Sociality
Journal of Public Health Service
p-ISSN 2962-3472 | e-ISSN 2962-181X

Volume 4, Issue 2, March-August 2025
Page 83-88

Educational intervention on food coloring awareness among elementary students: A study in Makassar, Indonesia

Sulasmi Sulasmi[1], Mulyadi Mulyadi[2], Rostina Rostina[3], Iwan Suryadi[4], Tsarwa Vania[5]

[1, 2, 3, 4, 5] Department of Environmental Health, Poltekkes Kemenkes Makassar, Makassar, Indonesia

Disclosure: The author(s) declare no potential conflict of interest with respect to the research, authorship, or publication

ABSTRACT

The prevalence of unsafe food coloring in snacks consumed by elementary school children remains a public health concern, particularly in urban and rural school environments. Despite ongoing efforts, studies have inadequately addressed the role of educational interventions in improving children's awareness regarding the consumption of harmful food additives. This study aimed to evaluate the effectiveness of an educational program in enhancing knowledge about food coloring among elementary students. A community-based educational intervention was conducted at Elementary School of Inpres Cilallang, Makassar, targeting fifth-grade students. The method employed was direct health education using pre-test and post-test assessments to measure knowledge improvement. Findings revealed a significant increase in students' understanding of harmful food colorants in street food and the ability to identify healthier snack options post-intervention. The program demonstrates the feasibility and impact of simple, targeted health education in promoting food safety awareness among school-aged children. These results highlight the importance of integrating such interventions into public health strategies, especially in urban-rural transitional zones where food safety monitoring may be limited.

ABSTRAK

Prevalensi pewarna makanan yang tidak aman pada jajanan yang dikonsumsi oleh anak-anak sekolah dasar masih menjadi masalah kesehatan masyarakat, terutama di lingkungan sekolah perkotaan dan pedesaan. Meskipun berbagai upaya telah dilakukan, namun belum ada penelitian yang secara memadai membahas peran intervensi edukasi dalam meningkatkan kesadaran anak-anak terkait konsumsi bahan tambahan pangan yang berbahaya. Penelitian ini bertujuan untuk mengevaluasi efektivitas program edukasi dalam meningkatkan pengetahuan tentang pewarna makanan di kalangan siswa sekolah dasar. Intervensi edukasi berbasis masyarakat dilakukan di SD Inpres Cilallang, Makassar, dengan sasaran siswa kelas 5 SD. Metode yang digunakan adalah pendidikan kesehatan langsung dengan menggunakan penilaian pre-test dan post-test untuk mengukur peningkatan pengetahuan. Hasil penelitian menunjukkan adanya peningkatan yang signifikan dalam pemahaman siswa mengenai pewarna makanan berbahaya pada jajanan anak sekolah dan kemampuan untuk mengidentifikasi pilihan jajanan yang lebih sehat setelah intervensi. Program ini menunjukkan kelayakan dan dampak dari pendidikan kesehatan yang sederhana dan tepat sasaran dalam mempromosikan kesadaran keamanan pangan di kalangan anak usia sekolah. Hasil ini menyoroti pentingnya mengintegrasikan intervensi semacam itu ke dalam strategi kesehatan masyarakat, terutama di zona transisi perkotaan-perdesaan di mana pemantauan keamanan pangan mungkin terbatas.

ARTICLE INFO

Keywords
children; food coloring; health education; school snacks; street food

Article History
Submit : 03 October 2024
In Review : 26 October 2024
Accepted : 10 July 2025

AUTHOR(S) INFO

Correspondence Email
laksmi.kesling@gmail.com

Address
Jl. Wijaya Kusuma Raya No. 46, Banta-Bantaeng, Kota Makassar, Sulawesi Selatan, 90222, Indonesia.

INTRODUCTION

The consumption of snacks among school-aged children has emerged as a critical public health concern, particularly regarding food safety and nutrition. Snacks consumed by children are often purchased from school canteens or nearby vendors, and their selection is primarily influenced by appearance, color, smell, taste, temperature, and texture rather than nutritional value or safety. These ready-to-eat foods frequently bypass thorough preparation or hygiene controls. According to the Indonesian National Agency of Drug and Food Control (BPOM), 16.35% of food poisoning incidents in 2018 occurred in school settings, and 42.14% originated from homemade snacks distributed in such environments (Mukaromah & Anggraeni, 2020). This scenario underscores the pressing need for improved food safety education among school children.

Advancements in food technology have led to increased availability of synthetic food additives, particularly artificial colorants used to enhance the appeal and shelf life of snack products. These substances, such as Rhodamin B and Metanil Yellow, are often misused in food production despite being prohibited due to their toxicological risks. These dyes are known to cause gastrointestinal irritation, respiratory problems, and other health hazards (Soumokil & Marsaoly, 2022). The affordability and visual attractiveness of these colorants make them popular among street food vendors aiming for mass sales at low production costs. This highlights the necessity for health education targeting elementary students to raise awareness about harmful additives and promote safer snack choices (Tutik et al., 2022).

The widespread use of hazardous synthetic food colorants in children's snacks, particularly in school environments, poses a significant threat to child health and well-being. While regulations exist, enforcement remains inadequate, and consumer awareness is limited. The general solution involves educational interventions aimed at increasing children's knowledge about the dangers of harmful additives and encouraging healthier food choices through structured awareness programs in schools (Asdar et al., 2024).

Educational interventions in school settings have proven effective in improving health-related knowledge and practices among children. Research by Handayani et al. (2021) demonstrated that food safety education significantly enhanced students' ability to identify harmful food ingredients and influenced their snack selection behavior. Similarly, a study by Rahayu and Nuraeni (2020) found that visual learning tools, such as posters and interactive discussions, helped young students retain information about healthy eating practices. These findings indicate that age-appropriate, engaging, and contextualized education is crucial for lasting impact in altering children's food-related behaviors.

Furthermore, community-based participatory approaches have been advocated as effective strategies for health promotion in schools. Wulandari et al. (2019) emphasized the role of collaboration between schools, parents, and health workers in developing tailored educational content that resonates with local cultural and dietary contexts. The integration of health education into school curricula not only increases students' knowledge but also empowers them to become agents of change within their peer groups and families. These collaborative and culturally adapted models can serve as a framework for implementing similar programs in diverse settings, including SD Inpres Cilallang.

Despite the proven benefits of health education programs, few studies have addressed the specific risks associated with synthetic food colorants in snacks consumed by elementary students in urban-rural fringe areas like Makassar. Prior studies have primarily focused on general nutrition or hygiene, leaving a gap in targeted interventions addressing the toxicological risks posed by substances like Rhodamin B and Metanil Yellow. Asdar et al. (2024) identified the presence of Methanyl Yellow in two out of ten snack samples sold around a Makassar elementary school, underscoring the urgent need for focused educational interventions to address this overlooked hazard.

This study aims to address that gap by implementing a structured educational outreach program on food colorant awareness among fifth-grade students at SD Inpres Cilallang. The novelty of this research lies in its localized approach, integrating empirical findings from recent food safety surveillance with a participatory educational model designed to empower students with actionable

knowledge. The primary objective is to evaluate the impact of this intervention on students' knowledge and awareness regarding harmful food colorants and their ability to make safer dietary choices.

METHODS

This study employed a community-based health education intervention design aimed at enhancing knowledge regarding food colorants in snacks among elementary school students. The intervention was implemented in May 2024 at UPT SPF SD Inpres Cilallang, located at Jl. Cilallang Raya No. 30, Makassar City. The target population included all fifth-grade students enrolled in the school, totaling 32 participants who were selected using a purposive sampling technique. Inclusion criteria required that students be present during the intervention, enrolled in Grade V, and had obtained parental consent. The methodology was structured into three primary stages: preparation, implementation, and evaluation.

Figure 1
Registration of extension participants

Preparatory activities included identifying and securing the intervention site and coordinating with school authorities through an official letter. Supporting educational materials were developed, including PowerPoint slides, leaflets, an educational video, and structured pre-test and post-test questionnaires. These materials were tailored to suit the cognitive levels of elementary students and ensure engagement and understanding.

The educational session was conducted in the classroom environment of the school. Students were first registered for participation (Figure 1), and attendance was documented. They were then given leaflets and the pre-test questionnaire to assess their initial knowledge. The main counseling session involved the delivery of educational content on food colorants and healthy snack selection using multimedia tools such as an LCD projector, laptop, and smartphone. The presentation was conducted using PowerPoint slides, supplemented with an educational video, followed by an interactive discussion (Figure 2).

To assess knowledge acquisition, a post-test questionnaire was administered following the session. Additionally, a verbal quiz was conducted to evaluate immediate comprehension and engagement. A dynamic question-and-answer session with students further reinforced learning. The results of both pre-test and post-test were analyzed descriptively to measure the effectiveness of the intervention. Ethical considerations were strictly observed, with informed consent obtained from parents and verbal assent from the students. The educational strategy was designed to be age-appropriate, culturally relevant, and conducive to fostering long-term behavioral change regarding food safety.

Figure 2
Provision of counseling materials

RESULTS AND DISCUSSION

Table 1
Process of Health Examination Activities

Knowledge Level	Before		After	
	n	%	n	%
Good	13	40	29	90
Poor	19	60	3	10

Based on Table 1, there was a notable improvement in students' knowledge regarding food colorants in snacks before and after the educational intervention. Initially, only 40% of students demonstrated awareness of the presence and risks of food coloring in snacks. Following the health education session, this figure increased significantly to 90%. This positive change indicates that the dissemination of health information was effective in enhancing children's understanding. At the beginning of the intervention, a pre-test was administered to assess baseline knowledge. The session was followed by a post-test, where 90% (29 out of 32 students) correctly identified snacks containing food additives (colorants), and only 10% (3 students) failed to identify them. Thus, knowledge improvement post-intervention reached 50%.

This result aligns with findings from Febrina et al. (2022), who reported that elementary school children generally lack adequate understanding of the nutritional and hygienic value of snacks they consume. Zaenab et al. (2024) also found that 55% of students in SDN KIP Bara-Baraya showed low knowledge levels regarding food safety, while Gobel et al. (2025) reported a 70% rate of poor awareness in SD Inpres Parang, Gowa. Compared to these studies, the current research demonstrates a stronger post-intervention outcome, achieving a 90% awareness rate. The structured educational method used here—consisting of direct engagement, pre-test/post-test assessments, and participatory materials—provided a more effective learning experience than previous studies that relied only on observational data or limited intervention.

These findings are crucial as they confirm that well-targeted health education can significantly improve students' ability to identify harmful food additives, thus reducing their risk of foodborne illness and long-term health complications. On a practical level, this suggests the viability

of integrating such educational modules into school health programs. It also underscores the need for policy interventions to regulate food vendors near schools. The significant knowledge improvement observed further strengthens the case for routine health literacy campaigns in schools as a preventative public health measure.

The intervention also shed light on children's behavior and perception regarding snack choices. Children are highly influenced by visual appeal, especially color, which is often the deciding factor in choosing snacks. Many vendors deliberately enhance the color of their products using synthetic additives to attract school children. This creates a serious health risk when unapproved dyes like Rhodamin B and Metanil Yellow are used. Fardani (2023) observed that these substances are intended to enhance food appearance but are associated with negative health effects, including allergies, digestive issues, and potentially even carcinogenic and endocrine-disrupting effects when consumed long-term.

The study corroborates Desnita (2022), who noted that many food vendors are unaware of the dangers associated with synthetic dyes and use them solely to enhance product appearance. Rauf et al. (2022) further argued that although some producers are aware of the ban, economic incentives drive them to continue usage due to the low cost and strong visual impact of synthetic colorants compared to natural alternatives. This research goes a step further by actively addressing this gap in knowledge through direct education targeting the primary consumers—children—rather than solely focusing on vendors or regulatory bodies.

This behavioral insight points to the necessity of dual-focused interventions: increasing awareness among both consumers and vendors. For children, education fosters critical decision-making regarding food safety. For vendors, understanding the health implications and regulatory risks may lead to more ethical practices. Scientifically, this also calls for more integrative studies combining food chemistry, public health, and behavioral sciences to develop comprehensive food safety strategies.

The public health education activity not only increased individual knowledge but also provided the school community with a broader understanding of the risks associated with food additives. The practical implementation, which involved field observation and tailored messaging, ensured that the educational content was relevant to students' daily snack environments. Despite this success, the intervention faced logistical challenges. Due to access limitations and partial participation, not all students at SD Inpres Cilallang were able to benefit from the program. This limitation potentially influenced the reach and overall impact of the intervention.

Compared to standard health promotion models that often overlook real-time environmental observation, this intervention's field-based, problem-specific approach provided a clearer link between theoretical knowledge and everyday food practices. While other studies, such as those by Wulandari et al. (2019), emphasized community participation, this study integrated localized problem identification with direct response, creating a model that is not only reactive but also anticipatory. The resulting model may serve as a framework for replication in other semi-urban school settings with similar public health concerns.

From a scientific perspective, the study contributes a practical model for public health education tailored to school children's immediate environment and cognitive development. Practically, it demonstrates how schools can take initiative in promoting safe dietary habits, thereby contributing to long-term public health outcomes. However, future implementations should seek to expand reach, ensure inclusive participation, and integrate parent and vendor education for a more holistic impact.

CONCLUSION

The community-based educational intervention conducted among elementary school children successfully enhanced their knowledge regarding food colorants in snacks. Following the intervention, 90% (29 students) demonstrated a "good" level of knowledge, while 10% (3 students) remained in the "low" category. This significant improvement underscores the effectiveness of targeted health education in raising awareness and promoting healthier snack choices among

school-aged children. The intervention not only fulfilled its educational objectives but also highlighted the critical role of early preventive strategies in minimizing the risk of foodborne illnesses linked to synthetic additives.

This study contributes to the advancement of public health education by presenting a replicable model for school-based interventions in semi-urban contexts. The findings emphasize the importance of proactive health promotion in shaping children's dietary behavior and fostering informed food choices. However, the study was limited by the absence of laboratory testing of snacks sold around the school, which could have provided empirical evidence to support and contextualize the educational content. Future research is recommended to incorporate snack sample testing prior to intervention delivery to better assess the real-time risks faced by students and to further enhance the relevance and impact of the educational materials.

REFERENCES

Desnita, E. (2022). Identifikasi penggunaan Rhodamine B pada saus sambal jajanan di Kecamatan Koto Tangah. *Scientific Journal, 1*(6), 462–477. https://doi.org/10.56260/sciena.v1i6.79

Fardani, R. A. (2023). Analisis kandungan pewarna sintetis pada jajanan pasar di Kota Mataram dengan kromatografi kertas. *JSN: Jurnal Sains Natural, 1*(1), 23–31. https://doi.org/10.35746/jsn.v1i1.289

Febrina, W., Abdillah, N., Indrawan, S., Harfrida, E., & Srihandayani, S. (2022). Edukasi siswa sekolah dasar mengenai jajanan sehat. *Jurnal Pengabdian Kompetitif, 1*(2), 98–104.

Gobel, F. A., Safitri, A., & Sumiaty. (2025). Edukasi makanan jajanan sehat, halal dan thoyib sebagai upaya pencegahan penyakit diabetes melitus usia dini di lingkungan Sekolah Dasar Inpres Parang Kelurahan Lanna Parangloe Gowa. *JPMNT: Jurnal Pengabdian Masyarakat Nian Tanaa, 3*(1), 17–28. https://doi.org/10.59603/jpmnt.v3i1.636

Mukaromah, I. H., & Anggraeni, E. (2020). Gambaran pola pemilihan makanan jajanan pada siswa kelas IV di Sekolah Dasar Negeri (SDN) Bendo 1. *Jurnal Teknologi Pangan dan Kesehatan (The Journal of Food Technology and Health), 2*(2), 76–81. https://doi.org/10.36441/jtepakes.v2i2.514

Puspitasari, A. F., & Wulandari, W. (2023). Gambaran pengetahuan, sikap pedagang jajanan dan penggunaan Rhodamin B pada makanan jajanan di Sekolah Dasar Negeri Kecamatan Laweyan, Surakarta. *PREPOTIF: Jurnal Kesehatan Masyarakat, 7*(3), 16446–1647. https://doi.org/10.31004/prepotif.v7i3.20468

Rauf, D., Rahmawati, R., Fatmawati, A., & Sain, A. A. (2022). Identifikasi Rhodamin B pada jajanan agar-agar yang diperjualbelikan di Pasar Sungguminasa Kabupaten Gowa. *Jurnal Medika, 7*(1), 36–41. https://doi.org/10.53861/jmed.v7i1.289

Soumokil, O., & Marsaoly, M. (2022). Uji kandungan Rhodamin B pada jajanan es yang dijual di sekitar sekolah dasar wilayah Desa Passo. *Global Health Science, 7*(3), 108–110. http://dx.doi.org/10.33846/ghs7301

Tutik, Fitriani, E., Utami, K. B., Febriasti, N. A., & Putri, M. M. (2022). Pemanis dan pewarna pada makanan jajanan. *Jurnal Pengabdian Farmasi Malahayati, 5*(2), 94–102. https://doi.org/10.33024/jpfm.v5i2.7853

Zaenab, Azizah, N., Rafidah, & Haerani. (2024). Edukasi bahaya pewarna pada makanan jajanan terhadap kesehatan anak. *SEGANTANG LADA, 2*(2), 92–99. https://doi.org/10.53579/segantang.v2i2.210