0896.
- [10] Havelaar, A. D. Grace, and F. Wu, "Foodborne diseases from dairy products in developing countries: Hazards and health implications," 2019, [Online]. Available: <https://cgspace.cgiar.org/handle/10568/101624>.
- [11] Trigunarjo, S. I., "Hygiene Sanitasi dan Perilaku Penjamah Makanan dengan Angka Kuman pada Makanan Jajanan di Lingkungan Sekolah," *J. Kesehatan*, vol. 11, no. 1, pp. 115–124, 2020.
- [12] Santoso, S. O, A. Janeta, and M. Kristanti, "Faktor-Faktor yang Mempengaruhi Pemilihan Makanan pada Remaja di Surabaya," *J. Hosp. dan Manaj. Jasa*, vol. 6, no. 1, pp. 19–32, 2018, [Online]. Available: <http://publication.petra.ac.id/index.php/manajemen-perhotelan/article/view/6399/5818>.
- [13] Purwandari, R. A. Ardiana, D. Program Studi Ilmu Keperawatan Universitas Jember Kampus Bumi Tegal Boto, and J. N. Kalimantan, "HUBUNGAN ANTARA PERILAKU MENCUCI TANGAN DENGAN INSIDEN DIARE PADA ANAK USIA SEKOLAH DI KABUPATEN JEMBER Corelation Between Handwash Behaviour and diarrhea incident in school age children in Jember," *202.52.52.22*, pp. 122–130, 2013, [Online]. Available: <http://ejournal.umm.ac.id/index.php/keperawatan/article/view/2362>.
- [14] Yunus, S. P, Umboh, and O. Pinontoan, "Hubungan Personal Hygiene dan Fasilitas Sanitasi dengan Kontaminasi Escherichia Coli Pada Makanan di Rumah Makan Padang Kota Manado Dan Kota Bitung," *Jikmu*, vol. 5, no. 2, pp. 211–220, 2015, doi: 10.1016/j.biotechadv.2010.08.010.
- [15] Gultom, J. Y, N. M. Ariani, and N. N. Sri Aryanti, "Pengaruh Penyimpanan Bahan Makanan Terhadap Kualitas Bahan Makanan Di Kitchen Hotel The Patra Resort And VillasBali," *J. Kepariwisata dan Hosp. Vol 3 No 1 VOL 3 NO 1 2019*, vol. 3, no. 1, pp. 158–176, 2019.
- [16] Suci Fatmawati, E. H, Ali Rosidi, "Perilaku Higiene Pengolah Makanan Berdasarkan Olahraga Pelajar Jawa Tengah Hygiene Practice of Chef Based Food Hygiene Knowledge in the Operation of Food Processing in Center for Education and Training Sports Student in Central Java," *Pangan dan Gizi*, vol. 04, no. 08, pp. 45–52, 2013.
- [17] Maywati, S. L. Hidayanti, and N. Lina, "Pengetahuan Dan Praktek Hygiene Penjamah Pada Pedagang Makanan Jajanan Di Sekitar Sekolah Dasar Kota Tasikmalaya," *J. Heal. Sci. Gorontalo J. Heal. Sci. Community*, vol. 1, no. 1, pp. 8–16, 2019, doi: 10.35971/gojhes.v1i1.2283.
- [18] Hiskia K. Mantiri, A. J. M. R, Nancy S.H. Malonda, "Hubungan Antara Pengetahuan Sikap Dengan Tindakan Personal Hygiene Pelaku Jajanan Makanan Di Seputaran Pasar Jajan Kota Kotamobagu."
- [19] Shamseer, L. et al., "Preferred reporting items for systematic review and meta-analysis protocols (Prisma-p) 2015: Elaboration and explanation," *BMJ*, vol. 349, no. January, pp. 1–25, 2015, DOI: 10.1136/bmj.g7647.
- [20] Suryani, D, A. H. Sutomo, and A. T. Aman, "Unnes Journal of Public Health," vol. 3, no. 1, pp. 1–10, 2019.
- [21] Alqurashi, N. A, A. Priyadarshini, and A. K. Jaiswal, "Evaluating food safety knowledge and practices among foodservice staff in Al Madinah Hospitals, Saudi Arabia," *Safety*, vol. 5, no. 1, pp. 1–16, 2019, DOI: 10.3390/safety5010009.
- [22] Aua, L. I, V. C. Ginani, E. Stedefeldt, E. Y. Nakano, A. C. S. Nunes, and R. P. Zandonadi, "Food safety knowledge, attitudes, and practices of brazilian food truck food handlers," *Nutrients*, vol. 11, no. 8, 2019, DOI: 10.3390/nu11081784.
- [23] Dora-Liyana, A. L, N. A. Mahyudin, M. R. Ismail-Fitry, A. Ahmad-Zaki, and H. Rasyuddin, "Food Safety and Hygiene Knowledge, Attitude and Practices among Food Handlers at Boarding Schools in the Northern Region of Malaysia," *Int. J. Acad. Res. Bus. Soc. Sci.*, vol. 8, no. 17, pp. 238–266, 2018, DOI: 10.6007/IJARBS/v8-i17/5228.
- [24] Azanaw, J, M. Gebrehiwot, and H. Dagne, "Factors associated with food safety practices among food handlers: Facility-based cross-sectional study," *BMC Res. Notes*, vol. 12, no. 1, pp. 10–15, 2019, DOI: 10.1186/s13104-019-4702-5.
- [25] Alam, M. K, Y. Keiko, and M. M. Hossain, "SOCIAL SCIENCES & HUMANITIES Present Working Conditions in Slaughterhouses and Meat Selling Centres and Food Safety of Workers in Two Districts of," vol. 28, no. 2, pp. 867–881, 2020.
- [26] Ncube, F, A. Kanda, M. Chijokwe, G. Mabaya, and T. Nyamugure, "Food safety knowledge, attitudes, and practices of restaurant food handlers in a lower-middle-income country," *Food Sci. Nutr.*, vol. 8, no. 3, pp. 1677–1687, 2020, DOI: 10.1002/fsn3.1454.
- [27] Kurniawan, P. O, D. Darmiah, and R. Rahmawati, "Faktor-Faktor Yang Berhubungan Dengan Tindakan Penjamah Dalam Penanganan Makanan Pada Rumah Makan Di Kabupaten Banjar," *J. Kesehatan. Lingkung. J. dan Apl. Tek. Kesehat. Lingkung.*, vol. 15, no. 1, p. 599, 2019, doi: 10.31964/jkl.v15i1.82.
- [28] Ramadani, E, F. Nirmala, and A. Mersatika, "Higiene Dan Sanitasi Makanan Jajanan Di Kantin Sekolah Dasar Di Kecamatan Buke Kabupaten Konawe Selatan Tahun 2016," *J. Ilm. Mhs. Kesehat. Masy. Unsyiah*, vol. 2, no. 6, p. 198078, 2017.
- [29] Siswati, V. L., "Hakikat Ilmu Pengetahuan dalam Perspektif Modern dan Islam," *Ta'dibia J. Ilm. Pendidik. Agama Islam*, vol. 7, no. 1, p. 81, 2017, doi: 10.32616/tdb.v7i1.39.
- [30] Miranti, E. A and A. C. Adi, "Hubungan Pengetahuan Dengan Sikap Dan Higiene Perorangan (Personal Hygiene) Penjamah Makanan Pada Penyelenggaraan Makanan Asrama Putri," *Media Gizi Indones.*, vol. 11, no. 2, p. 120, 2018, doi: 10.20473/mgi.v11i2.120-126.
- [31] Assidiq, A. S, M. Darawati, A. Chandradewi, and N. L. Suranadi, "Pengetahuan, Sikap Dan Personal Hygiene Tenaga Penjamah Makanan Di Ruang Pengolahan Makanan," *J. Gizi Prima (Prime Nutr. Journal)*, vol. 4, no. 2, p. 81, 2019, doi: 10.32807/jgp.v4i2.135.
- [32] Indriany, D. P., "Hubungan Pengetahuan Dengan Perilaku Higiene Penjamah Makanan Di Instalasi Gizi Rsud Dr. Soeselo Slawi," *J. Gizi dan Pangan Soedirman*, vol. 2, no. 2, p. 87, 2019, doi:

- 10.20884/1.jgps.2018.2.2.1350.
- [33] Rahmayani, R, "Hubungan pengetahuan, sikap dan tindakan hygiene sanitasi pedagang makanan jajanan di pinggir jalan," *AcTion Aceh Nutr. J.*, vol. 3, no. 2, p. 172, 2018, doi: 10.30867/action.v3i2.84.
- [34] Amalia, I. S, E. Rohaeni, and D. Mariawati, "Hygiene Sanitasi Penjamah Makanan Di Kecamatan Kadugede Kabupaten Kuningan Tahun 2013," *J. ilmu-ilmu Kesehat. Bhakti Husada Kuningan*, vol. 04, no. 02, pp. 52–57, 2015.
- [35] Abdullah Sani, N and O. N. Siow, "Knowledge, attitudes, and practices of food handlers on food safety in food service operations at the Universiti Kebangsaan Malaysia," *Food Control*, vol. 37, no. 1, pp. 210–217, 2014, DOI: 10.1016/j.foodcont.2013.09.036.
- [36] McIntyre, L, L. Vallaster, L. Wilcott, S. B. Henderson, and T. Kosatsky, "Evaluation of food safety knowledge, attitudes and self-reported handwashing practices in FOODSAFE trained and untrained food handlers in British Columbia, Canada," *Food Control*, vol. 30, no. 1, pp. 150–156, 2013, DOI: 10.1016/j.foodcont.2012.06.034.
- [37] Smigic, N, I. Djekic, M. L. Martins, A. Rocha, N. Sidiropoulou, and E. P. Kalogianni, "The level of food safety knowledge in food establishments in three European countries," *Food Control*, vol. 63, pp. 187–194, 2016, DOI: 10.1016/j.foodcont.2015.11.017.
- [38] Al-Shabib, N. A, S. H. Mosilhey, and F. M. Husain, "Cross-sectional study on food safety knowledge, attitude, and practices of male food handlers employed in restaurants of King Saud University, Saudi Arabia," *Food Control*, vol. 59, pp. 212–217, 2016, DOI: 10.1016/j.foodcont.2015.05.002.
- [39] Lestari, A. O. A. W, "Relationship Between Knowledge and Attitude To Hand," *J. Promkes Indones. J. Heal. Promot. Heal. Educ.*, vol. 7, no. 1, pp. 1–11, 2019, DOI: 10.20473/jpk.V7.I1.2019.1.
- [40] Kurniasih, R, N. Nurjazuli, and Y. D, "Hubungan Higiene Dan Sanitasi Makanan Dengan Kontaminasi Bakteri Escherichia Coli Dalam Makanan Di Warung Makan Sekitar Terminal Borobudur, Magelang," *J. Kesehat. Masy.*, vol. 3, no. 1, pp. 549–558, 2015.

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