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# Knowledge and Attitudes of Food Hosters Towards Personal Hygiene and Description of the Existence of *E. Coli* And *Salmonella Sp* In Pesantren

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## ABSTRACT

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Personal hygiene is a health practice carried out when processing food. Lack of implementation of personal hygiene will have an impact on a person's health, such as experiencing food poisoning. The growth of a person's personal hygiene practices can be influenced by knowledge and attitudes. This research explores the knowledge and attitudes of food handlers towards personal hygiene using qualitative and quantitative approaches. A quantitative approach was performed with a cross-sectional design and a qualitative with a descriptive design. Sampling was taken using a total sampling technique, thereby, all food handlers were sampled, resulting in 30 respondents. Data analysis was carried out using the Spearman test. Meanwhile, the sample test was carried out using a compact dry test. The results indicate a relationship between knowledge of personal hygiene with a p-value of .000, along with a relationship between attitude and personal hygiene with a p-value of .000. Further, the compact dry test results signify negative results, suggesting the absence of bacteria in the food. Based on this study, Islamic boarding school needs to pay attention to the knowledge and attitudes of the host by providing cooking training or education regarding sanitary hygiene practices.

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## I. Introduction

Food handlers are closely related to the cooking process, encompassing activities such as purchasing, planning, processing, and distributing food (Anwar, Navianti, & Rusilah, 2020). Food is a vital source of energy for the human body. However, improper handling and preparation can lead to adverse health outcomes, including congenital and foodborne diseases (Naully & Mathilda, 2018). Ingestion of unhealthy foodstuffs has been demonstrated to have a detrimental impact on health, manifesting as a range of symptoms including diarrhea, dizziness, and even death (Ramdhanita et al., 2020). WHO (2020) reported that 600 million people became ill due to food poisoning, leading to 420,000 deaths, and 33 million lost their healthy lives (World Health Organization, 2022). The Food and Drug Administration of Indonesia (2021) reported that 36% of food poisoning incidents result from household processing, therefore food handlers have an important role in food processing (BPOM RI, 2021). In 2022, a food poisoning incident occurred at *Pondok Pesantren* (Islamic Boarding School) Bengkulu, Indonesia, affecting 122 individuals who exhibited symptoms of dizziness and vomiting (Febriyani, Ronitawati, Melani, Sa' pang, & Dewanti, 2022).

One of the essential criteria for ensuring the quality and safety of food is the absence of bacterial contamination, including that caused by *E. coli* and *Salmonella sp* (Sipayung, Rahayu, & Nurjanah, 2023). The presence of *E. coli* and *salmonella* bacteria in food can have serious consequences for human health, with the potential to cause illness and even death. One of the consequences of infection with these bacteria is dizziness, nausea, vomiting, and the potential for typhoid, cancer, and even death (Aliviameita & Puspitasari, 2020). In accordance with the 2011 Minister of Health Regulation, food must contain zero grams of *E. coli* and *salmonella* per serving (Kemenkes RI, 2011). A 2023 study

reported that 45.3% of food poisoning cases in Indonesia were caused by *E. coli* and *Salmonella sp.*, 30.6% by *Campylobacter sp.*, 20% by *L. monocytogenes*, and 15.7% by other pathogens (Sipayung et al., 2023). Therefore, food handlers need to pay attention to food health and hygiene.

The potential for contamination can be attributed to the personal hygiene practices of food handlers. However, food handlers' personal hygiene will not be implemented perfectly if the handlers do not have mature knowledge and attitudes. This is consistent with the findings of Miranti and Adi (2016) who posit that knowledge and attitudes have an important role in the implementation of personal hygiene (Miranti & Adi, 2018). This is also in line with research by Josita Baringbang (2023) which posits that the personal hygiene of food handlers can be influenced by a number of factors, including their knowledge, attitude, level of education, and food safety education (Josita Baringbang, Rini, & Putri, 2023). Thus, food handlers must possess comprehensive knowledge of the cooking process. This includes familiarity with personal hygiene standards as outlined in the standards of Minister of Health Regulation No. 1096 of 2011 concerning food service sanitation hygiene (Kemenkes RI, 2011). On the one hand, food handlers at Islamic boarding schools only rely on food that is both palatable and visually appealing, this aims to ensure that the students can consume this food happily. Based on the aforementioned background, this study explores the knowledge and attitudes of food handlers towards personal hygiene, as well as a description of the presence of *E. coli* and *Salmonella sp* bacteria in Islamic boarding schools.

## II. Method

This research employed a combination of qualitative and quantitative methods. Qualitative methods were employed in the form of cross-sectional and qualitative with descriptive. This research was carried out at Baitul Burhan Islamic Boarding School and Darul Ikhlas Islamic Boarding School, Indonesia, while bacterial testing was carried out at the Karawang Regency Health Laboratory. This research was conducted from March to April. The population in this study were food handlers at Baitul Burhan Karawang Islamic Boarding School and Darul Ikhlas Islamic Boarding School. Meanwhile, the sample was 30 food handlers. The food handlers at the Baitul Burhan Islamic Boarding School included food service employees and students on duty, with a total of 22 food handlers. Meanwhile, the food handlers at the Darul Ikhlas Islamic boarding school were all food service employees, with a total of 8 food handlers.

The inclusion criteria for this study were healthy eaters who were willing to participate in the research. The exclusion criteria were food handlers who were sick and unwilling to participate in the research. The food to be tested for bacteria was food that had been processed by food handlers at lunchtime. Data collection was carried out by direct interviews and direct measurements by researchers. The interviews of food handlers employed a structured questionnaire that included questions regarding gender, age, highest level of education, length of employment, and training in cooking. Meanwhile, direct measurements were carried out by researchers to assess the personal hygiene of the handlers. The personal hygiene of food handlers was evaluated in accordance with the Minister of Health Regulation no. 1096 of 2011 concerning food service sanitation hygiene. From the gender, the participants consisted of men and women, with the age groups of 10-20, 21-30, 31-40, and 41-50. The education of participants was divided into middle school, high school, and bachelor's degrees. The length of the workgroup was divided into <5 years and >5 years. Based on the food handler's cooking training, the group is divided into two categories: those who have never received training and those who have received training. The knowledge of food handlers is divided into two categories: good (76-100%) and poor ( $\leq 75\%$ ) (Silitonga & Nuryeti, 2021). Attitudes were similarly dichotomized, with positive (>50%) and negative (<50%) results (Edwiza, Sovani, & Ratnaningsih, 2020). In contrast, the results of the personal hygiene measurement are dichotomous, with a positive outcome ( $\geq 68$ ) and a negative outcome (<68) (Fadilasani, Sugito, & Purnamasari, 2023).

The research instrument was tested for validity and reliability on food handlers at the Islamic Boarding School Manbaul'Ulum Karawang, Indonesia involving 31 food handlers. The instrument was declared valid if  $r$  count >  $r$  table 0.3440. Therefore, from 32 knowledge questions, 20 question items were declared valid. Meanwhile, for the attitude questionnaire, from 30 items, 15 items were declared valid. Meanwhile, the knowledge reliability test obtained a Cronbach Alpha value of 0.714 and the attitudes questionnaire obtained 0.667. Data analysis was performed using univariate and bivariate analysis with the Spearman table 2x2 test with  $p$ -value <0.005 because the data was not

normally distributed. Subsequently, a test for e.coli and salmonella sp bacteria was carried out using the compact dry test. This research has received ethical approval from the Health Research Ethics Commission, Faculty of Health, Syarif Hidayatullah State Islamic University, Jakarta Un.01/F.10/KP.01.1/KE.SP/05.08.062/2024.

### III. Results and Discussion

#### A. Characteristics of Respondents

A person's personal hygiene practices can be influenced by several factors, such as knowledge, education level, cooking training, age, and length of work. A person's most recent educational experience affects their cognitive abilities, with individuals who have received higher levels of education demonstrating superior sanitation and hygiene practices. Age can influence a person's work level and productivity. A younger workforce tends to be more enthusiastic than those of mature age. However, on the other hand, those who are more mature have longer experience, thereby, they can provide better direction to new workers. Furthermore, cooking training can provide a more comprehensive understanding of implementing personal hygiene than before, which is hoped will result in better implementation.

It is evident that personal food handlers play a pivotal role in maintaining food safety and quality. Based on the results of observations, the majority of food handlers were male, amounting to 21 respondents (70%), and nine food handlers (30%) were female. The age of most food handlers was 10-20 years, totaling 15 respondents (50%). Furthermore, one respondent (3%) had obtained a bachelor's degree, 27 respondents (90%) had completed high school, and two respondents had received a junior high school education (7%). The length of time that the food handlers had been employed was less than five years, by as many as 16 respondents (53%), and the length of time was greater than five years, by as many as 14 respondents (47%). Moreover, the majority of food handlers have never attended cooking training. Specifically, 20 respondents (67%) have never attended training, while 10 respondents (33%) have always attended training, as summarized in Table 1.

Table 1. Characteristics of Respondents

Information	n	%
Gender		
Male	21	70
Female	9	30
Age		
10-20	15	50
21-30	6	20
31-40	0	0
41-50	9	30
Education		
SMP	2	7
SMA	27	90
S-1	1	3
length of working		
<5 tahun	16	53
>5 tahun	14	47
Cooking training		
Never	20	67
Always	10	33

#### B. The Relationship Between Knowledge and Personal Hygiene

Food handlers at Baitul Burhan Islamic Boarding School and Darul Ikhlas Islamic Boarding School exhibited a high level of knowledge and behavior. Among the respondents, 14 (46.7%) demonstrated a strong grasp of the subject matter, while 16 (53.3%) exhibited a weaker understanding. In addition, the personal hygiene of the handlers was found to be satisfactory, with 17 respondents (56.7%) exhibiting positive hygiene practices and 12 respondents (43.3%) exhibiting negative hygiene practices. Furthermore, some food handlers were observed to be wearing personal protective

equipment, including aprons, hair covers, and waterproof shoes. The results of this study indicate a significant relationship between knowledge of personal hygiene among food handlers and a p-value of  $0.000 < 0.005$ . Thus  $H_0$  is accepted and rejected. Additionally, there is a strong positive correlation between knowledge of personal hygiene and the obtained r-value of 0.627, as presented in Table 2.

Table 2. The Relationship Between Knowledge and Personal Hygiene

Knowledge	Personal hygiene				Total		r	p-value
	Positive		Negative		N	%		
	n	%	n	%				
Good	13	43.3	1	3.3	14	46.7	0.627	0.000
Less	5	16.7	11	36.7	16	53.3		
Total	18	60	12	40	30	100		

This research is consistent with research by Edinda Ayu Miranti (2018) which demonstrates a significant relationship between knowledge of personal hygiene with a p-value of 0.08 ( $p < 0.10$ ) (Miranti & Adi, 2018). This research is also aligned with research by S. Aprivia (2021) which describes a relationship between knowledge and personal hygiene with a p-value of  $0.006 < 0.05$ . However, this research differs from the research of Bersih Nilasari (2019) which reported that one-factor influencing knowledge is not related to personal hygiene. This is because food handlers do not implement hygiene practices according to standards that have been found (Nilasari, Setiadi, Subandriani, Larasati, & Rahayuni, 2019).

### C. The Relationship Between Knowledge and Personal Hygiene

A person's excellent knowledge can influence their attitude in their daily life. Those with a higher level of knowledge tend to exhibit more positive attitudes and behaviors in their everyday lives. The majority of food handlers at Baitul Burhan Islamic Boarding School and Darul Ikhlas Islamic Boarding School exhibited positive attitudes, with 17 respondents (56.7%) demonstrating a favorable disposition and 12 respondents (43.3%) displaying a negative one. The results of this study indicate a significant relationship between the attitude and personal hygiene of food handlers, with a p-value of  $0.000 < 0.005$ . Thus,  $H_0$  is accepted, and  $H_1$  is rejected. Additionally, there is a correlation of 0.796, which is included in the very strong category with a positive direction, as summarized in Table 3.

Table 3. The Relationship Between Attitudes and Personal Hygiene

Attitude	Personal hygiene				Total		r	p value
	Positive		Negative		N	%		
	n	%	n	%				
Positive	16	53.3	1	3.3	17	56.7	0.796	0.000
Negative	2	6.7	11	36.7	13	43.3		
Total	18	60	12	40	30	100		

This finding is in line with research by Supri Hartini (2022) which demonstrates that the attitude of food handlers towards personal hygiene is significantly correlated ( $p < 0.05$ ) (Hartini, 2022). This research is also in line with research by Aprilia Ayu (2022) which indicates that attitudes toward personal hygiene have a significant relationship with a p-value of 0.000 (Sajdah, Kurniawan, & Suhelmi, 2022). This research differs from that of A. Saputra (2023) posits that officers' ignorance regarding the need for personal protective equipment (PPE) causes a lack of correlation between attitude and personal hygiene. (Saputra, 2023). The majority of food handlers demonstrate positive attitudes when cooking, such as washing hands before and after processing, refraining from wearing long nails, refraining from coughing or spitting on the spot, refraining from smoking, refraining from wearing jewelry except for plain wedding rings, and refraining from wearing food handler's clothes. Food is kept clean. However, there are also food handlers who still have less than the required limit. A lack of behavioral attitudes is evident in daily life, as food handlers are less exposed to information. Consequently, they are not fully aware of the processing procedures (Fauziah & Suparmi, 2022).

*D. The Relationship Between Knowledge and Personal Hygiene*

The food samples were composed of 5 types of food ingredients, three of which were sourced from the Darul Ikhlas Islamic Boarding School and consisted of rice, chicken curry, and long beans cooked with tempeh. The remaining two food ingredients were procured from the Baitul Burhan Islamic Boarding School and included rice and chicken curry. The food samples were taken from the lunch menu that was prepared by the Islamic boarding school food handlers. Based on the dry compact test results, the e.coli bacteria level was 0 grams per food, with a quality threshold of less than 1.1. Apart from that, the food was declared negative for the presence of Salmonella sp with a threshold of 25/g of food, as shown in Table 4. All food samples met the standards or were free of Salmonella sp. and e. coli bacteria. This examination is in accordance with the Regulation of the Minister of Health of the Republic of Indonesia Number 2 of 2023 concerning the implementation of Government Regulation Number 66 of 2014 concerning Environmental Health.

Table 4. Results of Test for E. coli and Salmonella sp

Sample Code	Salmonella sp		E. Coli		Status
	Results	Quality standards	Results	Quality standards	
Rice	Negative	Negative	0	<1,1	Fulfill
Chicken curry	Negative	Negative	0	<1,1	Fulfill
Long bean tempeh oreg	Negative	Negative	0	<1,1	Fulfill
Rice	Negative	Negative	0	<1,1	Fulfill
Chicken curry	Negative	Negative	0	<1,1	Fulfill

The results of the compact dry test indicated the absence of microorganisms, such as salmonella and E. Coli. One factor that can influence this result is the lack of significant water content in the food samples. Water is a crucial component that affects the appearance, taste, and texture of food. Foods with a high water content are more susceptible to damage, which can facilitate the growth of microorganisms in the food. In contrast, foods with a lower water content may be less prone to contamination (Putri, 2015). Apart from water content, location, and environmental factors greatly influence sanitation hygiene practices to avoid contamination with dust and pollution. The observation results show that the locations of Baitul Burhan Islamic Boarding School and Darul Ikhlas Islamic Boarding School are far from crowds, thus avoiding the smell, dust, and fumes impacts from passing cars. This is consistent with the hypothesis put forth by Permatasari (2021) which posits that the processing of food, from its initial preparation to its subsequent distribution to students, can also result in contamination of the food. This contamination can be attributed to the facilities and location utilized (Permatasari, Handajani, Sulandjari, & Faidah, 2021).

The implementation of personal hygiene is very important in maintaining body health. One of the fundamental food requirements is the absence of microbial contaminants, such as E. coli and Salmonella sp (Kemenkes RI, 2011). Most of the food handlers at Baitul Burhan Islamic Boarding School and Darul Ikhlas Islamic Boarding School demonstrate positive personal hygiene, such as practices, including maintaining a healthy body and avoiding infectious diseases, abstaining from smoking, wearing clean clothes when processing, washing hands before and after processing, and so forth. In addition to these individual practices, the process of preparing and serving food is a crucial factor in obtaining healthy food that is free from microbes. It is imperative that food preparations be stored separately from other foods and properly sealed. To prevent food contamination, a ladle should be used when moving food. This is due to the possibility of cross-contamination by hand, in addition to the necessity of cleaning and washing food utensils with soap in order to ensure that the food is free from food residue (Atomoko, 2017).

**IV. Conclusion**

The personal hygiene of a food handler can be influenced by their knowledge and attitudes. Food handlers with greater knowledge tend to engage in better personal hygiene practices than those with less knowledge. This level of knowledge can influence an individual's everyday life, fostering a positive attitude and the ability to apply personal hygiene practices effectively. Positive personal

hygiene practices can also influence food safety. One method for determining whether a food item is included in the healthy category is to conduct a bacterial test. The food item sampled was found to be included in the good category due to the absence of *Escherichia coli* and *Salmonella* sp.

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