



ORIGINAL ARTICLE

Enhancing Food Poisoning Emergency Response Skills Through Simulation-Based Training Among Special Education Teachers: A Pre-Experimental Study



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ABSTRACT

Background: Food poisoning outbreaks in schools remain an important public health concern because teachers often become the first responders during emergencies. However, competencies related to post-food poisoning management remain limited, particularly in special education settings.

Objectives: To examine the effect of simulation-based post-food poisoning management training on teachers' skills at SLB Negeri 1 Bantul.

Methods: A quantitative pre-experimental study using a one-group pretest–posttest design was conducted among 51 teachers selected through simple random sampling. Participants received structured simulation training focused on post-food poisoning stabilization procedures. Teachers' skills were assessed using an observational checklist before and after the intervention. Data were analyzed using the Wilcoxon Signed Rank Test.

Results: Before training, most participants demonstrated poor (58.8%) and fair (27.5%) skill levels. Following simulation, all participants achieved very good skill levels (100%). Statistical analysis demonstrated significant improvement after the intervention ($Z = -6.224$; $p < 0.001$), with all participants showing positive rank changes.

Conclusions: Simulation-based training effectively improved teachers' post-food poisoning management skills and may strengthen emergency preparedness in school settings through improved early stabilization capacity.



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Introduction

Food poisoning remains a major public health concern worldwide, particularly in institutional settings where food is prepared and distributed on a large scale (Lopes et al., 2025; Viator et al., 2015). Contamination by pathogenic bacteria, viruses, parasites, or toxic chemical substances may trigger acute gastrointestinal disturbances ranging from mild discomfort to life-threatening complications (CDC, 2025; WHO, 2020). In severe cases, delayed management may result in dehydration, electrolyte imbalance, circulatory instability, and systemic complications requiring emergency treatment (Mayo Clinic, 2025; Zieg et al., 2024). Within school environments, the consequences may become more complex because outbreaks often involve large numbers of students simultaneously, increasing both medical burden and organizational disruption (Le et al., 2021; Sahu et al., 2021).

According to the World Health Organization, approximately 600 million people experience foodborne illnesses annually, contributing to nearly 420,000 deaths worldwide (Havelaar et al., 2015; WHO, 2024). Similar trends have also been reported in Indonesia, where outbreaks of food poisoning continue to occur in schools and boarding institutions (BPOM RI, 2025; Butler et al., 2025; Rajagopal & Rajesh, 2025; Saragih et al., 2025). Large-scale food preparation, inconsistent hygiene practices, and limited food safety supervision frequently contribute to these incidents (Rajagopal & Rajesh, 2025; Saragih et al., 2025). More recently, concerns regarding school-based food safety have intensified following the implementation of the government-sponsored Free Nutritious Meal Program (Makan Bergizi Gratis/MBG), which distributes meals to students on a mass scale (BGN RI, 2025; Nurulaini & Afifah, 2025). Although the program is intended to improve nutritional status and child health, several reports have indicated food poisoning incidents associated with weaknesses in food handling and food safety management during implementation (Apriliya Adha et al., 2025; Kulpiisova et al., 2025; Suprpto et al., 2025).

The consequences of food poisoning in schools extend beyond acute physical illness (Havelaar et al., 2015; Omer et al., 2018; WHO,

2024). Students affected by contaminated food may experience fear, anxiety, and reluctance to consume school-provided meals after the incident, potentially disrupting educational activities and reducing public trust toward educational institutions (Abuljadail, 2025; Rizou et al., 2020). In this context, emergency preparedness in schools should not be limited to preventive food safety strategies alone but must also include effective post-exposure management to stabilize affected students before professional medical assistance becomes available (Sawyer et al., 2021).

Teachers are often the first individuals to respond when health emergencies occur at school (Abelairas-Gómez et al., 2020). Their ability to recognize symptoms, provide early stabilization, prevent aspiration, maintain hydration, and monitor students' conditions may influence the severity of complications before referral to healthcare facilities (Donoghue & Kraft, 2018; Seddighi et al., 2020). Previous studies have shown that school-based first-aid training can improve teachers' emergency response skills (Banfai et al., 2017; Schroeder et al., 2023). Nevertheless, most educational interventions have focused primarily on evacuation procedures or general first aid rather than post-food poisoning management (Tse et al., 2023b). This issue becomes particularly important because the post-exposure phase requires rapid practical decision-making and coordinated responses, especially when multiple students are affected simultaneously (Bujang et al., 2023).

Simulation-based learning has increasingly been recognized as an effective strategy for improving practical emergency skills because it combines experiential learning with realistic situational training in a controlled environment (Chernikova et al., 2020). Through simulation, participants can develop psychomotor coordination, procedural confidence, and rapid decision-making abilities without exposing actual victims to risk (Cant & Cooper, 2017; Kim et al., 2016). Several studies in health education have demonstrated that simulation improves emergency preparedness and first-aid competence among both students and teachers (Reveruzzi et al., 2016; Tse et al., 2023a). However, evidence regarding simulation specifically designed for post-food poisoning management in school settings remains limited (Parada-Espinosa et al., 2025;

Reveruzzi et al., 2016; Tse et al., 2023b). Existing studies rarely address stabilization procedures after food poisoning incidents, despite the growing risk associated with mass meal programs in educational institutions (Li et al., 2023).

Emergency preparedness may become even more critical in special education schools because students can have varying levels of communication ability, dependency, and self-protective responses during acute health incidents (Ronoh et al., 2017). Preliminary observations conducted at SLB Negeri 1 Bantul revealed that most teachers had never received formal training related to post-food poisoning management and were unfamiliar with initial stabilization procedures for affected students. This condition becomes increasingly relevant because the school has implemented the MBG program, potentially increasing the risk of foodborne outbreaks involving multiple students. Unlike previous school-based emergency simulations that mainly focused on evacuation or general first aid, this study specifically examined post-food poisoning stabilization management in a special education school setting, an area that remains underexplored in school emergency preparedness research. Therefore, this study investigated the effect of post-food poisoning management simulation on teachers' skills at SLB Negeri 1 Bantul.

Methods

A quantitative pre-experimental study with a one-group pretest-posttest design was conducted to evaluate changes in teachers' skills following simulation-based training on post-food poisoning management. This design was selected to assess within-group changes in practical emergency response skills before and after exposure to the intervention in a school setting.

The study was conducted at SLB Negeri 1 Bantul, Yogyakarta, Indonesia, during the 2025/2026 academic year. The study population comprised all active teachers employed at the institution ($N = 84$). Participants were selected using simple random sampling to ensure equal opportunity for recruitment among eligible teachers. Sample size estimation using the Slovin formula with a 10% margin of error yielded a minimum requirement of 46 participants. To

account for potential attrition, an additional 10% was added, resulting in a final sample target of 51 teachers.

Eligible participants were active teachers employed during the study period, willing to participate, and able to complete all study procedures, including pretest assessment, simulation sessions, and posttest evaluation. Teachers who were absent during core study activities, on leave, experiencing illness during data collection, or unwilling to participate were excluded.

The intervention consisted of simulation-based training focused on post-food poisoning management in school settings. Simulation scenarios were developed using a standardized operating procedure (SOP) emphasizing early stabilization following food poisoning incidents. Participants practiced sequential emergency responses including symptom recognition, consciousness assessment, airway management, positioning techniques, oral hydration support, and referral procedures. Simulations were facilitated by researchers and trained assistants using standardized scenarios to maintain procedural consistency.

Teachers' skills were measured using an observational checklist developed from the simulation SOP. The instrument assessed participants' ability to perform critical stabilization procedures correctly during simulated scenarios. Each item was scored dichotomously (performed/not performed), and total scores were converted into percentages and categorized as very poor (0–54%), poor (55–65%), fair (66–75%), good (76–85%), and very good (86–100%). Content validity was established through expert review to evaluate item relevance, clarity, and procedural appropriateness. Internal consistency reliability testing was performed using Cronbach's alpha, with coefficients ≥ 0.70 considered acceptable.

Data collection was conducted in three sequential phases. Baseline skill assessments were first performed using direct observation during simulated emergency scenarios. Participants subsequently received simulation-based training delivered under standardized conditions. Immediately after intervention completion, participants underwent reassessment using the same observational

instrument. Trained research assistants supported the assessment process to improve scoring consistency and reduce observer variability.

Descriptive statistics were used to summarize participant characteristics and skill distributions using frequencies and percentages. Because skill scores were ordinal and paired observations were obtained from the same participants, pre-post differences were analyzed using the Wilcoxon Signed Rank Test. Statistical significance was established at $p < 0.05$.

Ethical approval was obtained from the Ethics Committee of Universitas 'Aisyiyah Yogyakarta (No. 5261/KEP-UNISA/II/2026). Written informed consent was obtained from all participants before enrollment. Participation was voluntary, and anonymity and confidentiality were maintained throughout the study process.

Results

A total of 51 teachers participated in this study. Most participants were categorized as late adulthood (36–45 years) (47.1%), followed by early elderly (46–55 years) (33.3%) and early adulthood (26–35 years) (19.6%). Female participants predominated the sample, accounting for 68.6% of respondents, while males represented 31.4%. These findings indicate that the study population was primarily composed of experienced and productive-age teachers.

Table 1. Characteristics of Participants

Characteristics	n	%
Age Category		
Early adulthood	10	19.6
Late adulthood	24	47.1
Early elderly	17	33.3
Late elderly	0	0
Gender		
Male	16	31.4
Female	35	68.6

Teachers' Skills Before and After Simulation-Based Training

Before the intervention, most teachers demonstrated low levels of post-food poisoning management skills. More than half of participants were categorized as having poor skills (58.8%), followed by fair skills (27.5%) and very poor skills (11.8%). Only one participant (2.0%) achieved a good skill

category, and none were categorized as very good. These findings suggest limited baseline preparedness among teachers in responding to post-food poisoning emergencies.

Following simulation-based training, all participants (100%) achieved a very good skill level, indicating substantial improvement in practical emergency response skills after exposure to the intervention.

Table 2. Distribution of Teachers' Skill Levels Before and After Intervention

Skill Level	Pretest		Posttest	
	n	%	n	%
Very Poor	6	11.8	0	0
Poor	30	58.8	0	0
Fair	14	27.5	0	0
Good	1	2.0	0	0
Very Good	0	0	51	100
Total	51	100	51	100

A substantial shift in skill distribution was observed following simulation-based training. Before the intervention, most teachers demonstrated poor levels of post-food poisoning management skills, whereas post-intervention assessment showed that all participants reached the very good category, indicating marked improvement in practical emergency response competence.

Effect of Simulation-Based Training on Teachers' Skills

To examine changes in teachers' post-food poisoning management skills following simulation-based training, pretest and posttest scores were compared using the Wilcoxon Signed Rank Test. Descriptive findings showed a marked increase in mean skill scores after the intervention, suggesting substantial improvement in practical emergency response performance among participants.

The mean skill score increased from 62.12 ± 6.26 at baseline to 96.98 ± 2.96 after simulation training, indicating substantial improvement in teachers' post-food poisoning management skills. Wilcoxon analysis demonstrated a statistically significant difference between pretest and posttest scores ($Z = -6.224$, $p < 0.001$). All participants showed score improvement after intervention, with no negative ranks or tied scores observed, indicating a consistent positive effect across the study population.

Table 3. Comparison of Teachers' Skill Scores Before and After Simulation-Based Training

Variable	n	Mean $\pm$ SD	Min-Max	Z-value	p-value
Pretest	51	62.12 $\pm$ 6.26	50–76	-6.224	<0.001*
Posttest	51	96.98 $\pm$ 2.96	89–100		

*Wilcoxon Signed Rank Test

Discussion

Participant Characteristics and Contextual Interpretation

Participants were predominantly within productive working age groups and largely consisted of female teachers, reflecting the demographic profile commonly observed within educational institutions. Participant characteristics appeared less influential than the educational intervention itself because simulation-based learning primarily relies on experiential engagement and repeated practice rather than demographic factors alone. Previous evidence suggests that simulation creates equivalent learning opportunities across heterogeneous learner groups by emphasizing active participation and contextual learning experiences (Chernikova et al., 2020; Cant & Cooper, 2017).

The predominance of female teachers in this study also aligns with reports showing that women frequently represent the larger workforce proportion within educational settings. More importantly, both male and female participants demonstrated comparable participation during training sessions, suggesting that skill acquisition was more likely associated with the intervention rather than sex-related differences.

Pre-Intervention Skill Level in Post-Food Poisoning Management

Baseline findings demonstrated limited teacher preparedness regarding post-food poisoning management, with most participants categorized within poor skill levels before simulation exposure. These findings indicate insufficient emergency preparedness capacity within school settings, particularly for health incidents requiring rapid stabilization.

One possible explanation is the limited availability of structured emergency preparedness programs specifically targeting food poisoning management. Previous studies indicate that school-based emergency education frequently emphasizes preventive strategies or general first aid rather than post-

exposure stabilization procedures (Reveruzzi et al., 2016; Tse et al., 2023b). Consequently, teachers may possess conceptual understanding while lacking procedural competence.

This finding becomes particularly important considering that foodborne outbreaks frequently occur within educational institutions where large groups of students consume food simultaneously. Outbreak investigations from school settings have repeatedly shown that delayed recognition and inadequate early responses may increase outbreak severity and disrupt educational activities (Bujang et al., 2023; Li et al., 2023). In special education settings, preparedness gaps may become even more consequential because students can have varying communication abilities and dependency levels during acute health events (Ronoh et al., 2017).

Post-Intervention Improvement Following Simulation-Based Training

Teacher skills improved substantially following simulation exposure, with all participants reaching the highest performance category during post-intervention assessment. These results support evidence indicating that simulation-based learning effectively translates theoretical concepts into practical competencies through repetitive and contextual practice.

Simulation allows participants to rehearse procedures within psychologically safe environments while receiving immediate corrective feedback, thereby strengthening procedural memory and decision-making abilities. Meta-analytic evidence consistently demonstrates that simulation-based education improves psychomotor performance, learner confidence, and emergency management capabilities across multiple educational settings (Chernikova et al., 2020; Kim et al., 2016).

Another explanation for the strong improvement observed may relate to the instructional structure used during implementation. Participants received demonstrations, guided practice, repeated

procedural exposure, and direct supervision. Educational research suggests that active participation combined with structured feedback substantially improves skill acquisition compared with passive instructional approaches alone (Cant & Cooper, 2017).

Within special education environments, these improvements may have additional relevance because emergency responses frequently require rapid coordination and individualized assistance. Teachers therefore function not only as educators but also as immediate responders capable of initiating stabilization procedures while awaiting professional care.

Effect of Simulation-Based Training on Teachers' Skills

The Wilcoxon analysis demonstrated statistically significant improvement after simulation implementation ($p < 0.001$), indicating consistent skill enhancement across participants. All respondents demonstrated positive rank changes without deterioration in performance, suggesting a robust intervention effect.

Several mechanisms may explain these findings. Simulation facilitates experiential learning by integrating cognitive understanding with procedural execution, allowing participants to repeatedly practice decision-making under realistic conditions. This repeated exposure likely strengthens procedural confidence and reduces hesitation during emergencies (Elendu et al., 2024).

The findings are also consistent with previous evidence showing that simulation improves emergency preparedness within educational settings. Simulation-based interventions have demonstrated positive effects on first aid competence, trauma management readiness, and emergency response confidence among school personnel (Parada-Espinosa et al., 2025; Tse et al., 2023a).

The relevance of this intervention becomes increasingly important considering the expansion of large-scale meal programs within schools. Mass meal distribution systems inherently increase food safety risks when preparation, storage, and distribution processes are not adequately monitored (WHO,

2024; BPOM RI, 2025). Several recent reports have highlighted foodborne incidents associated with school meal implementation, emphasizing the importance of preparedness beyond prevention strategies alone (Rajagopal & Rajesh, 2025).

Implication and limitation

This study suggests that simulation-based training may improve teachers' practical skills in post-food poisoning management, supporting school preparedness for health emergencies, particularly in special education settings. The findings indicate that structured simulation can serve as a feasible strategy to strengthen early stabilization capacity before professional medical assistance becomes available. However, several limitations should be acknowledged, including the use of a one-group pretest-posttest design without a control group, implementation in a single institution, and short-term outcome measurement, which may limit causal interpretation and generalizability. Additionally, long-term retention of acquired skills was not evaluated.

Relevance for Practice

The findings indicate that simulation-based training may serve as a practical strategy to strengthen teachers' preparedness in responding to food poisoning emergencies within school settings. Improving early stabilization competencies among teachers could facilitate faster emergency responses, reduce delays before referral to healthcare services, and enhance student safety during acute health incidents. In schools implementing large-scale meal programs, integrating structured simulation training into school health initiatives may contribute to safer learning environments and support the development of more responsive school emergency preparedness systems.

Conclusion

Simulation-based training significantly improved teachers' skills in post-food poisoning management among teachers at SLB Negeri 1 Bantul. Following the intervention, participants demonstrated substantial improvements in performing early stabilization procedures, indicating that experiential

learning approaches may effectively strengthen emergency preparedness within school settings. These findings suggest that simulation offers a practical and structured strategy for enhancing teachers' readiness to respond to acute health incidents, particularly in special education environments where students may require additional support during emergencies. Integrating simulation-based preparedness programs into school health initiatives may contribute to safer educational environments and strengthen early emergency response capacity before professional medical assistance becomes available.

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Author Contribution

Deri Raihan Aljabar contributed to conceptualization, methodology development, data collection, data analysis, manuscript drafting, and preparation of the original manuscript. Gatot Suparmanto contributed to study supervision, methodology refinement, data interpretation, and critical review of the manuscript. Aisyah Nur Azizah contributed to study design, supervision, manuscript review, and final editing. All authors read and approved the final version of the manuscript and agreed to be accountable for all aspects of the work.

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Declaration of Conflicting Interest

The authors declare no conflict of interest.

Declaration of Use of AI in Scientific Writing

The authors declare that generative AI and AI-assisted technologies were used to support language editing and grammatical refinement of the manuscript.

References

- Abelairas-Gómez, C., Carballo-Fazanes, A., Martínez-Isasi, S., López-García, S., Rico-Díaz, J., & Rodríguez-Núñez, A. (2020). Knowledge and attitudes on first aid and basic life support of pre- and elementary school teachers and parents. *Anales de Pediatría (English Edition)*, 92(5), 268–276. <https://doi.org/https://doi.org/10.1016/j.anpede.2019.10.005>
- Abuljadail, M. H. (2025). The Role of Social Media in Shaping Knowledge, Attitudes, and Purchase Intention Toward Genetically Modified Foods in Saudi Arabia. *Sustainability*, 17(24). <https://doi.org/10.3390/su172411279>
- Apriliya Adha, Zakianis, Z., Laila Fitria, Haryoto Kusnopranto, Halik Hadi, & Surya Kusuma Purba. (2025). Food Safety Training and Food Safety Practices Among Street Vendors at Public Elementary Schools. *Media Publikasi Promosi Kesehatan Indonesia (MPPKI)*, 8(2), 131–140. <https://doi.org/10.56338/mpkki.v8i2.6937>
- Banfai, B., Pek, E., Pandur, A., Csonka, H., & Betlehem, J. (2017). "The year of first aid": effectiveness of a 3-day first aid programme for 7-14-year-old primary school children. *Emergency Medicine Journal : EMJ*, 34(8), 526–532. <https://doi.org/10.1136/emered-2016-206284>
- BGN RI. (2025). *Pedoman Umum Sistem dan Tata Kelola badan Gizi Nasional Untuk Program Makan Bergizi Gratis*. <https://www.bgn.go.id/>.
- BPOM RI. (2025). *Keamanan Pangan sebagai Kunci Keberlanjutan Program Makan Bergizi Gratis*. <https://intelijen.pom.go.id/>. <https://intelijen.pom.go.id/hot-issue/keamanan-pangan-sebagai-kunci-keberlanjutan-program-makan-bergizi-gratis>
- Bujang, N. N. A., Wahil, M. S. A., Abas, S. A., Amin, K. H. A. K., Zulkifli, N. I., Shah, S. M., Aziz, N. F., Kamarudin, S. A. A., Ganesan, V., Zainuddin, N. A., Hasani, M. H. M., Ali, N. K. M., & Yusof, M. P. (2023). Outbreak of foodborne disease in a boarding school, Negeri Sembilan state, Malaysia, 2021. *Western Pacific Surveillance and Response Journal : WPSAR*, 14(3), 1–7. <https://doi.org/10.5365/wpsar.2023.14.3.1043>
- Butler, G., Irham, M., & Saputra, Y. (2025, September 25). Over 1,000 children fall ill from free school lunches in Indonesia. *BBC*. <https://www.bbc.com/news/articles/cvg91y15l7qo>
- Cant, R. P., & Cooper, S. J. (2017). Use of simulation-based learning in undergraduate nurse education: An umbrella systematic review. *Nurse Education Today*, 49, 63–71. <https://doi.org/10.1016/j.nedt.2016.11.015>
- CDC. (2025). *Foodborne Illness Source Estimates*. <https://www.cdc.gov/>. <https://www.cdc.gov/food-safety/php/data-research/foodborne-illness-sources/index.html>
- Chernikova, O., Heitzmann, N., Stadler, M., Holzberger, D., Seidel, T., & Fischer, F. (2020). Simulation-Based Learning in Higher Education: A Meta-Analysis. *Review of Educational Research*, 90(4), 499–541. <https://doi.org/10.3102/0034654320933544>
- Donoghue, E. A., & Kraft, C. A. (2018). *Managing Chronic Health Needs in Child Care and Schools* (E. A. Donoghue & C. A. Kraft (eds.); 2nd ed.). American Academy of Pediatrics. <https://doi.org/10.1542/9781610021760>
- Havelaar, A. H., Kirk, M. D., Torgerson, P. R., Gibb, H. J., Hald, T., Lake, R. J., Praet, N., Bellinger, D. C., de Silva, N. R., Gargouri, N., Speybroeck, N., Cawthorne, A., Mathers, C., Stein, C., Angulo, F. J., & Devleeschauwer, B. (2015). World Health Organization Global Estimates and Regional Comparisons of the Burden of Foodborne Disease in 2010. *PLOS Medicine*, 12(12), e1001923. <https://doi.org/10.1371/journal.pmed.1001923>
- Kim, J., Park, J.-H., & Shin, S. (2016). Effectiveness of simulation-based nursing education depending on fidelity: a meta-analysis. *BMC Medical Education*, 16, 152. <https://doi.org/10.1186/s12909-016->

- 0672-7
- Kulpiisova, A., Dikhanbayeva, F., Tegza, A., Tegza, I., Abzhanova, S., Moldakhmetova, Z., Uazhanova, R., Alikhanov, K., Yerzhigitov, Y., Shambulova, G., Baikadamova, G., Admanova, G., Azimova, S., & Issimov, A. (2025). Assessment of food safety awareness and hygiene practices among food handlers in Almaty, Kazakhstan. *BMC Public Health*, 25(1), 2871. <https://doi.org/10.1186/s12889-025-24124-x>
- Le, H. H. T., Dalsgaard, A., Andersen, P. S., Nguyen, H. M., Ta, Y. T., & Nguyen, T. T. (2021). Large-Scale *Staphylococcus aureus* Foodborne Disease Poisoning Outbreak among Primary School Children. *Microbiology Research*, 12(1), 43–52. <https://doi.org/10.3390/microbiolres12010005>
- Li, T., Zou, Q., Chen, C., Li, Q., Luo, S., Li, Z., Yang, C., Yang, D., Huang, Z., Zhang, H., Tang, W., & Qi, L. (2023). A foodborne outbreak linked to *Bacillus cereus* at two middle schools in a rural area of Chongqing, China, 2021. *PLoS One*, 18(10), e0293114. <https://doi.org/10.1371/journal.pone.0293114>
- Lopes, J. K., Hossain, S. M., & Raszl, S. M. (2025). Science in action for safer food: World Food Safety Day 2025. In *Western Pacific surveillance and response journal: WPSAR* (Vol. 16, Issue 2, pp. 1–2). <https://doi.org/10.5365/wpsar.2025.16.2.1249>
- Mayo Clinic. (2025). *Food poisoning (foodborne illness)*. <https://www.mayoclinic.org/diseases-conditions/food-poisoning/symptoms-causes/syc-20356230>
- Nurulaini, R., & Afifah, D. F. (2025). Implementasi Program MBG Untuk Meningkatkan Gizi Anak Sekolah Dasar di Kota Semarang 2025. *Jurnal Sosial Teknologi*, 5(11), 4249–4259. <https://doi.org/10.59188/jurnalsostech.v5i11.32520>
- Omer, M. K., Álvarez-Ordoñez, A., Prieto, M., Skjerve, E., Asehun, T., & Alvseike, O. A. (2018). A Systematic Review of Bacterial Foodborne Outbreaks Related to Red Meat and Meat Products. *Foodborne Pathogens and Disease*, 15(10), 598–611. <https://doi.org/10.1089/fpd.2017.2393>
- Parada-Espinosa, J. M., Ortega-Gómez, S., Ruiz-Muñoz, M., & González-Silva, J. (2025). Teaching Methodologies for First Aid in Physical Education in Secondary Schools: A Systematic Review. *Healthcare (Basel, Switzerland)*, 13(10). <https://doi.org/10.3390/healthcare13101112>
- Rajagopal, R., & Rajesh, K. (2025). Assessing Food Safety Challenges in Indonesia's Free Nutrition Meal Program: Causes and Solutions to Foodborne Illnesses. *Escalate : Economics and Business Journal*, 3(02), 106–113. <https://doi.org/10.61536/escalate.v3i02.306>
- Reveruzzi, B., Buckley, L., & Sheehan, M. (2016). School-Based First Aid Training Programs: A Systematic Review. *The Journal of School Health*, 86(4), 266–272. <https://doi.org/10.1111/josh.12373>
- Rizou, M., Galanakis, I. M., Aldawoud, T. M. S., & Galanakis, C. M. (2020). Safety of foods, food supply chain and environment within the COVID-19 pandemic. *Trends in Food Science & Technology*, 102, 293–299. <https://doi.org/10.1016/j.tifs.2020.06.008>
- Ronoh, S., Gaillard, J. C., & Marlowe, J. (2017). Children with disabilities in disability-inclusive disaster risk reduction: Focussing on school settings. *Policy Futures in Education*, 15(3), 380–388. <https://doi.org/10.1177/1478210317694500>
- Sahu, R., Ray, A. L., Yadav, A. K., Kunte, R., & Faujdar, D. S. (2021). Acute gastroenteritis outbreak in a school associated with religious ceremony in Mirzapur District, Uttar Pradesh, India. *Indian Journal of Public Health*, 65(Supplement), S18–S22. https://doi.org/10.4103/ijph.IJPH_1045_20
- Saragih, R., Dasman, H., Indrapriyatna, A. S., Yani, F. F., Lipoeto, N. I., Yetti, H., Ilmiawati, C., & Harun, H. (2025). Behavior of Catering Owners towards Foodborne Disease Outbreaks in Indonesia: A Cross-Sectional Study. *The Open Public Health Journal*, 18(1). <https://doi.org/10.2174/0118749445380991250902114032>
- Sawyer, S. M., Raniti, M., & Aston, R. (2021). Making every school a health-promoting school. *The Lancet. Child & Adolescent Health*, 5(8), 539–540. [https://doi.org/10.1016/S2352-4642\(21\)00190-5](https://doi.org/10.1016/S2352-4642(21)00190-5)
- Schroeder, D. C., Semeraro, F., Greif, R., Bray, J., Morley, P., Parr, M., Kondo Nakagawa, N., Iwami, T., Finke, S.-R., Malta Hansen, C., Lockey, A., Del Rios, M., Bhanji, F., Sasson, C., Schexnayder, S. M., Scquizzato, T., Wetsch, W. A., & Böttiger, B. W. (2023). KIDS SAVE LIVES: Basic Life Support Education for Schoolchildren: A Narrative Review and Scientific Statement From the International Liaison Committee on Resuscitation. *Resuscitation*, 188, 109772. <https://doi.org/https://doi.org/10.1016/j.resuscitation.2023.109772>
- Seddighi, H., Sajjadi, H., Yousefzadeh, S., López López, M., Vameghi, M., Rafiey, H., Khankeh, H. R., & Garzon Fonseca, M. (2020). Students' preparedness for disasters in schools: a systematic review protocol. *BMJ Paediatrics Open*, 4(1), e000913. <https://doi.org/10.1136/bmjpo-2020-000913>
- Suprpto, F. A., Praditya, E., Dewi, R. M., & Adiyoso, W. (2025). A Policy Implementation Review of the Free Nutritious Meal (MBG) Program. *The Journal of Indonesia Sustainable Development Planning*, 6(2 SE-Policy Paper), 297–312. <https://doi.org/10.46456/jisdep.v6i2.798>
- Tse, E., Plakitsi, K., Voulgaris, S., & Alexiou, G. A. (2023a). Schoolteachers Teach First Aid and Trauma Management to Young Primary School Children: An Experimental Study with Educational Intervention. *Children (Basel, Switzerland)*, 10(6). <https://doi.org/10.3390/children10061076>
- Tse, E., Plakitsi, K., Voulgaris, S., & Alexiou, G. A. (2023b). The Role of a First Aid Training Program for Young Children: A Systematic Review. *Children (Basel, Switzerland)*, 10(3). <https://doi.org/10.3390/children10030431>
- Viator, C., Blitstein, J., Brophy, J. E., & Fraser, A. (2015). Preventing and Controlling Foodborne Disease in Commercial and Institutional Food Service Settings: A Systematic Review of Published Intervention Studies. *Journal of Food Protection*, 78(2), 446–456. <https://doi.org/https://doi.org/10.4315/0362-028X.JFP-14-266>
- WHO. (2020). *Framework for Action on Food Safety in the WHO South-East Asia Region*. World Health

- Organization, Regional Office for South-East Asia.
<https://www.who.int/southeastasia/health-topics/food-safety>
- WHO. (2021). *Making every school a health-promoting school Global standards and indicators*. World Health Organization and the United Nations Educational, Scientific and Cultural Organization.
<https://iris.who.int/server/api/core/bitstreams/936bedca-bd90-4bfb-846f-c0e97d8a158a/content>
- WHO. (2024). *Food safety*. <https://www.who.int/news-room/fact-sheets/detail/food-safety>
- Zieg, J., Ghose, S., & Raina, R. (2024). Electrolyte disorders related emergencies in children. *BMC Nephrology*, 25(1), 282. <https://doi.org/10.1186/s12882-024-03725-5>