

Hygiene and sanitation training for mobile street food vendors around schools in puskesmas catchment areas in Sleman

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Abstract

Purpose: To find out the implementation and influence of Puskesmas Godean I training program on sanitation and *Escherichia coli* contamination on school-based street food vendors in Godean sub-district. **Method:** The type of research was observational study with cross sectional design. The research sample was school-based street food vendors in the puskesmas catchment area. The sampling technique used was total sampling. **Result:** This study found that there were significant differences between vendors who took part in the training and those who did not take part in the training in terms of personal hygiene ($p = 0.002$; $p < 0.05$) and sanitation of food equipment ($p = 0.028$; $p < 0.05$). While there was no significant difference in terms of food serving sanitation ($p = 0.285$; $p < 0.05$), sanitation facilities of vendors ($p = 0.154$; $p < 0.05$), and *Escherichia coli* contamination ($p = 0, 126$; $p < 0.05$). **Conclusion:** The training program on the hygiene of sanitation and *Escherichia coli* contamination for school-based food vendors in the catchment area was not effective. Training programs for school-based food vendors were effective only on personal hygiene and food equipment sanitation.

Keywords: training program; personal hygiene; equipment sanitation; sanitation of food serving; *Escherichia coli*

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INTRODUCTION

Safe food is a basic need to protect and prevent disease or other health problems [1]. Among foods, snack food is popular because the price is low, reasonable, and easy to access, especially in Asia [2]. Nearly 2.5 billion people consume snacks every day [3]. The parties most often in contact with snacks are school children. They usually buy snacks around the school or in the school canteen. The main factor of school children in

determining the choice of snacks are aspects of price, prizes, and tastes [4].

Snacks food for school children is still a health risk because its handling is often unhygienic [5]. The seller, street food vendors, are usually located near traffic and less hygienic areas, including open sewers, garbage collection sites, construction sites, and even toilet facilities, so that food items are prone to contamination [2]. Microbiological contamination is the most critical health hazard associated with food snacks, while the use

of chemical additives, pesticide residues, parasitic transmission, and environmental pollution are also considered other possible health risks. The longer shelf life of a food product has a greater chance of being contaminated by bacteria [6]. Therefore traders and related parties in the production and provision of food need to understand how to produce food that is safe for consumption. The Government has regulated the food requirements for snacks in the Minister of Health's Decree Number 942 Year 2003 regarding food and sanitation hygiene requirements.

Hygiene is a health effort by maintaining and protecting the hygiene of individual subjects [7]. Hand hygiene is essential that everyone must accustom the habit of washing hands at any time. Washing hands with soap and followed by rinsing will remove many microbes found in the hands. [8]. This habit is very helpful in preventing the transmission of bacteria from hands to food [9]. In processing and preventing cross-contamination with food, clean equipment, and using tools or gloves in taking food is essential [10]. Food served must also be with a place that is clean and safe for health (Minister of Health's Decree Number 942 Year 2003) as food serving is the endpoint of a series of ready-to-eat food trips [9].

More than 200 diseases can be transmitted through food [11]. Foodborne illnesses are usually infective or toxic and are caused by bacteria, viruses, parasites, or chemicals that enter the body through contaminated food or water. Almost one in ten people suffer from illness after consuming contaminated food, resulting in 420,000 deaths each year. Forty percent of children under five years suffer from foodborne diseases, with 125,000 children die each year.

The distribution of poisoning shows that 28% of food poisoning incidents occur in schools. Outbreaks of food poisoning in school environments are partly due to food contaminated with pathogenic bacteria. Supervision on School Children Snack Food (PJAS) shows a trend in the results of testing, which tends to remain unchanged from several years of PJAS sampling and testing [12]. Data from the BPOM DIY in 2016 showed the Sleman Regency was ranked top in food poisoning as many as 44 cases [13].

Godean District is the economic center for the western part of the Sleman Regency of the Special Region of Yogyakarta. At present, the number of street food vendors, both permanent and mobile, is multiplying especially at street food merchant children making various types of food sold in schools. Vendor facilities must have construction so that food is safe from

contamination and easy to clean [14]. On September 6, 2013, an outbreak of street food poisoning occurred at Krajan 1 Godean Public Elementary School [15]. The number of victims was 27 children due to consuming candy containing citron powder. The events triggered the Godean I Health Center to move to provide guidance and supervision of the traveling school food vendors. With guidance and supervision, school food vendors will be able to apply sanitation hygiene principles in handling food. However, the results of sampling snacks for school children in 2017 in the Godean sub-district indicate that *Escherichia coli* contamination is still relatively high, at 60% [16]. *Escherichia coli* is a microbiological indicator of human or animal feces contamination in a food and beverage product [17].

METHODS

This study was an observational study with a cross sectional study design. The research was carried out in the Godean Subdistrict, Sleman Regency, Special Region of Yogyakarta after ethical approval was issued. The population in this study were all mobile street food street food merchants who were registered in the Traveling School Street Food Street Food Traders in Godean which consisted of 70 merchants. The sample in this study was all food vendors traveling mobile school children registered in the hawker food street food hawker merchant groups using total sampling techniques.

RESULTS

Implementation of the training program, following the Minister of Health's Decree Number 942 Year 2003 and Sleman District Regulation Number 108 the Year 2016 for street food vendors selling school children are as follows. Data collection carried out by Godean I Health Center has not been carried out routinely and is only done simply by asking the Chairman of the Association. Data collection should be done programmatically and routinely, at least once a year, to update the membership to minimize food poisoning incidence appropriately.

Registration of the training is carried out by the Godean I Health Center without extensive notification, only through word of the Chairman of the Association, and without prior registration form preparation. Food sellers carry out registration through the association, then used as a data source for the Puskesmas. Following the Minister of Health's Decree No 942 2003, registration needs to be widely informed to traders selling snacks for

school children. It is necessary to prepare an instrument for hawker food registration, including registration forms, register books, hawker food status cards, health handlers books, stickers for a registered sign of hawker food vendors, and placards for hawker food centers.

Godean I Health Center has provided counseling, but it has not been done routinely and periodically because the Community Health Center prioritizes traders who have never received it. Also, counseling was carried out by Sanitarian officers and Nutrition officers from the Godean I Health Center without involving cadres in the community. Following the Health Ministry's Decree no 942 Year 2003, counseling activities are carried out by health workers and associations together with cadres in the community towards traders and owners to motivate them further. Community cadre involvement will make the coaching program more effective because they have more closeness and even similarities in language and culture.

Supervision is carried out by testing sample food snacks on school children and conducting sanitation inspections. However, this has not yet worked because the costs for picking tests have been diverted to finance microbiological lab tests for street food vendors. The current supervision is limited to the provision of stickers to traders who have met the microbiological test requirements. However, this step has not yet been carried out routinely or periodically and thoroughly to all existing traders.

Table 1 shows a quarter of traders took the job almost as their permanent job (more than 10 years). In terms of education, most of these sellers have primary and junior high school education, which is very unlikely to grasp the importance of the safety and health of the food they sell.

Table 1. Characteristics of respondents in school food snack traders (n = 70)

Variable	Keterangan	%
Gender	Male	68,6%
	Female	31,4%
Education	Elementary school	28,6%
	Junior high school	32,9%
	Senior high school	38,6%
Age	<25 years	7,1%
	25-35 years	24,3%
	36-45 years	44,3%
	>45 years	24,3%
Working (in years)	1-10 years	75,7%
	>10 years	24,3

Table 2 shows the effect of coaching on vendors' health practices and their sanitation. Serving food and ingredients used for vendor facilities in street food vendors who participate or not participate in coaching is almost the same.

Food serving is not united with raw materials and uses a closed-place or equipment, such as a pan, which is then served to consumers using plastic. The ingredients used for vendor facilities are made of aluminum, wooden boards, and glass. Aluminum and glass are waterproof and easy to clean. Nevertheless, there are still traders who use materials from wooden boards. Vendors made of painted wood planks tend to be dirty and hard to clean.

Table 2. Distribution of Sanitation Hygiene Frequency of Food Traders of Snack Food for School Children Participating and Not Participating in the Coaching Program in the Godean I Health Center Area

Sanitation Hygiene	Coaching (n=36)		Non Coaching (n=34)		p-value
	n	%	n	%	
Personal Hygiene					
- Yes	19	55,9	7	19,4	0,002
- No	15	44,1	29	80,6	
Equipment Sanitation					
- Yes	24	70,6	16	44,4	0,028
- No	10	29,4	20	55,6	
Food Serving Sanitation					
- Yes	29	85,2	28	77,7	0,285
- No	5	14,8	8	22,3	
Vendor Facility Sanitation					
- Yes	20	58,8	21	58,3	0,154
- No	14	41,2	15	41,7	
Escherichia coli Contamination					
- Negative	31	91,2	28	77,8	0,126
- Positive	3	8,8	8	22,2	

DISCUSSIONS

In this study, there were significant differences in individual hygiene between school-based street food vendors in the working area of Godean I Health Center, who took part in the coaching program with those who did not participate. A similar study in India shows a significant improvement in personal hygiene, practice, and food handling at hawker food vendors after food safety training [18]. Another from Bali also shows an increased hygiene of food handlers after sanitation hygiene training at the Nutrition Installation at Sanglah General Hospital Denpasar [19].

Also, there were significant differences in equipment sanitation between school-based street food vendors in the working area of Godean I Health Center, who took part in the coaching program with those who did not participate. These are in line with other research which shows that providing training programs to food handlers can improve equipment hygiene [20]. Similar study also shows food safety counseling activities have improved equipment sanitation practices for traders in Dian Nuswantoro University neighborhood food stalls [21].

A food safety training program for food handlers is fundamental to ensuring food safety. The food safety program is not entirely carried out with a theoretical approach but also with a practical approach [20]. Providing training on food sanitation hygiene is an essential element in controlling diseases transmitted through food [22]. Food handler hygiene status dramatically contributes to the microbiological quality of a food product [23]. Further, sanitation facilities and environmental hygiene affect the microbiological quality of food in Gianyar [24]. The school can play a role in providing access to traders to obtain facilities when selling, such as clean water sources and trash bins provided by schools around the neighborhood so that the personal hygiene behavior of traders is better [25].

But, study also shows no significant differences in the food serving between school-based street food vendors in the working area of Godean I Health Center, who took part in the coaching program with those who did not participate. These are in line with research conducted on street vendors in India, which shows no effect of providing interventions in food safety training on food serving sanitation and food processing [18]. Similar research also shows that counseling has not been effective in improving sanitation practices in serving food stalls in a university neighborhood in Semarang City [21].

Most sellers in the working area of Godean I Health Center use a place or equipment in a closed state, for example, pan for their foods, which then served to consumers using plastic. These are in line with research in the Lerep Community Health Center's working area, which shows that most street food merchant vendors in elementary school use plastic to serve food [26]. Plastic packaging has advantages in its flexible shape, lightweight, not easily broken, but certain types (PE, PP, PVC) are not resistant to heat, so that it has the potential to release harmful chemicals from plastics [27].

In this study, there were also no significant differences in the sanitation of vendor facilities between school-based street food vendors in the working area of

Godean I Health Center, who took part in the coaching program with those who did not participate. The facilities of most hawkers are made of aluminum and glass that are waterproof and easy to clean. Nevertheless, some hawkers still use painted wooden boards that tend to be dirty and hard to clean. Health minister's decree 942 2003 states that food facilities' construction should be available for clean water, food storage, food storage, storage equipment, clean water, and trash. In reality, most hawkers' facilities in the working area of Godean Health Center had no clean water, handwashing facilities, and trash bins.

Last, there was also no significant difference in the contamination of *Escherichia coli* between snacks sold by school food vendors who took part in a guidance program from the Puskesmas with food vendors who did not participate. Our findings are in line with a study in Samarinda showing no effect of providing counseling to traders in Samarinda City elementary school with microbiological food quality ($p < 0.591$) [28].

Most foods met the requirements (negative of *Escherichia coli*) in both traders who followed and did not follow the coaching because most traders served food in hot conditions. *Escherichia coli* has a maximum growth temperature of 40-45°C. Above that, *Escherichia coli* is inactivated and may experience heat-shock, sublethally injured, or death [29]. Meanwhile, positive *Escherichia coli* foods were served in non-hot conditions; most were cold drinks. Some of the microbial contamination in drinks are derived from low-quality ice cubes [30] that used raw water and paid less attention to the cleanliness of its containers [31], unhygienic manufacturing process water, and bacterially contaminated equipment [32]. Traders need to pay attention to the source of water used, choose ice cubes from the water used, use clean equipment, and the manufacturing process environment.

CONCLUSION

Traders who participated in the coaching program have better personal hygiene and the sanitation equipment. There is no difference between hawker food traders who follow and those who do not follow the coaching program on food serving, sanitation of vendor facilities, and *Escherichia coli* contamination.

Puskesmas should continuously conduct a training program for mobile school food vendors, conduct supervision in pick tests and sanitation inspections related to personal hygiene, equipment sanitation, serving sanitation and sanitation of peddlers' facilities

regularly and periodically. Other than laboratory testing, the provision of snacks needs to consider aspects of hygiene sanitation traders. Schools should provide facilities for traders to access clean water sources and garbage bins to apply good aspects of personal hygiene. Finally, the next researcher is expected to research the implementation of a training program on the quality of school food snacks from chemical aspects such as borax and formalin.

Note: Puskesmas means public health center

REFERENCES

1. Fung F, Wang HS, Menon S. Food safety in the 21st century. *Biomed J*. 2018;41: 88–95.
2. Soon JM. Rapid Food Hygiene Inspection Tool (RFHiT) to assess hygiene conformance index (CI) of street food vendors. *LWT*. 2019. p. 108304.
3. Kotzekidou P. Food Hygiene and Toxicology in Ready-to-Eat Foods. Academic Press; 2016.
4. Kristianto Y, Riyadi BD, Mustafa A. Faktor Determinan Pemilihan Makanan Jajanan pada Siswa Sekolah Dasar. *Kesmas: National Public Health Journal*. 2013. p. 489.
5. Suherman AP, La Ane R, Ibrahim E. Praktik Hygiene Penjamah dan Sanitasi Peralatan Makanan Jajanan Anak Sekolah Dasar pada SD di Kelurahan Antang Kecamatan Manggala Kota Makassar. *Media Kesehatan Masyarakat Indonesia*. 2013;9: 103–108.
6. Walsh C, Leva MC. A review of human factors and food safety in Ireland. *Safety Science*. 2019. pp. 399–411.
7. Direktorat Jenderal Pengendalian Penyakit dan Penyehatan Lingkungan. Higiene Sanitasi Makanan dan Minuman. Kementerian Kesehatan; 2004.
8. Purnawijayanti AH. Sanitasi Hygiene dan Keselamatan Kerja dalam Pengolahan Makanan. Yogyakarta: Kanisius; 2001.
9. Amaliyah N. Penyakit Makanan dan Minuman. Yogyakarta: CV. Budi Utama; 2017.
10. Ramadani ER, Mersatika A. Higiene dan sanitasi makanan jajanan di kantin sekolah dasar di kecamatan buke kabupaten konawe selatan tahun 2016. *Jurnal Ilmiah Mahasiswa Kesehatan Masyarakat*. 2017;2: 1–12.
11. Food safety. [cited 18 Mar 2021]. Available: <https://www.who.int/news-room/fact-sheets/detail/food-safety>
12. BPOM. Laporan Tahunan 2017 BBPOM Yogyakarta. Balai Besar Pengawas Obat dan Makanan Yogyakarta; 2017.
13. BPOM. Laporan Tahunan 2016 BBPOM Yogyakarta. Balai Besar Pengawas Obat dan Makanan Yogyakarta; 2016.
14. Keputusan Menteri Kesehatan No. 942 Tahun 2003 tentang Pedoman Persyaratan Hygiene Sanitasi Makanan Jajanan. 2003.
15. Setyawan P. Makan Permen, 27 Murid SD di Sleman Keracunan. Sleman: Okezone; 2013 accessible on Makan Permen, 27 Murid SD di Sleman Keracunan : Okezone News.
16. Puskesmas G. Profil Puskesmas Godean Tahun 2017. 2017.
17. Sembel DT. Toksikologi Lingkungan. Jakarta: CV. Andi Offset; 2015.
18. Singh AK, Dudeja P, Kaushal N, Mukherji S. Impact of health education intervention on food safety and hygiene of street vendors: A pilot study. *Armed Forces Med J India*. 2016;72: 265–269.
19. Rapiasih NW, Prawiningdyah Y, Lestari LA. Pelatihan hygiene sanitasi dan poster berpengaruh terhadap pengetahuan, perilaku penjamah makanan, dan kelayakan hygiene sanitasi di instalasi gizi RSUP Sanglah Denpasar. *Jurnal Gizi Klinik Indonesia*. 2010. p. 64. doi:10.22146/ijcn.17738
20. Soares K, García-Díez J, Esteves A, Oliveira I, Saraiva C. Evaluation of food safety training on hygienic conditions in food establishments. *Food Control*. 2013. pp. 613–618.
21. Mahawati E. Efektivitas penyuluhan terhadap sanitasi warung makan di sekitar Universitas Dian Nuswantoro Semarang. *VISIKES: Jurnal Kesehatan Masyarakat*. 2012;11.
22. Choudhury M, Mahanta LB, Goswami JS, Mazumder MD. Will capacity building training interventions given to street food vendors give us safer food?: A cross-sectional study from India. *Food Control*. 2011. pp. 1233–1239.
23. Campos J, Gil J, Mourão J, Peixe L, Antunes P. Ready-to-eat street-vended food as a potential vehicle of bacterial pathogens and antimicrobial resistance: An exploratory study in Porto region, Portugal. *Int J Food Microbiol*. 2015;206: 1–6.
24. Purnama SG, Purnama H, Made Subrata I. Kualitas Mikrobiologis dan Higiene Pedagang Lawar di Kawasan Pariwisata Kabupaten Gianyar. *Jurnal Kesehatan Lingkungan Indonesia*. 2017. pp. 56–62.
25. Kurniawan YA, Sanubari TPE, Puspita D. Evaluasi Personal Hygiene Penjaja Pangan Jajanan Anak Sekolah di Salatiga. *Prosiding Seminar Nasional*

- Mahasiswa Universitas Muhammadiyah Semarang. Semarang: Universitas Muhammadiyah Semarang; 2018.
26. Rosida N, Windraswara R. Hygiene dan Sanitasi Pedagang Jajanan di Lingkungan SD/MI. *J Health Educ.* 2017;2: 80–85.
 27. Dharma S. Plastik sebagai Kemasan Makanan dan Minuman. Bali: Fakultas Kedokteran Universitas Udayana; 2016.
 28. Ningsih R. Penyuluhan Hygiene Sanitasi Makanan dan Minuman, Serta Kualitas Makanan yang Dijajakan Pedagang di Lingkungan SDN Kota Samarinda. *Kemas: Jurnal Kesehatan Masyarakat.* 2014.
 29. Hawa LC, Susilo B, Jayasari NE. Komparasi Inaktivasi *Escherichia Coli* dan Perubahan Sifat Fisik pada Pasteurisasi Susu Sapi Pemanasan dengan Kejut Medan Listrik. *Jurnal Teknologi Pertanian.* 2011;12: 31–39.
 30. Hadi B, Bahar E, Semiarti R. Uji Bakteriologis Es Batu Rumah Tangga yang Digunakan Penjual Minuman di Pasar Lubuk Buaya Kota Padang. *Jurnal Kesehatan Andalas.* 2014.
 31. Nur J, Asri Winarsih D. Identifikasi Bakteri *Escherichia Coli* Pada Es Batu di Wilayah Bojong Raya Cengkareng Jakarta. *Jurnal Wiyata: Penelitian Sains dan Kesehatan.* 2018;4: 151–156.
 32. Wibawa A. Faktor Penentu Kontaminasi Bakteriologis pada Makanan Jajanan di Sekolah Dasar. *Kesmas: Jurnal Kesehatan Masyarakat Nasional (National Public Health Journal).* 2008;3: 3–8.