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Nutrition Education on Food Hygiene and Sanitation to increase Knowledge, Attitude and Practice among Canteen Food Handler in Indonesia

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ABSTRACT

Background: Food has to be nutritious and safe to eat for all people. However not many people know how to prepare and cook food safely.
Aimed: This research aimed to analyze the influence of nutrition education about food hygiene and sanitation towards knowledge, attitude and behavior of food handlers in Universitas Airlangga canteens.
Methods: A quasi-experimental study with pre- and posttest measurement involving 72 food handlers were selected by simple random sampling with inclusion works as permanent food handlers in faculty canteen in Universitas Airlangga, Surabaya, Indonesia. The intervention group was given nutrition education using leaflet and the control group was given leaflet without education. Intervention conducted for 2 months with 5 sessions. Collected data was analyzed using SPSS and calculated by Wilcoxon signed rank test.
Results: There was a significant difference among knowledge ($p<0.001$), attitude ($p<0.001$) and behavior ($p<0.001$).
Conclusion: Nutrition education showed positive association towards better knowledge, attitude, and behavior about food hygiene and sanitation in food handlers.

Keywords: Nutrition education, food hygiene, sanitation, food handlers

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INTRODUCTION

In every process of food production, the risk of contamination could influence the safety and hygiene of the food. Hygiene and sanitation are an attempt to ensure food systems safe from the food source, food process, cooking utensils, food service and food handlers. Poor food handling will impose several hazards including physical, chemical, and biological hazard that might lead to foodborne disease. Foodborne disease is mostly caused by pathogenic bacteria[1]. Poor hygiene and sanitation by food handlers increase the risk of food contamination. According to Michaels et al in 2004, the Centers for Disease Control and Prevention (CDC) reported that food handlers caused 20% of food-related infections. Data from CDC in 2013, showed that in the USA 818 foodborne disease were reported, 13,360 people affected, 1,062 people hospitalized, 16 fatal cases and 14 food items were drawn[2]. With the lack of food inspection in developing countries due to limited resources and regulation, the small-scale food production, grocery and canteen might not be enforced to maintain its quality. Therefore, the role of food handlers as the center for food production in the small-scale businesses plays a pivotal role in ensuring the safety and quality of food[3]. Knowledge, attitude and behavior of the food handlers were significantly associated with the quality of food being prepared[4].

Based on the Food and Drug Administration of Indonesia in 2013, there were 48 cases of food poisoning outbreak in 34 provinces, affecting 1,690 people to be hospitalized and 12 people died. Most of the food poisoning were from the household (47.92%), small-scale food businesses (16.67%), snack food (16.67%), and unidentified source (4.17%)[5]. Between April to June 2016 there were 29 incidences of food poisoning consist of 12 small-scale businesses, 11 households, 4 from snack and the rest due to unsafe drink[5]. These high incidences of food poisoning pose a hypothetical question whether the food handlers were well equipped with knowledge, attitude and behavior related to food hygiene and sanitation.

Canteen is public facility that serves food for many customers in certain institution including university. The canteens in the Campus C were spread in the Faculty of Public Health, Faculty of Science and Technology, Faculty of Nursing, Faculty of Marine and Fisheries, Faculty of Veterinary Medicine and also Rectorate. With over 1 thousand students in each faculty, the need for safe foods and meals is quite high in comparison to the availability of canteen. Canteen sanitation is influential in ensuring the safety of foods eaten by students in the university [6]. Previous study by Azizah in 2016 showed that Campus C Canteen in Universitas Airlangga still needs improvement to improve their sanitation standard. Previous study showed that training on food hygiene and sanitation significantly improved knowledge, attitude and skill to better food handling[7].

According to the theory of the formation of behavior by Lawrence Green in 1980 the establishment of a behavior is determined by three factors, predisposing factors *(predisposing),* factors supporting *(enabling)* and reinforcing factors (reinforcing). *Predisposing* is a factor of a person to perform medical practices which includes knowledge, attitudes, beliefs, culture. Based on research conducted by Wahyuningsih in 2015 showed with given nutrition education using media *nutrition card* can

increase knowledge in choosing food. *Predisposing* are internal factors of an individual, to accelerate the practice of healthy behaviors are influenced by factors *enabling* that enable and facilitate behavior or action. *Enabling* is a facility that supports the implementation of the practice of an activity, with the availability of adequate facilities it can support the practice of healthy behavior. If supported by *reinforcing* it will further strengthen the occurrence of healthy behavior practices.

Reinforcing is a factor that strengthens the practice of healthy behavior which includes support, supervision, policy. Formation of behavior consists of 3 aspects, namely knowledge, attitude and action. These three aspects occur sequentially, which means from knowledge will change into attitude and attitude will change into action[8], hence in order to change behavior it must be done gradually.

Changes to the proper way of processing food can be done with education in the form of nutrition education. Nutrition education is a learning process to develop positive knowledge and attitude toward nutrition so that one can have and form good habit about food improvement and nutritional status in everyday life. Nutrition education is done to improve one's knowledge, with the increase of knowledge hence expected to happening change of behavior better to nutrition and health[9]. Based on research in *United State of America* (USA) on workers in food service showed that education and training based on *predisposing, enabling,* and *reinforcing* factors can improve behavior.

The foundation of Lawrence Green's theory is the beginning of standard food safety education practice is knowledge of the worker that may affect his behavior. This foundation is used to see the success of an education that can affect the change in the healthy behavior of food handlers. Education will be more effective if the presenters can work with workers to prevent foodborne illness.

According to research by Rapiasih et al in 2010 stated that there was an increase in knowledge and behavior of hygiene sanitation feasibility before and after given hygiene and sanitation training and poster installation. Training conducted using lecture, discussion, and demonstration methods with audiovisual aids. Food sanitation hygiene training materials were adopted from the food sanitation hygiene course curriculum for food handlers based on Kemenkes No 715 / Menkes / SK / V / 2003 on sanitary hygiene requirements. An integrated approach to foodborne disease prevention is done through education and training for food handlers[10]. Therefore, the authors want to analyze the effect of nutrition education on hygiene and food sanitation to the knowledge, attitude and behavior of canteen food handlers.

MATERIALS AND METHODS

This study used quasi experiment with pre-test and post test control group design. The design of this study was used to compare the intervention outcomes of nutritional education given to two groups. The intervention group provided nutrition education with the method of counseling, discussion, and aids in the form of leaflets and control group given leaflets without education. Measurements on the subject were done twice, before (*pre test*) and after the intervention (*post test*), hence the effect of the intervention given can be measured. The time range of measurements *pre-test* and *post-test* was one month. This was in line with the evaluation theory that stated the distance between two measurements is at least two weeks for knowledge and one month for attitudes and actions. At that time the nutrition education materials delivered were stored in the respondents' memory[11].

All food handlers meeting the inclusion criteria were participants. The participants were grouped into 2 groups, where in the group selection was done randomly with *simple random sampling*. Before the intervention begins, *pre-test* on knowledge and attitude of food sanitizing hygiene was given while researcher observed participants behavior. The intervention group was given nutritional education about hygiene and food sanitation by counseling method, discussion, and using leaflet tool, while control group was given leaflet without education.

Nutrition education was given to food handlers in the cafeteria of Campus C Universitas Airlangga. Nutrition education at food handlers were done once a week in 5 (five) weeks and conducted before and after lunch with 15-20 minute time allocation with leaflet aids. At week 5 (five), the intervention group and the control group were given *post-test* on the knowledge and attitude of food sanitation hygiene while researcher observed participants behavior again.

The population in this study were all food handlers in the cafeteria of Campus C Universitas Airlangga Surabaya. The participants in this study was determined from the population with inclusion criteria; food handlers who are always in contact and processing food and willing to follow the research by agreeing to *informed consent*. The total number of participants required in this study was 72 participantss. Determination and sampling was done by *simple random sampling*. Collected data was analyzed using SPSS and calculated by Wilcoxon signed rank test.The protocol and ethics of this study was approved by the institutional review board (IRB) of the faculty of Public Health Universitas Airlangga.

RESULTS AND DISCUSSION

The results of delta knowledge, attitudes and behaviors in the intervention group and control group were done by looking at the difference between posttest result and pretest result. Based on Table 1 it was known that the delta of knowledge in the intervention group and the control group has a significance of $p<0.001$, which means that there was a significant delta of knowledge between the intervention group and the control group. The result of attitude delta in intervention group and control group has significance equal to $p<0.001$, which means there was significant difference of attitude delta between both groups. The results of the behavior delta have significance of $p<0.001$ in the intervention group and the control group, which means that there was a significant delta of behavioral difference between the two groups. Figure 1 showed the boxplot graphic of the delta knowledge, attitude, and behavior of the food handlers.

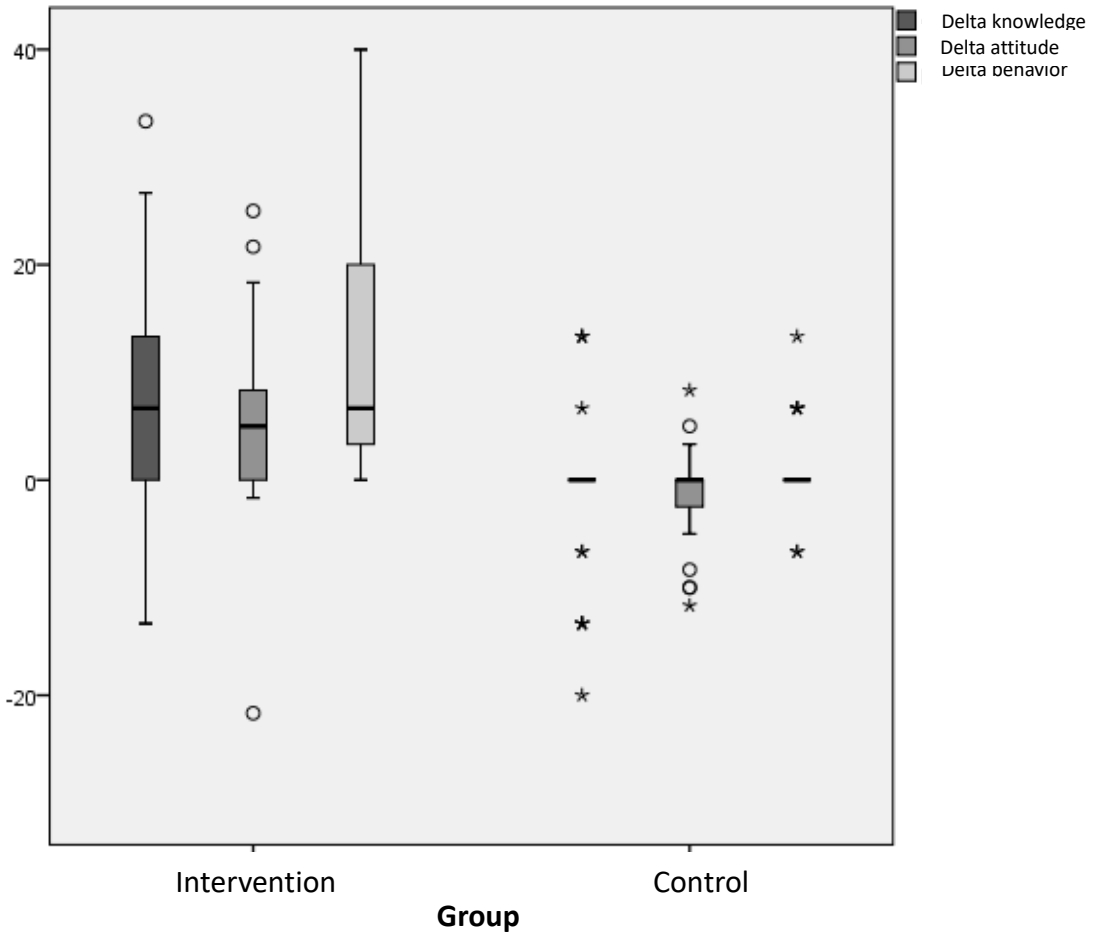

Figure 1: Boxplot Graphic of delta knowledge, attitude, and behavior

Table 1: Knowledge, Attitude, and Behavior Delta Results

Variable	Intervention Group		Control Group		*p-value*
	Δ mean	SD	Δ mean	SD	
Knowledge	8.00	9.67	-1.11	7.03	< 0.001
Attitude	5.52	8.67	-1.15	4.05	< 0.001
Behavior	11.04	10.34	0.74	3.48	< 0.001

* significant using Wilcoxon signed rank test with α=0.05

Knowledge can be gained from learning and experience. The success of the learning process to improve one's knowledge is influenced by many factors, which is educational methods and educational media. Right selection of methods and educational media can affect the success of an education.

In this study, we wanted to assess the knowledge of hygiene and sanitation towards food processing. Statistical test results with *independent t-test* showed no difference of knowledge result before given intervention. However, after intervention, there was difference of knowledge in the intervention group and control group. This study was in line with research conducted by Wahyuningsih in 2015 who said that after respondents were given intervention using *nutrition card* showed significant differences in results.

The average value of knowledge in the intervention group before and after nutritional education using the *leaflet* was increased, but in the control group with *leaflets* alone, showed no improvement. After tested with *Wilcoxon signed rank test*, only intervention group showed significant difference of knowledge (p <0.001). This research was in line with research of Rizka in 2015 which stated that the existence of treatment in the form of advertising media and poster can increase the knowledge of respondent.

One of the efforts to improve nutrition knowledge, especially about hygiene and sanitation in processing food is to provide nutrition education. Nutrition education is a learning process to develop a positive understanding and attitude toward nutrition so that one can have and form good habit about food improvement and nutritional status in daily life. There are many methods and media that can be used to assist the process of nutrition education. The methods used to increase knowledge can use lecture, assignment, read, and counseling methods. While the media education such as visual media, audio and audiovisual.

The results of research conducted by Rapiasih et al in 2010 showed that there was an increase in knowledge after being given hygiene and sanitation training and poster installation. Training conducted using lecture, discussion

and demonstration methods with audiovisual aids. Other studies have also mentioned that nutrition education through *puzzle games* could increase knowledge[12]. In addition, a study conducted by Hidayat in 2013 showed that there was a significant difference in the level of knowledge between the groups given nutritional education by using cube media compared to those without the media. Giving *leaflets* to the control group did not affect the value of knowledge, this may be due to lack of motivation, interest in reading and the attention of respondents.

In addition, it may be caused by the lack of design and language ambiguity that make respondents do not pay attention of the contents of the messages in the *leaflet* . Therefore the methods and media used must be appropriate with the characteristics of the target. Interesting media display can bring attention to the material delivered.

Attitude is one component of behavior[13]. Formation of behavior consists of 3 aspects, namely knowledge, attitude and action. These three aspects occur sequentially, meaning that from knowledge will change into attitude and attitude will turn into action[8]. Attitudes referred to in this study were respondents' behavior regarding hygiene and sanitation in processing food.

Based on statistical test results using *independent t test* showed no difference. However, after the intervention, there were differences in attitude in the intervention group and control group. The results of this study was in line with research conducted by Wahyuningsih in 2015 which stated that after intervention using media *nutrition card* and whiteboard media showed significant results.

The average value of respondents' attitudes in the intervention group before and after the intervention was given in the form of nutritional education has increased, but in the control group only given *leaflets* did not increase. According to research in Yogyakarta in 2005 stated that changes in attitude and behavior takes a long time, meanwhile good knowledge does not always reflect good attitude and behavior as well[14]. Statistical test using *paired t test* showed significant difference of attitudein intervention group ($p<0.05$).

In theory the attitude will be related to hygiene behavior and food sanitation, someone who has a good attitude tends to behave well too, hence good knowledge should be followed with a good attitude[15]. The attitude of a person also influenced by other factors such as the influence of family environment / support, experience / habit, beliefs and facilities[9].

Research by Rizka in 2015 showed that there were differences in attitude before and after given treatment in the form of advertising. Other studies have also mentioned that there were significant differences in attitude before and after the intervention given in the form of visual media *nutrition card*[16]. Increased one's attitude about nutrition is caused by family environmental factors and knowledge. Increased nutritional knowledge through nutrition education will help the child's attitude in choosing healthy foods[9].

Nutrition education provided by media *leaflets* can improve the attitude of food handlers in terms of hygiene and food sanitation. Attitudes do not include action, but are predisposing actions of behavior. In determining attitudes, knowledge and beliefs influence someone in a person's attitude, including in terms of addressing nutritional education provided[13]. Attitude is important, because if a person's attitude has been formed then the attitude can determine a person's behavior towards something[4].

Behavior referred to in this study is hygiene and sanitation behavior of food handlers in terms of processing food. Based on statistical test result with *independent t test* showed that there was no difference of behavior before given intervention in intervention group and control group. After the intervention showed significant differences in behavior in the intervention and control groups. This showed that overall behavior of food handlers after being given intervention in the form of nutritional education with media *leaflets* in the intervention group and in the control group that only provided *leaflets* increased. This research was supported by research conducted by Rapiasih et al in 2010 which stated that after food handlers were given sanitation hygiene training for 2 months plus poster installation showed a significant difference.

The average value of respondents' behavior in the intervention group before and after has increased, as well as in the control group only given *leaflets*. After the *Wilcoxon signed rank test test, it was* shown that only the intervention group showed significant differences ($p<0.001$). Other studies have also mentioned that counseling using paperback and poster media may improve individual hygiene and behavior in food processing sanitation.

The results of behavioral observation showed that most respondents experienced an increase in behavior, such as the previous respondents did not wear apron so wear apron, before the respondent wear ring then they not wearing ring. The knowledge, skills and attitudes of a food handler can affect behavior. When a behavioral change is made through a process based on positive knowledge and attitude, it will be more last than a behavior that is not based on knowledge. Vice versa, behavior that is not based on positive knowledge and attitude will not last long[4].

In addition, according to research conducted by Wahyuningsih in 2015 showed increased action of schoolchildren in the selection of food after being given nutritional education using visual media *nutrition card* for 4 weeks. Nutrition education using media *leaflets* for 4 weeks showed significant improvement toward the behavior of food handlers in terms of hygiene and sanitation food processing. However, to change a behavior is not enough just to be given a nutrition education course, but needed other factors such as support from family and colleagues, as well as adequate canteen facilities. If the facilities in the canteen are adequate, it is expected that food handlers can behave in a healthy manner.

Research by Rapiasih in 2010 stated that knowledge of sanitation management of food did not affect the behavior in the management of food. Knowledge is not a major factor in behavioral change, but behavior based on sound knowledge and awareness of food hygiene and sanitation is more sustainable than not based on sound knowledge.

CONCLUSION

Based on the results of statistical tests there was significant difference of delta of knowledge, as well as delta result of attitude and behavior. This study was in line with other studies suggesting that there was a significant difference in weight delta values before and after intervention between treatment groups and controls. Most of the difference in value in the intervention group showed an increase, while in the control group some did not increase, even decreased. This might be because the

control group did not receive any form of nutrition education so that knowledge, attitude and behavior of food handlers did not change. Nonetheless, 5 sessions of nutrition education showed positive association towards better knowledge, attitude, and behaviour about food hygiene and sanitation in food handlers.

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REFERENCES

1. Triandini FA. Pengetahuan,Sikap Penjamah Makanan Dan KOndisi Higiene Sanitasi Produksi Otak-Otak Bandeng Di Kabupaten Gresik. E-Journal Boga. 2015;04 edisi y(2):27-36.
2. CDC. Annual Summaries of Foodborne Outbreaks: Foodborne Outbreak Surveillance System. CDC [internet]. 2013 [cited 2018 July 10]. Available from: https://www.cdc.gov/fdoss/annual-reports/index.html
3. Sofiana E. Hubungan Higiene Dan Sanitasi Dengan Kontaminasi Escherichia Coli Pada Jajanan Di Sekolah Dasar Kecamatan Tapos Depok. Jurnal Kesehatan Masyarakat. 2012.
4. Meikawati W, Pastuti R. The Correlation Between Knowledge and Attitude of Food Taster Officer with Hygiene Practice and Food Sanitation in Nutrition Unit Dr. Amino Gondohutomo Mental Hospital Semarang. Unimus [internet]. 2010 [cited 2018 July 10]. Available from: http://jurnal.unimus.ac.id.
5. BPOM. Berita Keracunan Bulan April – Juni 2016 [internet]. Available from : http://ik.pom.go.id/v2016/berita-keracunan/berita-keracunan-bulan-april-juni-2016. 2016 [cited 2018 July 10].
6. Nurhayati A, Setiawati T, Yulia C, Pendidikan DP, Boga T, Upi F. Pengembangan Model Pendidikan Gizi untuk Mencegah Foodborne Deseases pada Penjual Makanan Jajanan. 2018 [cited 2018 July 10]. Available from : http://download.portalgaruda.org/article.php?article=448412&val=8415&title=PENGEMBANGAN%20MODEL%20PENDIDIKAN%20GIZI%20UNTUK%20MENCEGAH%20FOODBORNE%20DESEASES%20PADA%20PENJUAL%20MAKANAN%20JAJANAN
7. Widyastuti. Penyakit Bawaan Makanan. Jakarta: EGC [internet]. 2006 [cited 2018 July 10]. Afailable from: https://books.google.co.id/books?id=2FYzqGw2DIkC&pg=PR4&lpg=PR4&dq=Penyakit+Bawaan+Makanan.+Fokus+Pendidikan+Kesehatan+WHO.+Jakarta:+EGC&source=bl&ots=0J3PzG9y3r&sig=pU-xYsjnS8qSFZtiHxBtYlITg4A&hl=en&sa=X&ved=0ahUKEwjRl9Lv_JTcAhULGuwKHfHCCw0Q6AEINTAB#v=on.
8. Maulana HDJ. Promosi Kesehatan. Jakarta: Penerbit Buku Kedokteran, EGC; 2009.
9. Nuryanto N, Pramono A, Puruhita N, Muis SF. Pengaruh pendidikan gizi terhadap pengetahuan dan sikap tentang gizi anak Sekolah Dasar. J Gizi Indones (The Indones J Nutr. 2014;3(1):32-36. doi:10.14710/JGI.3.1.121-125
10. Rapiasih NW, Prawiningdyah Y, Lestari LA. Pelatihan hygiene sanitasi dan poster berpengaruh terhadap pengetahuan, perilaku penjamah makanan, dan kelaiakan hygiene sanitasi di instalasi gizi RSUP Sanglah Denpasar. J Gizi Klin Indones. 2010;7(2):64-73. doi:10.22146/IJCN.17738
11. Hayati M. Tesis Pengaruh Peer Edukasi Tentang Jajanan Sehat Terhadap Perilaku Anak Usia Sekolah di Kota Lhokseumawe Nanggroe Aceh Darussalam [internet]. [cited 2018 July 11]. Available from : http://lib.ui.ac.id/file?file=digital/2016-11/125184-MawarHayati.pdf.
12. Demitri A, Nasution E, Aritonang EY. Pengaruh Pendidikan Gizi Tentang Pola Makan Seimbang Melalui Game Puzzle terhadap Peningkatan Pengetahuan Anak SDN 067690 Kota Medan. Gizi, Kesehat Reproduksi dan Epidemiol [internet]. 2015;1(2) [cited 2018 July 11]. Available from : https://jurnal.usu.ac.id/index.php/gkre/article/view/10297.
13. Notoatmodjo S. Pendidikan dan perilaku kesehatan / oleh Soekidjo Notoatmodjo. 1 Kesehatan - Pendidikan,Pendidikan dan perilaku Kesehat / oleh Soekidjo Notoatmodjo. 2003;2003(2003):1-99. doi:2003
14. Prabandari YS, Prabandari YS. Pelatihan keterampilan pencegahan perilaku penyalahgunaan narkoba bagi siswa SD dan SMP di Yogyakarta. Ber Kedokt Masy. 2012;21(1). doi:10.22146/bkm.3688
15. Astini Handayani NM, Adhi KT, Duarsa DP, Kesehatan D, Karangasem K. Faktor yang Mempengaruhi Perilaku Penjamah Makanan dalam Penerapan Cara Pengolahan Pangan yang Baik pada Industri Rumah Tangga Pangan di Kabupaten Karangasem Factors Associated with the Behavior of Food Handlers in the Application of Good Manufacturing Practice (GMP) in the Household Food Industry (HFI) in Karangasem Regency [internet]. [cited 2018 July 11]. Available from : http://download.portalgaruda.org/article.php?artic http://download.portalgaruda.org/article.php?article=411322&val=4933&title=Factors%20Associated%20with%20the%20Behavior%20of%20Food%20Handlers%20in%20the%20Application%20of%20Good%20Manufacturing%20Practice%20(GMP)%20in%20the%20Household%20Food%20Industry%20(HFI)%20in%20Karangasem%20Regencyle=448412&val=8415&title=PENGEMBANGAN%20MODEL%20PENDIDIKAN%20GIZI%20UNTUK%20MENCEGAH%20FOODBORNE%20DESEASES%20PADA%20PENJUAL%20MAKANAN%20JAJANAN.
16. Wahyuningsih NP, Nadhiroh SR, Adriani M. Media Pendidikan Gizi Nutrition Card Berpengaruh Terhadap Perubahan Pengetahuan Makanan Jajanan Anak Sekolah Dasar. Media Gizi Indones. 2016;10(1):26-31. doi:10.20473/MGI.V10I1.26-31