PROCEEDING MICTOPH 4 (1) 2026
MICTOPH: MULAWARMAN INTERNATIONAL CONFERENCE ON TROPICAL PUBLIC HEALTH
https://e-journals2.unmul.ac.id/index.php/mictoph/index

INVESTIGATION MANUSCRIPT OF EXTRAORDINARY EVENTS (KLB) FOOD POISONING AT SMPN 4 KINTAMANI SONGAN B VILLAGE, KINTAMANI DISTRICT, BANGLI REGENCY, BALI.

Nuhfarizki Lintang Prakasa[1]✉, Dr. drh. I Made Subrata, M. Erg.[2], Nyoman Suardani, ST., M. Kes.[3]

[1]Principal Investigator, Program Studi Magister Ilmu Kesehatan Masyarakat Fakultas Kedokteran Universitas Udayana. Email: prakasalintang@gmail.com
[2]Program Studi Magister Ilmu Kesehatan Masyarakat Fakultas Kedokteran Universitas Udayana
[3]Dinas Kesehatan Kabupaten Buleleng

Abstrak

Latar Belakang: Kejadian Luar Biasa (KLB) keracunan makanan merupakan masalah kesehatan masyarakat yang membutuhkan respons cepat. Pada 14 Mei 2025, dilaporkan sejumlah siswa SMPN 4 Kintamani mengalami gejala akut keracunan setelah makan di kantin sekolah. Penelitian ini bertujuan mengidentifikasi sumber penyebab, pola penyebaran, dan faktor lingkungan yang mempengaruhi kejadian.
Metode: Penelitian ini menggunakan desain case-control dengan pendekatan kuantitatif. Subjek terdiri dari 16 siswa sebagai kasus (memiliki gejala keracunan) dan 32 siswa sebagai kontrol (tanpa gejala), dipilih secara purposive. Pengumpulan data dilakukan melalui wawancara menggunakan kuesioner semi-terstruktur, observasi sanitasi lingkungan, dan pemeriksaan laboratorium terhadap sampel air.
Hasil: Gejala muncul 1–26 jam pascakonsumsi makanan, menunjukkan pola point source. Konsumsi ayam sisit berhubungan signifikan dengan kejadian keracunan (OR = 4,488; p = 0,004; CI 95%: 1,544–13,049). Seluruh kasus mengonsumsi ayam sisit. Uji laboratorium menunjukkan air minum mengandung Escherichia coli dan total coliform melebihi ambang batas. Kondisi kantin tidak higienis, dekat tempat sampah, dan banyak lalat mendukung kemungkinan kontaminasi silang.
Simpulan: KLB diduga disebabkan oleh ayam sisit terkontaminasi, dengan faktor pendukung berupa sanitasi lingkungan yang buruk dan kualitas air tidak layak.
Kata Kunci: keracunan makanan, KLB, point source, ayam sisit, sanitasi kantin

Abstract

Background:*An extraordinary event (KLB) of food poisoning is a public health issue that requires a rapid response. On May 14, 2025, several students at SMPN 4 Kintamani reported experiencing acute symptoms of food poisoning after eating in the school cafeteria. This study aims to identify the source, distribution patterns, and environmental factors influencing the incident.*
Method:*This study used a case-control design with a quantitative approach. Subjects consisted of 16 students as cases (having symptoms of poisoning) and 32 students as controls (without symptoms), selected purposively. Data collection was conducted through interviews using a semi-structured questionnaire, environmental sanitation observations, and laboratory examination of water samples. B*
Results:*Symptoms appeared 1–26 hours after food consumption, indicating a point source pattern. Consumption of scalloped chicken was significantly associated with poisoning (OR = 4.488; p = 0.004; 95% CI: 1.544–13.049). All cases involved consumption of scalloped chicken. Laboratory tests showed drinking water containing Escherichia coli and total coliforms exceeding the threshold. The canteen's unhygienic conditions, proximity to a trash can, and abundance of flies support the possibility of cross-contamination.*
Conclusion:*The outbreak is suspected to have been caused by contaminated chickens, with contributing factors including poor environmental sanitation and unsuitable water quality.*
Keywords:*food poisoning, outbreak, point source, chicken skewers, canteen sanitation*

INTRODUCTION

Food poisoning is a common public health problem that can have serious consequences for both individuals and the environment. The main cause of food poisoning is contamination by biological agents such as bacteria (e.g., Salmonella, E. coli, Staphylococcus aureus), viruses, parasites, and chemicals like pesticides or heavy metals. Contamination can occur during food production, storage, processing, and even serving.

Symptoms of food poisoning usually appear within hours of consuming contaminated food and include nausea, vomiting, diarrhea, abdominal pain, and fever. In severe cases, poisoning can lead to dehydration, organ failure, and even death, especially in vulnerable groups such as children and the elderly.

In Indonesia, food poisoning is categorized as an Extraordinary Event (KLB) when there is an epidemiologically significant increase in cases, usually with at least two cases with similar symptoms associated with the same food. A rapid response through epidemiological investigation is crucial to identify the source of contamination and prevent further spread.

On May 24, 2025, there was an increase in patient visits to the emergency room (ER) of the Kintamani V Community Health Center (Puskesmas UPTD) in Bangli Regency, after 15 students from SMPN 4 Kintamani experienced nausea, vomiting, and diarrhea after consuming packed rice from the school cafeteria. All patients were children, with mild to moderate symptoms. The community health center immediately administered medical treatment, collected samples, and coordinated with the Health Office for further investigation.

The purpose of this investigation is to identify the causes and risk factors for food poisoning outbreaks and to provide prevention recommendations to prevent similar incidents from recurring in school environments.

METHOD

Initial Stages

On May 24, 2025, surveillance officers from the Kintamani V Community Health Center (UPTD) reported an increase in food poisoning cases to the Bangli District Health Office. The report stated that several students from Kintamani 4 Junior High School in Songan B Village presented with nausea, vomiting, and diarrhea after consuming rice packets from the school cafeteria.

The investigation team immediately conducted preparations and searched the location. The activity began with a discussion with the local Community Health Center (Puskesmas) and Health Department staff to gather initial information. An interview with the principal of SMPN 4 Kintamani revealed that the food consumed by the students consisted of rice, noodles, red spiced shredded chicken, tofu, and tempeh. The food was prepared at the vendor's home and packaged at the school before being sold as rice packets. The first case arrived at 10:30 a.m. WITA (Central Indonesian Time), followed by other students, bringing the total number of cases to 15 by 12:00 p.m. WITA. All patients were treated at the Community Health Center's emergency room and discharged after treatment.

Search Preparation

a. Tools and materials

The instruments used include questionnaires, investigation forms, and personal protective equipment (PPE).

b. Investigation Team

Consisting of Community Health Center surveillance officers, Health Service officers, and a Masters student in Public Health Sciences from Udayana University, accompanied by school officials.

c. Cross-Sector Coordination

Conducted with Community Health Centers, private clinics, Health Services, and schools to collect information related to the incident.

d. Goal Setting

The target was students of SMPN 4 Kintamani who experienced symptoms and were recorded as seeking treatment at local health facilities.

e. Case Finding

Cases were identified through reports from surveillance officers. The team conducted interviews with school principals and food handlers, as well as environmental surveys at the incident locations. The tracing included questionnaires to identify cases and controls and trace the index case.

KLB Investigation

This study used a quantitative approach with a case-control design to analyze the relationship between consumption of certain foods and food poisoning incidents. Furthermore, descriptive analysis was used to describe the distribution of cases by time, place, and person.

Investigation Area Boundaries

The search was conducted in Songan B Village, Kintamani District, Bangli Regency, the working area of the Kintamani V Health Center UPTD.

Data source

a. Primary Data

Obtained through environmental surveys, interviews with school principals and food handlers, and students completing questionnaires.

b. Secondary Data

Obtained from patient data recorded as receiving treatment at the Kintamani V Health Center on the day of the incident.

Operational Definition

a. Case

Students of SMPN 4 Kintamani who experienced at least two symptoms such as nausea, vomiting, diarrhea, fever, or headache after consuming rice packets from the school canteen on the day of the incident, without a history of other similar illnesses.

b. Control

Students who consumed the same food at the same time and place but did not experience symptoms.

c. Personal Hygiene

The level of students' habits in maintaining personal hygiene before and after eating, especially washing hands with soap.

Analysis

- Descriptive analysis was used to describe the characteristics of cases based on time, place, and person, as well as the distribution of food consumption.
- Bivariate analysis was used to test the association between specific food consumption and case status using the chi-square test. Risk was calculated using the odds ratio (OR) and 95% confidence interval (CI).

This investigation uses the principles of field epidemiology to detect patterns of case distribution and determine the source of poisoning, as well as provide preventive recommendations to prevent similar incidents from recurring.

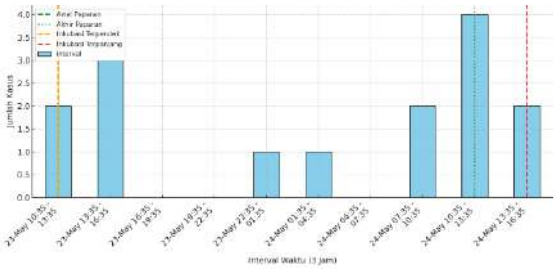
RESULT AND DISCUSSION

Time

A suspected food poisoning outbreak was reported by the Kintamani V Community Health Center (UPTD) on May 24, 2025, with all patients coming from Kintamani 4 Junior High School. On the same day, samples of leftover food, cooking utensils, water, and rectal swabs from handlers were collected. Field investigations were conducted on May 28, 2025, by the surveillance team and researchers.

The students' meals were prepared from 3:00 a.m. WITA (Central Indonesian Time) and served in the school cafeteria starting at 7:00 a.m. WITA. The first symptoms appeared on May 23 at 10:35 a.m. WITA, approximately three hours after initial consumption. All symptom onsets occurred within approximately 28 hours, with most appearing within 12 hours.

Figure 1. Epidemiological Curve Based on Time of Symptom



The epidemiological curve shows a peak in cases on May 24, between 11:30 and 14:30 WITA (Central Indonesian Time). This pattern reflects a point-source outbreak, meaning a single exposure within a short period of time. The shortest recorded incubation period was 3 hours and the longest 26 hours, consistent with the characteristics of bacterial toxins such as Staphylococcus aureus or Bacillus cereus.

Place

The poisoning cases occurred among students at SMPN 4 Kintamani who reside in various hamlets in Songan B Village. The food was prepared at a food handler's home in the same village, using well water, then packaged and sold in the school cafeteria. This process indicates that the food exposure originated from a single serving location and not from the students' homes.

Table 1. Medical Visits in the Case Group

Health facilities	Get medical treatment		Total
	Yes	No	
Clinic	1	0	1
Community Health Center	15	0	15
Total	16	0	16

The majority of patients sought treatment at the Kintamani V Community Health Center (93.8%), with only one attending a private clinic (6.3%). This demonstrates the central role of public health facilities in the initial response to the outbreak and in case reporting.

Person

A total of 107 respondents participated in the investigation, consisting of 105 students and 2 food handlers. The gender distribution was 61.7% female and 38.3% male. Sixteen students were defined as cases (symptomatic), while 64 students were defined as controls (asymptomatic). The remaining students had incomplete symptom data and were not included in the case-control analysis.

Table 2. Table of Respondent Involvement in Food Poisoning Outbreak Cases

Gender	Role		Total
	The handler	Student	
Man	1	40	41
Woman	1	65	66
Total	2	105	107

The most predominant symptoms were nausea and vomiting (100%), followed by headache (75%), diarrhea (43.8%), body aches (37.5%), and shortness of breath (43.8%). This pattern demonstrates the predominance of acute gastrointestinal symptoms typical of food poisoning with rapid toxins.

Table 3. Distribution Table of Case and Control Groups Based on Symptoms

Case/Control Group		Symptom Status	
		No	Yes
Case	No	0	16
	Yes	0	16
Control	Not Control	9	32
	Control	64	0

Table 4. Symptom Distribution Table in Case Group

Symptom		Case	
		No	Yes
Nauseous	No	13	0
	Yes	3	16
Vomit	No	10	0
	Yes	6	16
Diarrhea	No	10	9
	Yes	6	7
Fever	No	13	11
	Yes	3	5
Headache	No	4	4

Symptom		Case	
		No	Yes
Body Aches	Yes	12	12
	No	13	10
Out of breath	Yes	3	6
	No	16	9
	Yes	0	7

Bivariate Analysis

Bivariate tests were conducted on five types of food consumed: rice, shredded chicken, noodles, tofu, and tempeh. All foods showed a significant association with food poisoning. Consuming shredded chicken had the highest and most significant OR, at 4.488 (95% CI: 1.544–13.049; p = 0.004), indicating that consuming shredded chicken increased the risk of developing a case by 4.5 times.

Other foods are also significant, including:

- Noodles: OR 4.029 (95% CI: 1.562–10.384; p = 0.003)
- Tofu: OR 3.273 (95% CI: 1.293–8.283; p = 0.011)
- Tempeh: OR 2.929 (95% CI: 1.163–7.379; p = 0.023)
- Rice: OR 6.545 (95% CI: 0.872–49.140; p = 0.030), although the CI range is wide

All cases (n = 16) consumed chicken skewers, supporting the hypothesis that this ingredient was the primary source of poisoning.

Table 8. Table of Bivariate Test Results Based on Food Type in Case and Control Groups

Food	Consumption Status	Case (n)	Control (n)	OR	p-value	95% CI (Lower – Upper)
Rice	Eat	16	63	6,545	0.030	0.872 – 49.140
	Do not eat	0	1			
Noodles	Eat	11	19	4,029	0.003	1,562 – 10,384
	Do not eat	5	45			
Know	Eat	12	24	3,273	0.011	1,293 – 8,283
	Do not eat	4	40			
Tempeh	Eat	9	21	2,929	0.023	1,163 – 7,379
	Do not eat	7	43			
Chicken Sisit	Eat	16	48	4,488	0.004	1,544 – 13,049
	Do not eat	0	16			

DISCUSSION

The results of the investigation showed that the extraordinary event (KLB) of food poisoning that occurred at SMPN 4 Kintamani was acute and spread rapidly in a short time, with a distribution pattern of cases that showed the typical characteristics of a point source outbreak, namely exposure originating from a single source within a narrow time period (Heymann, 2015). Food exposure occurred on two consecutive days, namely May 23 and 24, 2025 in the morning, and symptoms began to appear within 2–4 hours after consumption of food, with the longest incubation period reaching 26 hours. This pattern is very typical for food poisoning caused by preformed bacterial toxins, such as Staphylococcus aureus or Bacillus cereus emetic type, which are capable of causing symptoms in a short time (WHO, 2018).

Based on the distribution of meal times, 16 students experienced symptoms after consuming food provided in the school cafeteria. Meal times were distributed almost evenly across the two days, but the uniform pattern of consumption times and the relatively short onset of symptoms suggest exposure to food prepared and served within the same time period. Analysis of the time course of symptoms showed that 100% of cases developed symptoms within 28 hours, with the majority appearing within 12 hours. This supports the presence of a single, rapid-acting source of exposure, consistent with previous reports that Staphylococcus aureus enterotoxin can induce vomiting within 2–6 hours of consumption (CDC, 2020).

In terms of symptoms, all cases experienced nausea and vomiting (100%), followed by diarrhea (43.8%), fever (31.3%), headache (75%), body aches (37.5%), and shortness of breath (43.8%). The predominant symptoms in the upper gastrointestinal tract (nausea and vomiting) also strengthen the suspicion of the involvement of enteric toxins, rather than invasive bacterial infections such as Salmonella or Shigella, which generally require a longer incubation period and produce bloody diarrhea or high fever (Jay et al., 2005).

Bivariate analysis of the types of food consumed by the case and control groups showed that chicken skewers were the food with the highest odds ratio (OR) value, namely 4.488 ($p = 0.004$; 95% CI: 1.544 – 13.049). All cases (100%) consumed chicken skewers, while only 75% of the control group did. This indicates that chicken skewer consumption significantly increases the risk of becoming a case. This finding is in line with several reports of similar incidents, where processed chicken (especially served at room temperature for too long) becomes an ideal medium for the growth of Staphylococcus aureus, especially if the reheating process is not sufficient to inactivate the toxin that has been formed (Bryan, 1988).

Besides ayam slit, other foods such as noodles, tofu, and tempeh also showed a significant association with poisoning incidents, with ORs of 4.029 (noodles), 3.273 (tofu), and 2.929 (tempeh), respectively, with p-values all below 0.05. However, not all cases involved consuming noodles, tofu, or tempeh, which makes ayam slit a stronger candidate as the main source of poisoning. Rice consumption also had a high OR (6.545), but with a very wide CI range (0.872 – 49.140) and including the number 1, indicating uncertainty in

estimation and the possibility of a statistically weak association.

In terms of location, all food is prepared by two food handlers living in Songan B Village, who then transport it to the school and package it in the cafeteria. This process increases the potential for cross-contamination, especially if hand hygiene or cooking utensils are inadequate. The water source used comes from a well, which, if it does not meet clean water quality standards, can also contribute to contamination. This situation is consistent with the WHO (2018) report, which states that the combination of prolonged food storage at room temperature, poor water quality, and limited personal hygiene are the main causes of food poisoning incidents in school communities.

Overall, the investigation results indicate a strong association between the consumption of scalloped chicken and food poisoning. A review of time, place, and person revealed a consistent pattern of exposure, timing of symptoms, and homogeneous individual involvement (all junior high school students consuming food from a single source). These results suggest that the most likely cause of these incidents was contaminated scalloped chicken containing bacterial toxins that were not destroyed during the reheating process.

In addition to food, laboratory tests on water samples from two key locations support the suspicion that sanitation factors contributed to the worsening situation. Well water in the canteen of SMP 4 Songan contained 920 MPN/100 mL total coliform and 27 MPN/100 mL E. coli, while water in the food handler's home contained 350 MPN/100 mL coliform and 130 MPN/100 mL E. coli. However, according to Indonesian Minister of Health Regulation No. 02 of 2023, the standard for clean water is 0 CFU/100 mL for both. These findings indicate severe fecal contamination and make the water highly unsuitable for food processing, washing eating utensils, or hand hygiene (WHO, 2011).

Environmental factors also contribute significantly to the increased risk of contamination. Field surveys indicate that the canteen is located directly adjacent to a school waste disposal site and that the fly population in the area is very high. Flies (Musca domestica) are known as mechanical vectors of various pathogenic microorganisms, which can transfer from trash, feces, or other dirty environments to food through direct contact with their feet or mouths (Das et al., 2014). Research shows that food exposed to flies for more than 30 minutes has a high risk of contamination. WHO (2020) also emphasizes that vector control such as flies must be part of the food safety system, especially in school environments that serve large quantities of food to children.

The canteen's substandard hygiene and sanitation, the use of contaminated water, and the abundance of potential vectors such as flies indicate that the risk factors in this incident stem not only from the food itself, but also from the unhygienic environment and poor sanitation. All of these elements form a chain of causal factors that contribute to the occurrence of an extraordinary food poisoning outbreak.

Thus, these results underscore the importance of strict monitoring of food storage, clean water sources, environmental cleanliness, and personal hygiene of food handlers. This investigation also reinforces the importance of implementing HACCP (Hazard Analysis and Critical Control Point) principles at the school or local food

service level to prevent cross-contamination and similar outbreaks in the future (FAO/WHO, 2006).

CONCLUSION

Research Limitations

This study has several limitations that should be considered when interpreting the results. First, whole food samples were not available for laboratory testing because all food had been sold. Although there were food scraps in the trash, these samples were not submitted for microbiological testing, so the investigation relied solely on epidemiological approaches and interviews. Second, the validity of the data from the questionnaires completed by respondents can be affected by errors in filling out or understanding the questions. Because the data were collected several days after the event, there is the potential for recall bias, which could lead to misclassification between case and control groups. This impacts the strength of inferences and the accuracy of the association between exposure and event.

Conclusion

Based on the results of the epidemiological investigation into the food poisoning outbreak at SMPN 4 Kintamani, the following conclusions were obtained:

- The incident showed a point source outbreak pattern, characterized by short-term exposure and symptom onset within ≤6 hours.
- The dominant symptoms are nausea and vomiting (100%), followed by headache, diarrhea, fever, and shortness of breath, according to the characteristics of bacterial toxins such as Staphylococcus aureus or Bacillus cereus.
- The riskiest food was shredded chicken with an OR of 4.488 ($p = 0.004$; 95% CI: 1.544–13.049), followed by noodles, tofu, and tempeh, which were also significant, although not all cases consumed them.
- Sanitation factors also play a role, as indicated by well water contaminated with coliform and E. coli, as well as an unhygienic canteen environment, close to trash cans and with lots of flies.
- The conclusion is based on an epidemiological approach due to the lack of laboratory confirmation from food samples.

Suggestion

- Local governments need to increase supervision of school canteens regarding hygiene, sanitation, and food handler training.
- Schools must ensure the use of clean water meets the Ministry of Health's standards. If well water is used, regular quality monitoring is mandatory.
- Rearranging the location of the canteen so that it is not close to the trash can, as well as controlling vectors such as flies.
- Encourage the implementation of HACCP in school canteens, especially temperature control, food storage, and raw material safety.
- Develop SOPs for outbreak investigations that ensure prompt

sampling and laboratory testing to support epidemiological analysis.

- Conduct regular education to students about clean and healthy living behavior, including the importance of washing hands and avoiding food from unreliable sources.

REFERENCES

Bryan, F.L. (1988). Risks of practices, procedures and processes that lead to outbreaks of foodborne diseases. Journal of Food Protection, 51(8), 663–673.

CDC. (2020). Staphylococcal Food Poisoning. Centers for Disease Control and Prevention. Retrieved fromhttps://www.cdc.gov/foodsafety/diseases/staphylococcal.html

Cheesebrough, M. (2006). District Laboratory Practice in Tropical Countries (Part 1, 2nd ed.). Cambridge University Press.

Das, S., Dey, A., Dutta, A., & Paul, D. (2014). Bacterial contamination by houseflies (Musca domestica L.) in food and food preparation areas of restaurants in India. Journal of Environmental Health, 76(9), 18–22.

FAO/WHO. (2006). Food safety risk analysis: A guide for national food safety authorities. FAO Food and Nutrition Paper 87.

Jay, J. M., Loessner, M. J., & Golden, D. A. (2005). Modern Food Microbiology (7th ed.). Springer.

Regulation of the Minister of Health of the Republic of Indonesia. (2023). Regulation of the Minister of Health Number 02 of 2023 concerning Environmental Health. Jakarta: Ministry of Health of the Republic of Indonesia.

WHO. (2011). Basic Food Safety for Health Workers: A Manual for Training. World Health Organization Western Pacific Region.

WHO. (2018). Estimating the burden of foodborne diseases: A practical handbook for countries. Geneva: WHO Press.

WHO. (2020). Food safety: Key facts. Retrieved fromhttps://www.who.int/news-room/fact-sheets/detail/food-safety