

Creating a health promotion university through healthy canteen development in a private university

Helfi Agustin¹, Musfirah Musfirah¹, Atikah Rahayu²

¹Department of Public Health, Faculty of Public Health, Universitas Ahmad Dahlan, Yogyakarta, Indonesia

²Department of Public Health, Faculty of Medicine, Universitas Lambung Mangkurat, Banjarmasin, Indonesia

Article Info

Article history:

Received Jan 14, 2023

Revised Apr 22, 2023

Accepted May 9, 2023

Keywords:

Food hygiene and sanitation

Healthy canteen

Health promotion university

Nutrition

SWOT analysis

ABSTRACT

A healthy canteen is one of the supporting elements of healthy campus infrastructure. Leaders' policies, engagement, and support are essential for healthy campus initiation advocacy initiatives. This qualitative case study approach aims to determine the possibility of implementing a healthy canteen in a private university. The study was conducted in Yogyakarta from July 2017 until March 2018 with informants sequentially from five university leaders, one canteen manager, ten canteen consumers, and including 15 food handlers. We collected data through in-depth interviews and then analyzed it with content analysis. Finally, we use the SWOT matrix to investigate the possibility of developing a healthy canteen at private colleges using strengths, weaknesses, opportunities, and threats. The obstacle to developing healthy canteens is the limited area for infrastructure. We found environmental health problems, such as unqualified sanitary conditions and unapplied food hygiene and sanitation principles. Healthy canteen could be developed if the leaders at all levels committed to allocating spaces and sanitation infrastructure, making policies and regulations for testing the food in laboratories, training and inspecting food handlers regularly and providing quality foodstuffs, clean and healthy nutritious food, and educating customers with posters on the canteen walls.

This is an open access article under the [CC BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) license.



Corresponding Author:

Musfirah Musfirah

Department of Public Health, Faculty of Public Health, Universitas Ahmad Dahlan

Prof. Dr. Soepomo Street, Janturan, Umbulharjo, Yogyakarta City, Indonesia

Email: musfirah@ikm.uad.ac.id

1. INTRODUCTION

Food is a potential source of infection disease from the procurement point to the consumption point in food service establishments [1]. Poor practices in food processing plants, food service establishments, and the home industry play a crucial role in foodborne diseases [2]. Food sanitation management can impact severe health manifestations such as diarrhea, hepatitis A, and even food poisoning (Staphylococcus and Botulism) bacteria. Inadequate food sanitation management can lead to serious health consequences such as diarrhea, hepatitis A, and even food poisoning (Staphylococcus and Botulism) bacteria. Cross-contamination of food is possible if food management is poor during the cooking, storage, distribution, and serving processes [3]. The hygiene and sanitation of food and beverages need to be supported by environmental conditions and good sanitation facilities. Poor sanitary hygiene conditions can affect the quality of food served to consumers. The study stated that the food handlers contributed to an increased risk of cardiovascular disease, foodborne disease, and food poisoning [4].

Every business with more than 200 people must provide a canteen to meet its employees' nutritional needs and control foodborne diseases from these regulations [5]. Whereas Law Number 18/2012 states that

everyone involved in the food chain to maintain food safety, materials, equipment, production facilities, and food handlers, so that food security is guaranteed [6], and Minister of Health Decree number 1096 of 2011 concerning hygiene sanitation of catering services too [7]. The university is an intellectual and professional learning environment concerned with human resource quality, and its facilities allow students, lecturers, and employees to buy food and beverages [8]. A previous study discovered that children and adolescents do not consume healthy foods at school or on campus [9]. Many developing countries are transitioning from malnutrition to overnutrition [10], [11]. A healthy and safe canteen refers to the food's quality, which must provide the appropriate proportion of energy, fiber, and nutrients to maintain health outcomes [12]. Most foods served in the canteen are high energy but low in nutrients [13]. Besides nutrition, hygiene, sanitation, and the absence of toxic materials will impact the quality of healthy food. Poor sanitary conditions and poor food management can cause severe health manifestations [14]. The development of the canteen should be done under government regulations.

Health promotion activities play a role in changing individual, group, and community behaviors. It needs the policy to develop a healthy canteen [15]. Monitoring nutritional status is critical for safe access to healthy foods [16]. A healthy campus is initiated based on one health promotion property that emphasizes the involvement and mobilization of various sectors and community groups [17]. The Health Promoting University (HPU) declaration was first implemented by members of the Asian University Network-Health Promotion Network (AUN-HPN) at Mahidol University, Bangkok, in 2016. In 2019 the Ministry of Health Affairs of the Republic of Indonesia conducted a workshop on developing HPU in Indonesia involving 40 universities and health polytechnics throughout Indonesia. It resulted in the signing of the start of a healthy campus on the campuses of the universities involved. However, some studies show that students neglect their health because they think the risk of chronic diseases exists in old age. Meanwhile, many college employees suffer from various health problems due to lifestyle and environmental pollution [18].

A healthy canteen is an indicator of health promotion at universities. A healthy canteen should provide diverse, nutritious food and not harmful to health. Many factors cause food to be dangerous for consumption. The study aims to determine the possibility of implementing a healthy canteen at a private university in Yogyakarta.

2. RESEARCH METHOD

This research consists of two stages. First, collect data from the qualitative research through in-depth interviews. Five university leaders (vice-rector for finance, head of the facilities and infrastructure bureau at the campuses in Kapas Street, Pramuka Street, and Warungboto Street, and one canteen manager) were chosen as respondents using the purposive sampling technique. The study was conducted in Yogyakarta from July 2017 until March 2018 with respondents sequentially the leaders were asked about many issues related to the canteen, such as leaders' vision and policies, canteen management, and canteen infrastructure, using interview guidance. Data about the food hygiene principle were asked from fifteen food handlers.

In comparison, consumer responses and expectations regarding healthy canteens were collected from ten canteen consumers. An audit of the canteen's sanitary infrastructure was observed using a checklist. Triangulation of techniques, sources, and analysis by a three-person examination for the validity of the qualitative data. Second, all data were collected through in-depth interviews and observations for SWOT analysis material. The condition of the existing canteen was grouped into internal and external factors based on study data and enabling (Summary of External Factor Analysis/EFAS). After that, the data was arranged in a matrix with four quadrant areas showing the strategic conditions. Match and adjust to another factor from the Internal-External matrix and the SWOT matrix, starting with Strength-Opportunity, then Weakness-Opportunity, Strength-Threat, and Weakness-Threat area. The entire picture of the organization can be seen when compiling a SWOT analysis. It can find ways to improve or eliminate organizational weaknesses and capitalize on its strengths. Thus, these ways can be a formula for developing a healthy canteen. The Ethical Committee of Universitas Ahmad Dahlan, 011705073, has approved Ethical Clearance from this study.

3. RESULTS AND DISCUSSION

Six leaders at the university and ten canteen consumers were involved in this study. They have authority in the canteen as a policy maker on university finances (male) and one manager of campus facilities canteens (male). There is the person in charge of whom job desk for technical procurement, maintenance, and arrangement of campus building facilities at Kapas Street (male), campus building at Pramuka Street (male), and campus building at Janturan Street (male); also, a coordinator of the stalls in the canteen (woman). Then, there are 15 food handlers (4 male and 11 female), and ten canteen consumers. The participant characteristics and authority of canteens are shown in Table 1.

Table 1. Participant characteristics and authority of canteens

Informant code	Authority of canteens
Informant 1	A policy maker in finance at the university level
Informant 2	Head of facilities and infrastructure bureau
Informant 3	Procurement technical officer of canteen facilities
Informant 4	Maintenance technical officer of canteen facilities
Informant 5	Arrangement technical officer of canteen facilities and amenities
Informant 6	Coordinator of the canteen's stalls

The information from all interviews and observations was compiled and transcribed verbatim as a unit of analysis. Three team researchers reviewed the transcript several times to obtain a complete understanding. The information was then divided into meaning units and coded. The codes were sequentially compared based on internal and external factors (summary of external factor analysis/EFAS) is summarized in the vertical axis and can be seen in Table 2 to 4:

Table 2. Internal factors evaluation matrix

Category, No of inf*	Theme of SWOT
Strength points	
S1	The vision of the private university has evolved into an international campus (<i>from university document</i>).
S2	A large number of students, employees, and lecturers are potential customers (<i>from university document</i>).
S3	The university's canteen was managed by vendor stalls (<i>informant 3</i>).
S4	A large number of consumers such as students, lecturers, laboratory workers, administrative employees, cleaning services, security, and parking attendants (<i>from university document</i>).
S5	The canteen service is available (<i>observation result</i>).
S6	Canteen service procedures (buying and paying, returning utensils, garbage disposal, etc.) are currently in place (<i>observation result</i>).
S7	The decor and menu list are already in place and quite informative (<i>observation result</i>).
Weaknesses points	
W1	Land for campus expansion in buildings on campuses one, two, and three is difficult and expensive. If campus four is completed, some faculties can be moved and the empty space can be used as a more proper canteen (<i>informant leader 1</i>).
W2	There is no agreement between the leadership of this private university and the canteen manager and stall owners about food safety and halal aspects (<i>informant leader 6</i>).
W3	There is no supervision to ensure proper hygiene and sanitation, nor MUI's halal certification (<i>informant canteen manager</i>).
W4	There is no policy governing the usage of food additives (<i>informant food handlers and canteen manager</i>).
W5	No hygiene food sanitation training for food handlers (<i>informant food handlers</i>).
W6	No medical test of food handlers regularly (<i>informant food handlers</i>).
W7	No infectious disease screening for food handlers prior to signing a contract with the vendor (<i>informant food handlers and informant canteen manager</i>).
W8	Conditions and sanitation infrastructure in canteens (including the environment and facilities) do not meet health standards.
W9	Application of food hygiene and sanitation by handlers who do not adhere to food hygiene and sanitation principles.
W10	Food variety remains limited (<i>informant consumers and observation result</i>).
W11	Not yet considering energy values based on gender (<i>observation result</i>).
W12	The canteen does not have nutritionists and sanitarians (<i>informant canteen manager</i>).
W13	No standard operating procedures for procuring foodstuffs, storing food ingredients, storing cooking utensils, processing food, and serving food (<i>informant food handlers and informant canteen manager</i>).

Table 3. External factors evaluation matrix

No	Opportunity points
O1	This private university is a Muslim Organization Charity Business concerned with halal and toyyib food (<i>university document</i>).
O2	Consumers' appreciation and trust for canteens remain high, and they remain optimistic that canteen management at private universities will eventually improve based on the checklist responses (<i>informant consumers</i>).
O3	Autonomy in financial management (<i>informant leader 1</i>).
O4	Public health human resources consisting of sanitarians, laboratory assistants, and nutritionists already exist in the health cluster faculty (<i>canteen manager</i>).
O5	Chemical, biology, and nutrition laboratories are already available in the Public Health Faculty (<i>canteen manager</i>).
T1	Because a private university is located in the middle of a residential area, there are constraints to expanding land (<i>informant leader 2</i>).
T2	The external community's consideration of the physical aspect of the building and the need for office buildings has encouraged the authority of private universities to develop massive construction and fulfill its facilities as a top priority so that the canteen will automatically become a secondary priority (<i>informant 1 and 2</i>).
T3	The stigma that a canteen at a private university will be inadequate to a halal and healthy canteen (<i>informant consumer</i>).

*Category SWOT analysis based and the number of informants

Table 4. Research analysis quotation, category, and theme SWOT based

Quotation*	Category SWOT analysis based*	Theme SWOT based
...according to the vision of our institution, which is towards international level..."(inf.1)	S1	
...canteen customers from various strata of society, such as students, employees, and lecturers..."(inf.2)	S2	
"...usually consumers who have money are more selective in their food choices..."(inf.3)	S3	Strength
"...there is a vendor that we appoint to manage the canteen..."(inf.4)	S4	
"...our canteen provides various kinds of food and drinks..."(inf.5)	S5	
"... we have prepared the procedure for managing the canteen..."(inf.5)	S6	
"...the canteen traders arrange the place, prepare a list of food to be sold..." (inf.6)	S7	
"...Campus 1, 2, and 3 are difficult to expand, but campus 4 is arranged to accommodate standard faculties and canteens..." (inf.1)	W1	
"...between the stall owner and us, there is no coordination regarding the feasibility of the food..." (inf.6)	W2	
"... there is no monitoring of the suitability of food to eat..." (inf. canteen manager)	W3	
"...we haven't received any information regarding usage such as artificial sweeteners/colorants from campus..." (inf food handlers), "...we haven't made rules such as preservatives/artificial sweeteners/artificial coloring that may be used in canteens..."(inf. canteen manager)	W4	
"...have never received proper and standardized food processing training..." (inf. food handlers)	W5	
"... haven't received a medical test, so it's safe to process food..." (inf. food handlers)	W6	
"...we are waiting for tests so that we are declared healthy..." (inf. food handlers), "...we will arrange medical tests..." (inf.canteen manager)	W7	Weaknesses
"...the condition of the canteen has not met the standards of a healthy canteen..."(observation result), "...there are still servings that have not used headgear, water, and hand washing facilities are not limited..."(inf.customer)	W8	
"...need information on how to apply, starting from preparing to providing food for the sellers, so that we can safely eat there..."(inf. customer)	W9	
"...it seems the food menu is limited..."(inf. customer), "...the food provided is not yet varied..." (observation result)	W10	
"...the food provided in the canteen has not adapted to consumer needs..." (observation result)	W11	
"...no nutritionists and sanitarians yet..." (inf. canteen manager)	W12	
"...private campuses prioritize halal and toyyib-based food management..." (document analysis)	O1	
"...it seems the more the canteen comes here, the better it is, including the way the canteen lady prepares the food ordered..." (inf. customers)	O2	Opportunity
"... we do financial management independently..." (inf.1)	O3	
"...We have the sanitarians, laboratory assistants, and nutritionists..." (inf. canteen manager)	O4	
"... there are currently three laboratories including chemistry, biology, and nutrition labs" (inf. canteen manager)	O5	
"...our campus is in the middle of a settlement. That's the limitation..." (inf.2)	T1	
"...according to the agenda, we will prioritize the needs of office buildings, the supports will follow..." (inf.1) "...procurement of high-tech campus facilities, equipment for canteens will follow..." (inf.2)	T2	
"...apa mungkin karena kampus swasta jadi susah diatur kebersihan, dan jaminan halalnya ya..." (inf.costumer)	T3	Threats
"...private campuses are so difficult to regulate cleanliness, and halal guarantees..." (inf. customer)		

* inf (informant); Category SWOT analysis based (number of informants)

Food safety will impact human health problems produced by a large food service company [1]. Malnutrition is a common public health problem [19]. Nutritious food can improve children's behavior [20]. The canteen has a considerable impact on consumption patterns [21]. An environmental factor that influences food choices. These factors can assist students in making healthy food choices and developing healthy eating habits [22]. The most frequently suggested changes to campus food availability were related to sustainability, the availability of high nutritional quality products, price, and allergen information on labeling [23]. The latter statement is critical because food management from preparation to serving requires good management; the goal is to protect food handlers (processors) and consumers from foodborne disease [24], as well as to avoid transmission of COVID-19 during a pandemic situation [25]. The Nutrition Center of the Netherlands [26] created national guidelines for healthier canteens. Canteens should sell nutritious food to encourage healthy eating [27]. However, suppose the diet is significantly changed. In that case, there is a risk that the proportion of the amount and type of food consumed by consumers will be insufficient, resulting in

inadequate nutrient intake [28]. The healthy canteen program is a type of intervention that can assist people in becoming healthier. The other study discovered that the intervention was highly effective and encouraged students to use healthy cafeterias after implementing the program rather than before [22]. Adaptive strategies can be developed to match the healthy canteen's strengths with external opportunities, the force with threats, weaknesses with opportunities, and weaknesses with threats, as shown in Table 5.

Table 5. SWOT matrix

	Strength points (S)	Weakness points (W)
	Strength and Opportunity (SO) strategy:	Weakness opportunity (WO) strategy:
Opportunities (O)	<ol style="list-style-type: none"> 1. The vision of a private university becoming an international campus allows the Amal Enterprises Moeslem Organization to provide halal food (halal and toyyib) for all people who support Islamic values practiced through the canteen. 2. A large number of students, employees, and lecturers have expressed gratitude and great trust in the development of a healthy canteen. 3. The availability of funds to purchase good physical facilities and human resources is usually linked to healthy and halal food. It comes at a high cost. Consumers' economic situation (upper-middle class) allows for cost increases while accounting for the health benefits gained. 4. The vendor, whose management and members include private university employees and lecturers, can easily coordinate with the head of the appropriate research laboratories to conduct food sample testing and germ number on food equipment. 5. Vendors" has the authority to monitor canteen service procedures (procedures for buying and paying, returning utensils, garbage disposal, etc.) and decorating places to set menus and prices in outlets regularly. 	<ol style="list-style-type: none"> 1. As part of the Muslim Organization's Charitable Business Values, MUI is attempting to obtain good hygiene, sanitation, and halal certificates. Limited land prevents canteen facilities from being provided with optimal conditions, for example, a separate room for storing food, processing, and serving materials. 2. Conflict management with food service owners that concretely emphasize food security and food halalness. 3. Recruited nutritionists and sanitarians to develop standard operating procedures for hygiene and sanitation principles or collaborate with laboratory analysts in public health laboratories. 4. Policies governing the use of food additives still need to be created—technical and training assistance on utilizing local food to increase food diversity. Use Public Health laboratories to conduct food sample tests and germ numbers on cooking utensils and cutlery. 5. Before signing a contract with vendors," financial autonomy allows for more flexibility in budgeting funds for hygiene and food sanitation training, health checks regularly, and infectious disease screening for food handlers.
Strategy: Opportunities (O)	<p>Strength and Threats (ST) strategies:</p> <ol style="list-style-type: none"> 1. Higher education is the epicenter of scientific, technological, and artistic, and funds for these activities are typically allocated. It can use research funding, community service through lecturers' movements, and Corporate Social Responsibility funds to foster entrepreneurs. 2. Respondents greatly appreciate the healthy canteen, which will be fulfilled as a university's mandate. The canteen's management has food safety and security standards (hygiene, sanitation, and MUT's halal certificate). 	<p>Weakness and Threats (WT) strategy:</p> <ol style="list-style-type: none"> 1. The students, lecturers, and employees prefer to buy food outside. Private universities have indeed had a social and economic impact through businesses managed by communities. However, it is better to guide the food handler or merchants as their responsibility to provide healthy food. 2. Private and public universities already have halal and healthy canteens. People must dispel the notion that private universities are inadequate for strengthening their facilities and infrastructure because they have decent facilities. 3. Implementing HPU should use the resources and facilities of private universities to improve healthy canteens for traders.

Foodborne disease outbreaks in developing countries are rising due to poor personal hygiene and food safety legislation [24]. Schools can aid in the improvement of children's health [29]. Food service policies at schools and universities have the potential to influence community food behavior and unhealthy lifestyles [30]. The research found that management of the university canteen has been delegated to vendors affiliated with the vendor. It is authorized to manage the canteen and provide food services to students, employees, and lecturers. Food service companies are a source of foodborne diseases, and food handlers contribute to the spread of these [31]. The quality of product sanitation provided by food service is an essential issue for individual and population health [32]. They were improving health promotion at the university level through health policy interventions [33]. Not only can health promotion in universities

improve health [34], but the environment can also impede healthy eating [35]. According to international studies, universities frequently fail to implement consistent practices in healthy canteen policies [36]. The vendor is fully authorized to manage the canteen, according to the Vice-Rector and the Head of the Facilities Bureau in this study. The head of facilities in canteen affairs provides infrastructure facilities. The university only accepts recommendations from down-level, according to structural leadership informants, but there have been almost no problems or complaints so far. According to the vendor management informant, the canteen administrator sometimes monitors and evaluates the cleanliness.

Monitoring and evaluating food environments can improve healthy canteens by ensuring that healthy food is served on campus during class parties, school events, canteens, and fundraising events [34]. All territorial states in Australia have implemented healthy canteen policies that use traffic light systems to promote healthy food and limit sales of unhealthy foods [37]. Other studies reported that food and meals could be monitored through the regulation of unhealthy food and beverages, the timing of access, pricing, portion size, hygiene, food labeling and color-coding of food sold, monitoring the canteen environment, menu review, and compliance with school policies and food safety standards [33]. All food handlers in this study said they had never received information about food hygiene and sanitation training. According to the vendors informant, he was considered to provide training as a plan even though his short-term target was not to obtain a certificate in food hygiene and sanitation. The related study [38] examined factors affecting school food policy implementation in low-resource settings. Another study [39] found that food handlers must be trained in basic hygiene and sanitation principles. Canteen management or Y cooperative had yet to perform a medical examination of food handlers. According to the epidemiological triangle principle, possible incidences caused by agent factors derived from food vendors mediate the transmission of water-borne diseases, and it can be resolved regularly [40].

3.1. SWOT analysis of healthy canteen development at a private university

The matrix depicts the four strategic conditions confronting the private university canteen. At this point, the researchers collected data and classified external and internal data. According to the SWOT analysis in Table 3, lower-level leaders (down managers) of universities and canteen vendors only focus on the canteen's infrastructure and environment. Limited land is a significant issue for the leaders when building a canteen that meets the university's health requirements. It is difficult to control due to the increasing population and number of vehicles on campus each year. Food handlers will require courses and technical guidance in assessing risks, and implementing effective food safety practices is critical to ensuring food safety and quality [41]. Food service providers must obtain a license and have appropriate training and protective clothing for food handlers. Higher authorities must maintain infrastructure development on a regular basis. Food handlers' knowledge and practice of food safety should be improved through training in food security, food sanitation, and personal hygiene [42], [43], [44]. It is regarded as one of the most critical interventions in avoiding foodborne disease outbreaks [45].

Advocacy is required to obtain a hygiene and sanitation certificate and a halal certificate from the Indonesia Ulemas Council and public health services in a private university. The previous study [33] describes educational institutions' role in advocating for a healthy diet and nutrition, such as providing access to food stores, outlets, and vendors outside school hours and promoting beneficial food advertising. Then, as a reward or punishment, they should assist in promoting healthy food access. The private university leader must deal with the food stall owner regarding an agreement for a healthy canteen. Relevant studies found that healthy nutritional intake requires ongoing political efforts and actions, such as innovation strategies and healthy food recommendations [16]. In addition, food marketing and promotion must emphasize daily foods while confining other foods and sugary drinks on occasion [46].

The lecturers participate in research and community service activities to supervise and promote food safety and hygiene sanitation to realize a healthy canteen at a private university. Posters on the canteen walls are needed to educate students, lecturers, and employees about food hygiene and sanitation. The point-of-purchase (POP) nutritional information media in university canteens is an effective way to promote a healthy diet in groups of teenagers or adolescents. POP nutritional information affects food choices and energy intake and has proven effective in changing the food choices of university canteen customers [47]. Healthy food in the workplace should be the primary goal to promote healthy workers and can improve employee productivity and corporate image [48], [49]. Food ingredients, handlers, location, and equipment are potential sources of food contamination they must avoid. Based on research findings can inform policymakers about potential intervention opportunities [33]. Other studies have identified a lack of strategic vision, inadequate planning, limited human and financial resources, and the absence of an organized monitoring system as obstacles and enabling factors for the successful implementation of school food policies [50].

4. CONCLUSION

Healthy canteen development would significantly enhance the success of HPU program in a private university. Leaders raised concerns about limited infrastructure space because the classroom remains a priority. We also discovered environmental health issues, such as inadequate sanitary conditions and a failure to apply food hygiene and sanitation principles. To prevent foodborne diseases, the study recommends leaders' commitment and policies to support sanitary infrastructure such as space for a healthy canteen, adequate clean water, drainage, soap, and washbasins. We recommend developing food hygiene and sanitation supervision, food handler literacy through training and education on food hygiene and sanitation, and food diversification of fruits and vegetable supplies, then increasing nutrition literacy among consumers.

ACKNOWLEDGEMENTS

We thank the Universitas Ahmad Dahlan Research and Community Service Institutions-Indonesia for their financial support throughout The Competition Research Grants Schema with contract number: PHB-036/SP3/LPP-UAD/IV/2017 for completing this study.

REFERENCES

- [1] P. Boro, V. C. Soyam, T. Anand, and J. Kishore, "Physical environment and hygiene status at food service establishments in a Tertiary Care Medical College campus in Delhi: A cross-sectional study," *Asian Journal of Medical Sciences*, vol. 6, no. 4, pp. 74–79, Dec. 2014, doi: 10.3126/ajms.v6i4.11533.
- [2] A. U. Abidin, A. A. Asmara, A. Asmarany, L. I. Ardhayanti, D. S. Ramadhani, and R. D. Iskandar, "A linkage of personal, food, and environmental hygiene to presence of E. coli in Warmindo Food Stall," *Gaceta Sanitaria*, vol. 35, pp. S107–S111, Jan. 2021, doi: 10.1016/j.gaceta.2021.10.008.
- [3] Pan American Health Organization, "Food handler: Manual instruction," in *Food and Agriculture Organization of the United Nations and Pan American Health Organization/WHO*, 2017. [Online]. Available: <https://www.fao.org/3/i5896e/i5896e.pdf>
- [4] N. Medyati, R. Amiruddin, S. Russeng, and S. A. Rahman, "Food stalls ownership and its contribution on body mass index and the risk of cardiovascular disease in cooker profession," *Indian Journal of Public Health Research & Development*, vol. 9, no. 10, pp. 429–434, 2018, doi: 10.5958/0976-5506.2018.01382.7.
- [5] *Minister of Manpower and Transmigration, Circular of the Minister of Manpower and Transmigration No. 01 of 1979 concerning the Procurement of Canteens and Dining Spaces*. 1979.
- [6] *Law of the Republic of Indonesia Number 18 of 2012 concerning food*. 2012.
- [7] *Minister of Health of the Republic of Indonesia. Decree of the Minister of Health of the Republic of Indonesia Number 1096/MENKES/PER/VI/2011 concerning Jasaboga Sanitation Hygiene*. 2011.
- [8] Á. F. Torres, R. Moreno-Rojas, and F. C. Martos, "Nutritional content of foods offered and consumed in a Spanish university canteen," *Nutrición hospitalaria*, vol. 31, no. 3, pp. 1302–1308, Oct. 2015, doi: 10.3305/nh.2015.31.3.8006.
- [9] H. Luu-Thi and C. W. Michiels, "Microbiological safety of ready-to-eat foods in hospital and university canteens in Hanoi, Vietnam," *Journal of Food Protection*, vol. 84, no. 11, pp. 1915–1921, Nov. 2021, doi: 10.4315/JFP-20-324.
- [10] A. E. Adetunji *et al.*, "Socio-demographic factors associated with overweight and obesity among primary school children in semi-urban areas of mid-western Nigeria," *PLoS One*, vol. 14, no. 4, Apr. 2019, doi: 10.1371/journal.pone.0214570.
- [11] E. D. Eze *et al.*, "assessing factors contributing to the prevalence of protein–energy malnutrition among children under five years of age attending kigoma district hospital, Tanzania," *Journal of Food and Nutrition Sciences*, vol. 6, no. 5, pp. 123–128, 2018, doi: 10.11648/j.jfns.20180605.12.
- [12] Y. Sakai, Y. Y. S. Rahayu, and T. Araki, "Nutritional value of canteen menus and dietary habits and intakes of university students in Indonesia," *Nutrients*, vol. 14, no. 9, pp. 1–18, May 2022, doi: 10.3390/nu14091911.
- [13] A. Brennan and S. Browne, "Food waste and nutrition quality in the context of public health: A scoping review," *International Journal of Environmental Research and Public Health*, vol. 18, no. 10, MDPI AG, pp. 1–26, May 02, 2021. doi: 10.3390/ijerph18105379.
- [14] L. Lin, H. Yang, and X. Xu, "Effects of Water Pollution on Human Health and Disease Heterogeneity: A Review," *Frontiers in Environmental Science*, vol. 10, Frontiers Media S.A., pp. 1–16, Jun. 30, 2022. doi: 10.3389/fenvs.2022.880246.
- [15] S. L. Yoong *et al.*, "Adapting implementation strategies: a case study of how to support implementation of healthy canteen policies," *Public Health*, vol. 177, pp. 19–25, Dec. 2019, doi: 10.1016/j.puhe.2019.07.003.
- [16] A. D. Lassen, P. Knuthsen, A. Bysted, and E. W. Andersen, "The nutritional quality of lunch meals eaten at Danish worksites," *Nutrients*, vol. 10, no. 1518, pp. 1–11, Oct. 2018, doi: 10.3390/nu10101518.
- [17] J. Kemm, *Health Promotion*. Oxford University Press, 2014. doi: 10.1093/med/9780198713999.001.0001.
- [18] AUN-HPN. ASEAN University Network-Health Promotion Network, "AUN Healthy Campus Development Framework. AUN-Health Promotion Network (2nd Edition), Mahidol University," 2nd ed. Thailand, 2017.
- [19] S. Farhin, T. Jaffry, S. Zafar, and F. Rashid, "Frequency and assessment of nutritional status of school going children in rural areas of islamabad," *Pakistan Journal of Medical Sciences*, vol. 37, no. 5, pp. 1475–1479, Sep. 2021, doi: 10.12669/pjms.37.5.3773.
- [20] A. A. A. Hidayat and M. Uliyah, "The Self-Care learning exchange (SCLE) model: A model for promoting nutrition in malnourished children in Indonesia," *Indian Journal of Public Health Research & Development*, vol. 9, no. 10, pp. 306–311, 2018, doi: 10.5958/0976-5506.2018.01361.X.
- [21] J. Woods, A. Bressan, C. Langelan, A. Mallon, and C. Palermo, "Australian school canteens: Menu guideline adherence or avoidance?," *Health Promotion Journal of Australia*, vol. 25, no. 2, pp. 110–115, Aug. 2014, doi: 10.1071/HE14009.
- [22] H. Fudla *et al.*, "A Mixed-Methods Exploration of Implementation of a Healthy School Canteen Program after a Year Intervention," *Open Access Macedonian Journal of Medical Sciences*, vol. 10, no. T8, pp. 58–68, Jan. 2022, doi: 10.3889/oamjms.2022.9483.
- [23] N. Martinez-Perez *et al.*, "On-campus food purchase behaviors, choice determinants, and opinions on food availability in a Spanish university community," *Nutrition*, vol. 103–104, Nov. 2022, doi: 10.1016/j.nut.2022.111789.

- [24] U. Lawan, Z. Iliyasu, S. Abubakar, A. Gajida, and A. Abdussalam, "Personal and food hygiene practices of subsistence food vendors operating in Kano metropolis, northwestern Nigeria," *International Journal of Medical Science and Public Health*, vol. 4, no. 2, p. 214, 2015, doi: 10.5455/ijmsph.2015.1509201441.
- [25] S. Sulistyawati, R. Rokhmayanti, B. Aji, S. P. M. Wijayanti, T. W. Sukesu, and S. A. Mulasari, "They looked at me like I am a virus: how survivors cope with COVID-19 stigma during the early stage of pandemic," *International Journal Public Health Science (IJPHS)*, vol. 12, no. 1, pp. 277–285, Mar. 2023, doi: 10.11591/ijphs.v12i1.21954.
- [26] I. J. Evenhuis *et al.*, "Development of the 'Canteen scan': An online tool to monitor implementation of healthy canteen guidelines," *BMC Public Health*, vol. 18, no. 1, pp. 1–11, 2018, doi: 10.1186/s12889-018-5974-8.
- [27] S. Varman, C. Bullen, K. Tayler-Smith, R. Van Den Bergh, and M. Khogali, "Primary school compliance with school canteen guidelines in Fiji and its association with student obesity," *Public Health Action*, vol. 3, no. 1, pp. 81–84, Feb. 2013, doi: 10.5588/pha.12.0063.
- [28] T. Lawlis, M. Knox, and M. Jamieson, "School canteens: A systematic review of the policy, perceptions and use from an Australian perspective," *Nutrition & Dietetics*, vol. 73, no. 4, pp. 389–398, Sep. 2016, doi: 10.1111/1747-0080.12279.
- [29] N. H. M. Bartelink *et al.*, "One- and two-year effects of the healthy primary school of the future on children's dietary and physical activity behaviours: A quasi-experimental study," *Nutrients*, vol. 11, no. 3, pp. 1–18, Mar. 2019, doi: 10.3390/nu11030689.
- [30] N. Rathi, L. Riddell, and A. Worsley, "Food environment and policies in private schools in Kolkata, India," *Health Promotion International*, vol. 32, no. 2, pp. 340–350, 2017, doi: 10.1093/heapro/daw053.
- [31] G. T. Engdaw, A. H. Tesfaye, and E. A. Worede, "Food handlers' practices and associated factors in public food establishments in Gondar, Ethiopia 2021/2022," *Heliyon*, vol. 9, no. 4, pp. 1–10, Apr. 2023, doi: 10.1016/j.heliyon.2023.e15043.
- [32] A. G. da Vitória, J. de Souza Couto Oliveira, L. C. de Almeida Pereira, C. P. de Faria, and J. F. B. de São José, "Food safety knowledge, attitudes and practices of food handlers: A cross-sectional study in school kitchens in Espírito Santo, Brazil," *BMC Public Health*, vol. 21, no. 1, pp. 1–10, Dec. 2021, doi: 10.1186/s12889-021-10282-1.
- [33] K. Saluja *et al.*, "School environment assessment tools to address behavioural risk factors of non-communicable diseases: A scoping review," *Preventive Medicine Reports*, vol. 10, Elsevier Inc., pp. 1–8, Jun. 01, 2018, doi: 10.1016/j.pmedr.2018.01.014.
- [34] D. Wang, D. Stewart, Y. Yuan, and C. Chang, "Do health-promoting schools improve nutrition in China?," *Health Promotion International*, vol. 30, no. 2, pp. 359–368, Jun. 2015, doi: 10.1093/heapro/dat047.
- [35] V. B. Gray, S. H. Byrd, B. J. Fountain, N. E. Rader, and A. D. Frugé, "Childhood nutrition in the Mississippi Delta: Challenges and opportunities," *Health Promotion International*, vol. 31, no. 4, pp. 857–868, 2016, doi: 10.1093/heapro/dav072.
- [36] L. Wolfenden *et al.*, "A randomised controlled trial of an intervention to increase the implementation of a healthy canteen policy in Australian primary schools: Study protocol," *Implementation Science*, vol. 9, no. 1, pp. 1–8, Oct. 2014, doi: 10.1186/s13012-014-0147-3.
- [37] K. Reilly *et al.*, "Validity of four measures in assessing school canteen menu compliance with state-based healthy canteen policy," *Health Promotion Journal of Australia*, vol. 27, no. 3, pp. 215–221, Dec. 2016, doi: 10.1071/HE16053.
- [38] E. Reeve *et al.*, "Implementation lessons for school food policies and marketing restrictions in the Philippines: A qualitative policy analysis," *Global Health*, vol. 14, no. 1, pp. 1–14, Jan. 2018, doi: 10.1186/s12992-017-0320-y.
- [39] C. Nnebue, Prosper O. U. Adogu, C. Ifeadike, and O. Ironkwe, "Assessment of the food hygiene practices of food handlers in the Federal Capital Territory of Nigeria," *Tropical Journal of Medical Research*, vol. 17, no. 1, pp. 10–15, 2014, doi: 10.4103/1119-0388.130175.
- [40] T. W. Bulto, G. Y. Juta, B. B. Demissie, S. J. Woldemichael, B. C. Werku, and Y. W. Berkessa, "Knowledge of food safety and handling practices among food handlers of student cafeteria at Kotebe Metropolitan University, Addis Ababa, Ethiopia," *Environmental Health Insights*, vol. 16, pp. 1–11, 2022, doi: 10.1177/11786302221133951.
- [41] J. Azanaw, H. Dagne, Z. Andualem, and T. Adane, "Food Safety Knowledge, Attitude, and Practice of College Students, Ethiopia, 2019: A Cross-Sectional Study," *BioMed Research International*, vol. 2021, pp. 1–10, 2021, doi: 10.1155/2021/6686392.
- [42] H. Al-Akash, A. A. Arrah, F. Bhatti, R. Maabreh, and R. A. Arrah, "The effect of food safety training program on food safety knowledge and practices in hotels' and hospitals' food services," *Italian Journal of Food Safety*, vol. 11, no. 1, 2022, doi: 10.4081/ijfs.2022.9914.
- [43] R. Addo-Tham, E. Appiah-Brempong, H. Vampere, E. Acquah-Gyan, and A. Gyimah Akwasi, "Knowledge on food safety and food-handling practices of street food vendors in ejisu-juaben municipality of Ghana," *Advances in Public Health*, vol. 2020, pp. 1–7, 2020, doi: 10.1155/2020/4579573.
- [44] M. Musfirah, A. Rahayu, and H. Agustin, "Application of sanitation hygiene principles with the existence of biological hazards in equipment in university canteens," *Jurnal Kesehatan dan Pengelolaan Lingkungan*, vol. 3, no. 1, pp. 18–23, Jan. 2022, doi: 10.12928/jkpl.v3i1.6336.
- [45] World Health Organization, "COVID19 and Food Safety: Guidances for Food Businesses interim guidance," 2020. <https://www.who.int/publications/i/item/covid-19-and-food-safety-guidance-for-food-businesses> (accessed Oct. 10, 2022).
- [46] Centre for Population Health, "Healthy food and drink in NSW health facilities for staff and visitors framework. NSW Ministry of Health," 2017. Accessed: May 07, 2023. [Online]. Available: <https://www.health.nsw.gov.au/heal/Pages/healthy-food-framework.aspx>.
- [47] K. Reilly *et al.*, "Assessing the potential impact of a front-of-pack nutritional rating system on food availability in school canteens: A randomised controlled trial," *Appetite*, vol. 121, no. 1, pp. 309–315, Feb. 2018, doi: 10.1016/j.appet.2017.11.103.
- [48] European Commission, "EU Health Programme 2014–2020." https://ec.europa.eu/health/home_en (accessed Nov. 15, 2019).
- [49] C. D. Gardner *et al.*, "Food-and-beverage environment and procurement policies for healthier work environments," *Nutrition Reviews*, vol. 72, no. 6, pp. 390–410, 2014, doi: 10.1111/nure.12116.
- [50] J. Saito *et al.*, "Factors influencing the National School Health Policy implementation in Lao PDR: A multi-level case study," *Health Promotion International*, vol. 30, no. 4, pp. 843–854, Dec. 2015, doi: 10.1093/heapro/dau016.

BIOGRAPHY OF AUTHORS

Helfi Agustin    is an assistant professor at the Public Health Department, Faculty of Public Health, Universitas Ahmad Dahlan, Yogyakarta, Indonesia, managing editor of Journal of Cakrawala Promosi Kesehatan (Cakrawala of Health Promotion), and researcher, PhD candidates from Universitas Sebelas Maret, Surakarta. Her research interest: Empowerment, health promotion, health communication, healthy tourism, mental health. She can be contacted at email: helfi.agustin@ikm.uad.ac.id.



Musfirah Musfirah    is an assistant professor at the Public Health Department, Faculty of Public Health, Universitas Ahmad Dahlan, Yogyakarta, Indonesia. Her research focuses on Environmental Health Risk Assessment, Environmental Pollution, Hygiene and sanitation, Chemical Hazard Pollution and contamination, and the Health of Settlements and Buildings. She is the author of several international publications about environmental health risk assessment, pollution, sanitation, and other public health issues. She has written books and modules. She can be contacted at email: musfirah@ikm.uad.ac.id.



Atikah Rahayu    is an associate professor at the Public Health Department, Faculty of Medicine, University of Lambung Mangkurat, Banjarmasin, Indonesia. Her research focuses on health nutrition risk assessment, health promotion, obesity, and stunting. She is the author of several international publications about health risk assessment, health nutrition, and other public health issues. She can be contacted at email: atikahrahayu@ulm.ac.id.