Analysis of the Effectiveness of Food Safety of School Snacks Program in Changing Knowledge, Attitude, and Behavior of School Children in Southeast Sulawesi

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ABSTRACT / ABSTRAK

Snacks are trendy foods with school-age children to fulfil their energy and nutrition needs in the school environment and must be ensured to be safe from biological, chemical, and physical contamination. However, food safety of school snacks program (PJAS) in Indonesia is still a reasonably concerning problem. One of the efforts made by the government to protect school-age children from unsafe PJAS is by increasing the knowledge, behavior, and attitudes of school children in choosing, buying, and consuming food through the Safe PJAS Program. This study aimed to examine the effect of the Safe PJAS program on the knowledge, attitudes, and behavior of school children in Southeast Sulawesi and the effectiveness of the Safe PJAS program in terms of the Knowledge, Attitudes, and Behavior of school children. The research methodology used was the quantitative analysis with Wilcoxon Test and Oneway Anova Test and literature review. The research results showed it was found that the Safe PJAS program carried out in Southeast Sulawesi in 2023 in Wakatobi and Central Buton Regencies had an impact and was influential in increasing the knowledge, attitudes, and behavior of school children in choosing and consuming snack foods. The author's recommendation for the Safe PJAS Program is that the Indonesian FDA can improve coordination and communication with the Ministry of Education and Culture to include food safety material in the independent learning curriculum and increase advocacy to obtain support from the Regional Government in allocating a budget for improving canteen facilities and infrastructure and to replicate the Safe PJAS program.

Pangan jajanan merupakan pangan yang sangat digemari oleh anak usia sekolah dalam pemenuhan energi dan gizinya saat anak berada dalam lingkungan sekolah. Pangan jajanan yang dikonsumsi harus dipastikan aman dari cemaran biologi, kimia dan fisik. Namun, Keamanan pangan jajanan anak sekolah (PJAS) di Indonesia masih menjadi masalah yang cukup memprihatinkan. Salah satu upaya yang dilakukan pemerintah untuk melindungi anak usia sekolah dari PJAS yang tidak aman dengan meningkatkan pengetahuan, perilaku dan sikap anak sekolah dalam memilih, membeli dan mengkonsumsi pangan melalui Program PJAS Aman. Tujuan penelitian ini untuk mengkaji pengaruh program PJAS Aman terhadap pengetahuan, sikap dan perilaku anak sekolah di Sulawesi Tenggara serta efektivitas program PJAS Aman ditinjau dari Pengetahuan, Sikap, dan Perilaku anak sekolah. Metodologi penelitian yang digunakan yaitu metode analisa kuantitatif dengan Uji Wilcoxon dan Uji Oneway Anova dan kajian literatur. Hasil penelitian menunjukkan bahwa program PJAS Aman yang dilakukan di Sulawesi Tenggara pada tahun 2023 di Kabupaten Wakatobi dan Buton Tengah berpengaruh

dan efektif terhadap peningkatan pengetahuan, sikap dan perilaku anak sekolah dalam memilih dan mengkonsumsi pangan jajanan. Rekomendasi penulis terhadap Program PJAS Aman adalah agar Badan POM dapat meningkatkan koordinasi dan komunikasi dengan Kementerian Pendidikan dan Kebudayaan guna memasukkan materi keamanan pangan dalam kurikulum pembelajaran merdeka dan meningkatkan advokasi untuk mendapatkan dukungan Pemerintah Daerah dalam mengalokasikan anggaran perbaikan sarana dan prasarana kantin serta untuk mereplikasi program PJAS Aman.

Keywords: Safe PJAS Program, Southeast Sulawesi, Student
***Kata kunci**: Program PJAS Aman, Sulawesi Tenggara, Anak Sekolah*

1. Introduction

Food safety of school snacks (PJAS) in Indonesia is still a concern. Sampling data from the Safe PJAS Program of the Indonesian FDA Regional Office in Kendari in 2023 showed that 15.67% did not meet the microbiological requirements of 185 PJAS samples tested (Balai POM in Kendari, 2023). Microbial contaminated food can come from bacteria, fungi, protozoa, and viruses that can cause foodborne diseases. Foodborne diseases symptoms include fever, headache, nausea, vomiting, abdominal pain, and diarrhoea (WHO, 2022). Foodborne diseases can lead to an Extraordinary Event of Food Poisoning (KLB KP). According to KP outbreak data in 2022 (Figure 1), the causative agent of most KP outbreaks was microbial contamination, with 55 incidents, consisting of 50 suspected microbiology (69.44%) and five confirmed microbiology (6.95%) due to *Salmonella* and *Staphylococcus aureus* contamination. Based on the distribution of KP outbreaks, schools ranked second at 38.89%, after residential homes at 40.28% (Badan POM RI, 2022).

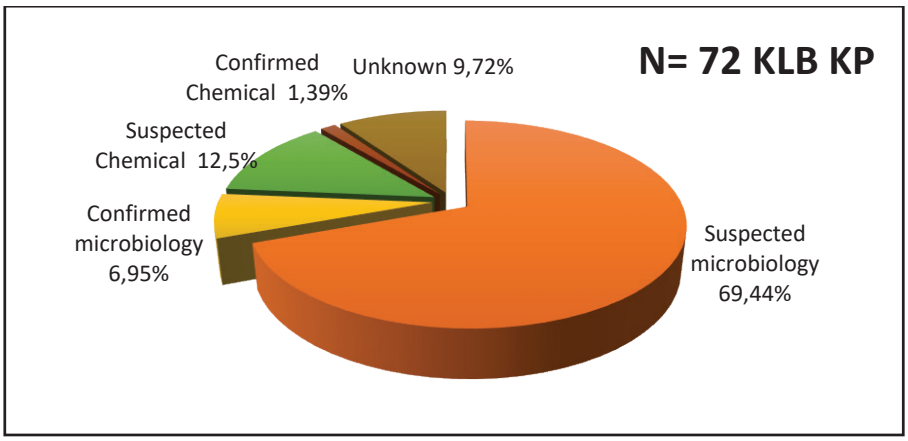

Figure 1. Distribution data of the causes of KP outbreaks in 2022 (Badan POM RI, 2022)

Problems in food safety include microbial contamination due to poor sanitation and hygiene in the production and preparation process of PJAS and chemical contamination problems due to the misuse of hazardous chemicals in food (Syah et al., 2015). Microbial contamination can occur due to unhygienic behavior and attitudes of food vendors, such as not washing hands or not using mouth/head/hand covers. Meanwhile, contamination due to unfulfilled sanitation can cause cross-contamination of processed food from unclean facilities/equipment. These problems can be prevented by increasing the knowledge of food vendors in canteen, teachers, and school children about choosing and consuming PJAS.

There is a relationship between the knowledge and behavior of school children in choosing healthy snacks (Febrianto, 2016). Education can instill the concept of behavior change to prevent consuming unhealthy snacks (Surya Syarifuddin, 2022).

The government has made efforts to improve the safety of PJAS through various programs, one of which is the Safe PJAS Program. This program started in 2011, and in 2017, the program was integrated into the Healthy Living Community Movement (GERMAS SAPA), initiated by President of the Republic of Indonesia. Prioritizing promotive and preventive efforts that involve all components of the nation to promotes a healthy paradigm. Safe PJAS aims to improve the knowledge, attitudes, and behavior of school children, PJAS traders, and teachers related to the safety of snacks so that they can protect themselves and their families from unsafe and unhealthy food to realize superior and competitive human resources towards Golden Indonesia 2045 Vision (BPOM, 2023). Evaluation of the objectives achievement of the Safe PJAS program needs to be done to assess the effectiveness of program implementation and increase knowledge, attitudes, and behavior, which is one of the critical indicators in the success of the Safe PJAS program. Based on this, related research is needed in schools intervened by the Balai POM in Kendari in 2023.

Wakatobi and Central Buton Regency are the focus locations of the Safe PJAS Program intervention in 2023 implemented by Indonesian FDA Regional Office in Kendari. Health problems occur in these two regencies, such as a high prevalence of diarrhoea. Based on data from the Central Bureau of Statistics in 2023, diarrhoea ranked 4th most cases of diseases that occurred in 2021 in Wakatobi Regency with 653 instances and 9th in Central Buton Regency (Anjani et al., 2023; Maulana et al., 2024).

This study examines the effect of the Safe PJAS Program on the knowledge, attitude, and behavior of school children in Southeast Sulawesi. In addition, the effectiveness of the Safe PJAS program will also be reviewed based on the knowledge, attitude, and behavior of school children.

2. Methodology

The study used a quantitative analysis method based on the survey assessments conducted before and after the intervention (pre- and post-interventional study). The survey was conducted directly by food safety cadres in school by distributing questionnaires containing questions for assessing Knowledge, Attitude, and Behavior with ten questions each. The results obtained are quantitative data, which are then statistically analysed using descriptive analysis methods, comparison tests, and variance analysis to obtain descriptions of the patterns of knowledge, attitudes, and behavior of school children. Furthermore, a literature review was conducted from reports related to school snacks in national and international journals.

2.1. Research Design

Descriptive with a longitudinal survey type to see changes before and after implementing the Safe PJAS Program in Schools.

2.2. Population and Sample

The population in this study were elementary, junior high, and high school students in Wakatobi and Central Buton Regency who received the Safe PJAS Program from Balai POM in Kendari. The samples were taken by 120 children divided into 60 children in

Wakatobi Regency and 60 in Central Buton Regency. Samples were taken from 6 schools in each regency, each involving ten children.

2.3. Time and Place

This study was conducted in May-July 2023 in the focus location of the intervention of Safe PJAS Program in 2023, namely Wakatobi and Central Buton Regency, with details of schools according to Table 1.

Table 1. Intervention Schools of PJAS Program of Balai POM in Kendari in 2023

No.	Intervention School	
	Wakatobi Regency	Central Buton Regency
1.	SDN 1 Mandati	SDN 1 Lakudo
2.	SDN 1 Pongo	SDN 7 Lakudo
3.	SMPN 1 Wangi-wangi	SDN 9 Lakudo
4.	SMPN 3 Wangi-wangi Selatan	SDN 17 Lakudo
5.	MTSN 1 Wakatobi	SMPN 3 Buton Tengah
6.	MAN 1 Wakatobi	MAN 1 Buton Tengah

2.4.Data Collection Technique

Data collection was collected based on secondary data from the results of implementing the PJAS program in 2023 by giving questionnaires directly to school children. The questionnaire given to respondents consisted of 30 questions divided into three assessment components: Knowledge, Attitude, and Behavior. The questionnaire was given before and after the PJAS program intervention by the Balai POM in Kendari in Wakatobi and Central Buton Regency, which was implemented in 2023. The pre-intervention survey was conducted before school children's food safety socialization activities. The post-intervention survey was conducted after school children received Information, Education, and Communication (IEC) from food safety cadres in school.

2.5. Data Analysis Technique

Data analysis was conducted using the SPSS 26 application, paired-samples T-Test, to compare differences in knowledge, attitude, and behavior of school children before and after the intervention of the Safe PJAS program. The data must be normally distributed as a requirement for paired-sample T-test analysis, so a normality test was conducted using the Kolmogorov-Smirnov method. If the data is not normally distributed, proceed with a non-parametric test using the Wilcoxon Test method. Normality test was conducted on knowledge, attitude, and behavior score data.

Furthermore, the data were analyzed using the Oneway Anova method to determine the increase in knowledge, attitude, and behavior before and after the PJAS program intervention. A further test was conducted using the Games Howell method because the data was not homogeneous. This test aims to determine the school that experienced the best improvement.

3. Results and Discussion

3.1 Respondent Characteristics

The respondents in this study amounted to 120 schoolchildren from elementary/junior high/high school in Wakatobi Regency (50%) and Central Buton Regency (50%). The distribution of schoolchildren based on education level is elementary school (50%), junior

high school (33.33%), and high school (16.67%). Meanwhile, the distribution of schoolchildren by gender was male (48.33%) and female (51.67%).

3.2 Knowledge of school children about the safety of PJAS

Knowledge of school children before and after the intervention of food safety program in Wakatobi Regency (Chart 1) and Central Buton Regency (Chart 2), with the average value of knowledge in 5 schools in Wakatobi Regency increased, except for one school that decreased its score, namely MAN 1 Wakatobi. Likewise, the average knowledge score in Central Buton Regency increased in 5 schools. One school's score did not change before or after the Safe PJAS Program intervention, namely MAN 1 Central Buton. From both regencies, at the secondary school level there was no increase in knowledge (the same or decreased). This can be caused by several possibilities, such as school children already having good food safety knowledge before the intervention, school children being less interested in the socialization material provided, and the presentation method being less attractive. Hence, participants are less interested in the information provided.

The PJAS program's effect on school children's knowledge score was further analyzed using the Wilcoxon test. Based on the results of the analysis of the Wilcoxon test, the significance of 0.000 is smaller than 0.05 (Sig < α). Statistically, the Safe PJAS Program has an influence on school children's knowledge of PJAS food safety in Southeast Sulawesi in 2023. Sixty-one school children experienced increased knowledge, with an average increase of 36.72.

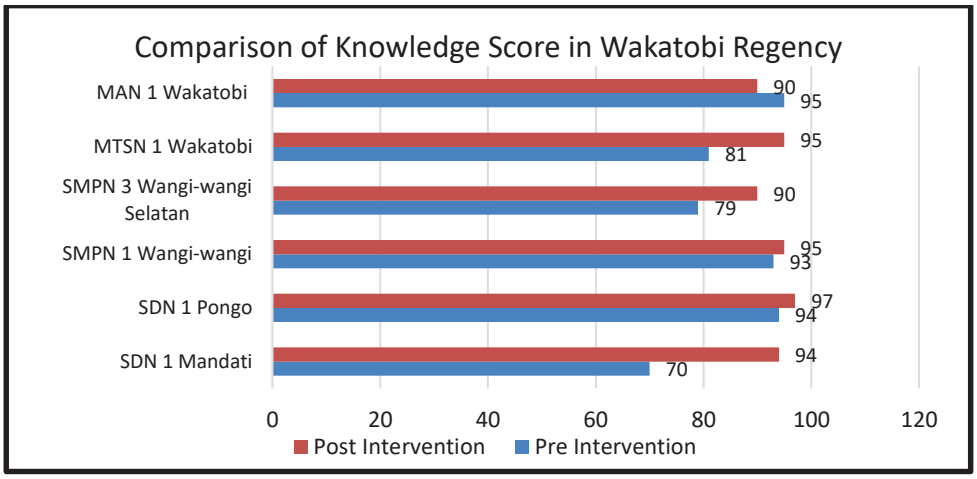

Chart 1. Comparison of Mean Knowledge Score Before and After Safe PJAS Program Intervention in Wakatobi Regency

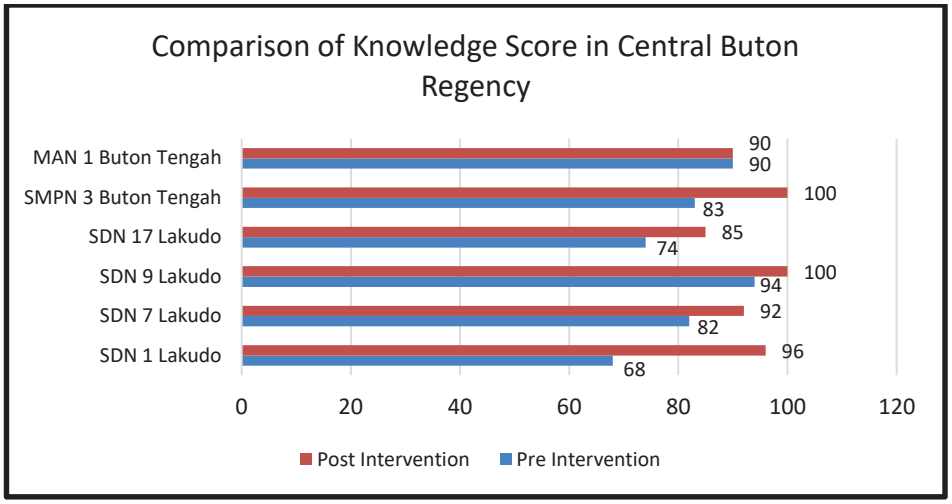

Chart 2. Comparison of Average Knowledge Score Before and After Safe PJAS Program Intervention in Central Buton Regency

The Oneway Anova test was conducted to determine the differences between schools. H0 in the Oneway Anova test is the increase in the score of knowledge of school children in all schools is the same, after the intervention of Safe PJAS Program, while H1: The increase in in the score of school children's knowledge is different in each school after the Safe PJAS Program intervention. The test results (Table 2) obtained Sig 0.000, Significance <0.05 indicates that H0 is rejected and Ha is accepted. From this test, it can be said that statistically, the increase in knowledge scores of school children was different in each school after the Safe PJAS Program intervention.

Table 2. Oneway Anova Test of Knowledge Score of School Children

Difference between pre- and post-knowledge	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	10409.167	11	946.288	4.139	.000
Within Groups	24690.000	108	228.611		
Total	35099.167	119			

Based on the Howel Games Test with α 5%, the results show that the score improvement at SDN 1 Mandati, SMPN 3 Wangi-Wangi, and MTsN 1 Wakatobi is better than other schools in Wakatobi Regency. Meanwhile, in Central Buton Regency, significant improvements occurred at SDN 1 Lakudo, SDN 7 Lakudo, SDN 17 Lakudo, and SMPN 3 Central Buton.

Providing information on food safety to school children showed positive results in improving the food safety knowledge of school children (Anggitasari et. al., 2014). Food safety knowledge is an essential aspect of a person's understanding of food safety. One of the best methods to increase a person's knowledge is through the provision of Information, Education, and Communication (IEC) in the form of lectures, leaflets, and videos. The higher a person's knowledge, the better their behavior and attitude when choosing, buying, and consuming snacks.

In the Safe PJAS Program, intervened schools will be provided with food safety information in the form of posters, leaflets, food safety videos, banners, and IEC on the introduction of food safety hazards, recognizing and choosing safe food (5 Keys to Food Safety) and Tips for Safe Food Consumption by Paying Attention to Nutritional Value Information and Checking Packaging, Label, Distribution Permit, and Expiration.

3.2. Attitude of school children on the safety of PJAS

Questionnaire-based scores of school children's attitudes before and after food safety program intervention in Wakatobi Regency (Chart 3) and Central Buton Regency (Chart 4). The average value of Attitude in Wakatobi Regency has increased in 5 schools, and one school has not changed, namely SMPN 3 Wangi-Wangi Selatan. Meanwhile, the increase in the mean score of attitude in Central Buton Regency occurred in all schools intervened by the Safe PJAS Program.

The PJAS program's effect on school children's attitude score was analyzed using the Wilcoxon test method, preceded by the Kolmogorov-Smirnov test. The normality test results obtained a significance of 0.000, Asymp Sig (2-tailed) < α; the data is not normally distributed. Based on the results of the analysis of the Wilcoxon test, the significance of 0.000 is smaller than 0.05 (Sig < α), so statistically, there is an influence of the Safe PJAS Program on the attitude of school children about PJAS food safety in Southeast Sulawesi in 2023. Sixty-four school children experienced an increase in attitude, with an average increase of 41.10.

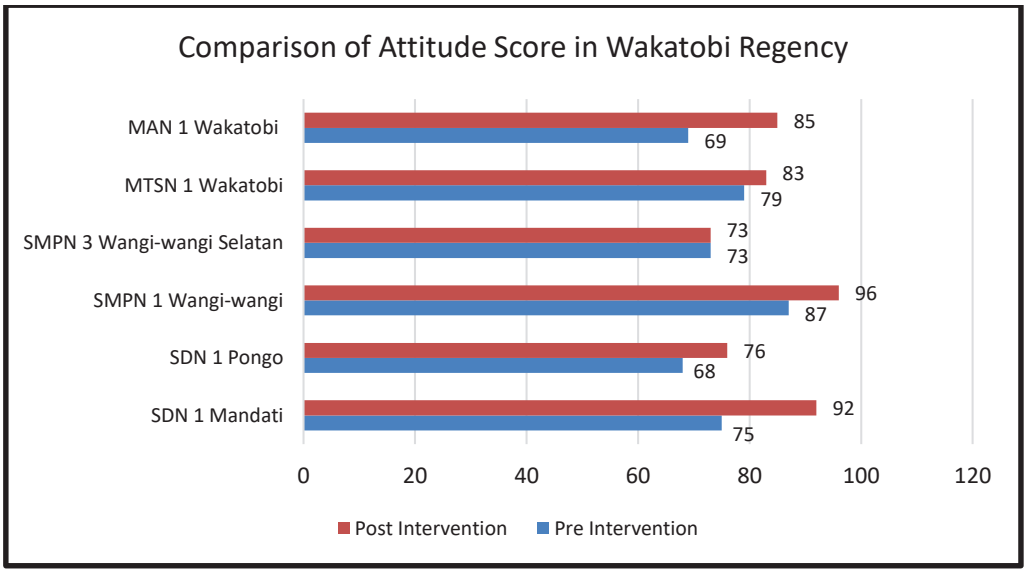

Chart 3. Comparison of the Mean Score of Attitude Before and After Safe PJAS Program Intervention in Wakatobi Regency

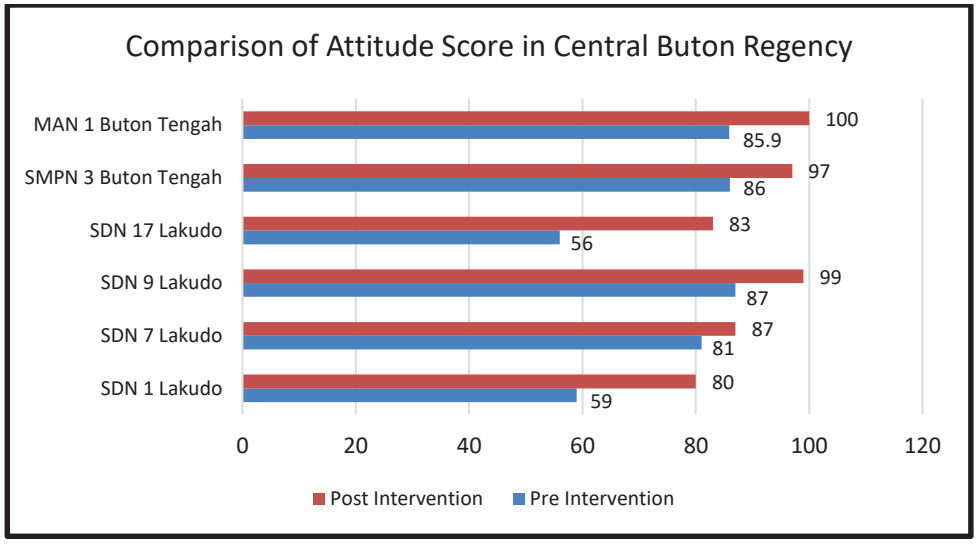

Chart 4. Comparison of Mean Score of Attitude Before and After Safe PJAS Program Intervention in Central Buton Regency

The Oneway ANOVA test was conducted to determine the difference in attitude score in each school. H0: The increase in the attitude score of school children in all schools is the same after the Safe PJAS Program intervention, while Ha: The increase in the attitude score of school children is different in each school after the intervention of the Safe PJAS Program. The test results (Table 3) obtained Sig 0.030, Significance <0.05 indicates that H0 is rejected and Ha is accepted. Statistically, the increase in the score of attitude of school children is different in each school after the intervention of the Safe PJAS Program.

Table 3. Oneway Anova Test of Attitude Score of School Children

Difference between Pre and Post Attitude	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6213.092	11	564.827	2.057	.030
Within Groups	29648.900	108	274.527		
Total	35861.992	119			

Based on descriptive analysis, the best improvement in attitude scores of school children occurred at SDN 17 Lakudo, with a difference in pre-and post-test scores of 27 points. This was followed by the Games Howell test, with α 5% significant difference compared to SMPN 3 Wangi Selatan. However, there is insufficient evidence that SDN 17 Lakudo is better than other schools.

Children's decisions to buy snacks are usually influenced by price, desire to try and the color of the food; the more striking the color, the more interested children are in buying. The Safe PJAS program in intervention schools is expected to change children's attitudes toward food purchasing decisions. In addition, the support of teachers, parents, and food vendors in canteen is critical so that safe snacks are easily obtained.

3.3. Behavior of School Children on the Safety of PJAS

Chart 5 and 6 show that the average behavior score increased in all schools in the Wakatobi and Central Buton Regency. The most significant increase occurred at SDN 1 Lakudo and SDN 17 Lakudo.

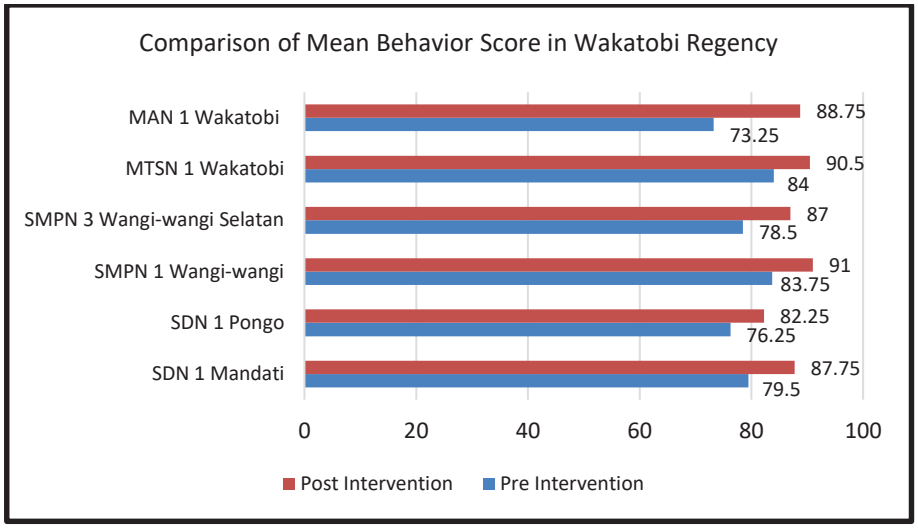

Chart 5. Comparison of Mean Behavior Score Before and After Safe PJAS Program Intervention in Wakatobi Regency

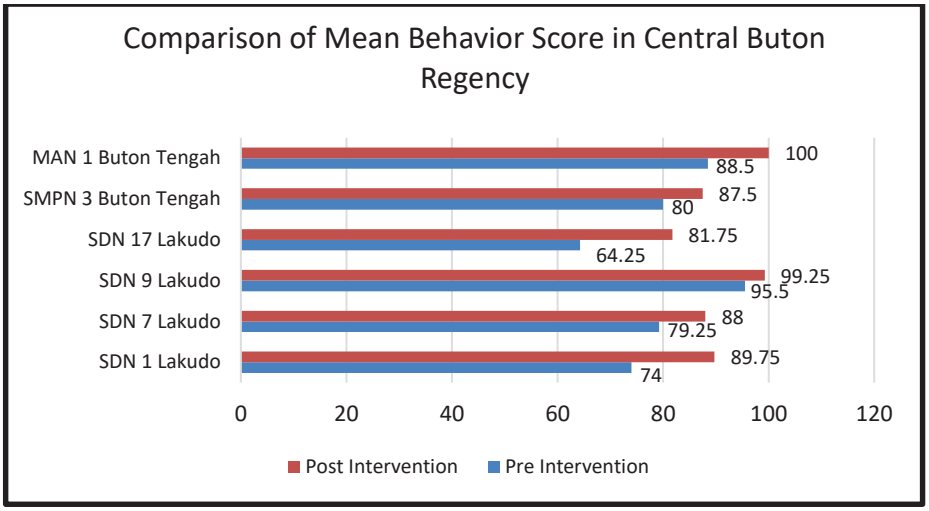

Chart 6. Comparison of Mean Behavior Score Before and After Safe PJAS Program Intervention in Central Buton Regency

The Wilcoxon Test method analyzed the PJAS program's effect on school children's behavior value. In the Wilcoxon Test of Attitude Value, H0 is that there is no influence of the Safe PJAS Program on the behavior of school children about PJAS food safety in Southeast Sulawesi in 2023. Based on the analysis results, the significance of 0.000 is smaller than 0.05 (Sig < α); statistically, there is an influence of the Safe PJAS Program on the behavior of school children regarding PJAS food safety in Southeast Sulawesi in 2023. Ninety-eight school children experienced an increase in behavior, with an average increase of 55.14.

The Oneway ANOVA test was conducted to determine the difference in behavioral values in each school. H0: The increase in the value of school children's behavior in all schools is the same after the Safe PJAS Program intervention. Ha: The increase in the value of school children's behavior is not the same in each school after the intervention of the Safe PJAS

Program. The test results (Table 4) obtained Sig 0.012, Significance <0.05 indicates that H0 is rejected and Ha is accepted. Statistically, the increase in the value of school children's behavior is not the same in each school after the intervention of the Safe PJAS Program.

Table 4. Oneway Anova Test of Behavior Score of School Children

Difference between Pre and Post Behavior	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2089.323	11	189.938	2.366	.012
Within Groups	8670.625	108	80.284		
Total	10759.948	119			

Further tests to determine scholls that experienced a better increase in behavioral values than other schools. Howel's Games test with α 5%, the results of the analysis obtained that the increase in behavior scores that are better than other schools for Wakatobi Regency occurred in SDN 1 Mandati, SMPN 1 Wangi-Wangi, MTS 1 Wakatobi, MAN 1 Wakatobi. Meanwhile, significant increase occurred in the Central Buton Regency at SDN 1 Lakudo, SDN 17 Lakudo, SMP 3 Central Buton, and MAN 1 Central Buton compared to other schools. Some schools, such as SDN 1 Pongo, SMPN 1 Wangi-Wangi, SDN 7 Lakudo, and SDN 9 Lakudo, did not experience significant increase in behavior after the intervention. This is due to the suboptimal role of food safety cadres in implementing the food safety program action plan. The success of health programs is influenced by trained human resources (cadres) and good supervision (Pratiwi, 2021). The safe PJAS Program can run because of the contribution of PJAS cadres, namely teachers and little doctors, as role models who provide examples to other school children (Imara Ihsan et al., 2024).

Interventions in the Safe PJAS Program provided at elementary, junior, and senior high school education levels in Wakatobi and Central Buton Regencies use the same stages of activities, namely by conducting direct socialization of food safety to students, showing food safety videos, installing banners and food safety posters. However, education through the snakes and ladders game is only done at the primary school level. Intervention through providing education with media such as flipcharts, posters, and audio-kinetic (gymnastics) with the theme of good snack foods and drinks can improve snacking behavior to be better in school children (Briawan, 2016).

Knowledge is a factor that supports school children in terms of healthy snack selection behavior (Febriyanto, 2016). The increase in school children's behavior in food safety practices in intervention schools can be caused by an increase in school children's knowledge about food safety, so it is expected that the Safe PJAS program can continue to be carried out in intervention schools independently.

3.4. Effectiveness of Safe PJAS Program at Indonesian FDA Regional Office in Kendari

Based on the research results, the Safe PJAS Program implemented in Wakatobi and Central Buton Regency effectively improves knowledge, attitudes, and behavior in choosing and consuming snacks (S value < a). The PJAS Program intervention begins with advocating for the Local Government to deliver the program, followed by food safety socialization activities, food safety technical guidance for food safety cadres in school, providing food safety education packages, monitoring the empowerment of food safety cadres in school, and certifying schools with safe PJAS (BPOM, 2023). This program also prepares

commitment documents from school principals and forms school food safety teams. In addition, food safety education packages such as posters, educational books, leaflets, banners, etc., are provided. This is in line with research conducted by Rahayu (2015), which showed that poster installation and the formation of food safety teams in schools had a significant effect on changes in the attitudes of elementary school children in western Indonesia, while in eastern Indonesia, another critical factor was food safety counseling. However, 25% of schools had no improvement in knowledge or attitude, namely MAN 1 Wakatobi, MAN 1 Buton Tengah, and SMPN 3 Wangi-Wangi Selatan. School children's health empowerment programs are less effective in changing children's behavior and attitudes toward consuming PJAS because children's decisions to choose food are influenced by teachers, parents, friends, and children's character (Anna Triwijayati et al., 2016). Therefore, food safety materials must be included in the school learning curriculum to carry out education continuously.

The success of the Safe PJAS program implemented by the Balai POM in Kendari was due to several factors, such as the role of food safety cadres in carrying out food safety program action plan through direct of face-to-face socialization, food safety videos, installation of banners and posters in the school environment and supervision of snacks in school canteens. According to Imara Ihsan et.al.. (2024), in a case study of an elementary school (SD 1 Banjar) found that the PJAS program was running because of the contribution of PJAS Cadres (teachers and little doctors). In addition, innovative educational media also influence the effectiveness of the Safe PJAS program, such as integration with P5 and ladders games. Such as the education conducted by Andriani et al. (2023) at the Pilot Elementary School, Meulaboh, West Aceh, with educational and persuasive media using snakes and ladders games, showed an increase in school children's knowledge about healthy snacks.

Even so, there are several obstacles faced by officers in implementing the Safe PJAS program, such as the lack of motivation of food safety cadres in school to implement food safety action plans due to the busy teaching schedule with government programs in schools. Not only that, the availability of facilities and infrastructure in school canteens, hygiene and sanitation issues in school canteens, and the lack of support from local governments to replicate PJAS Program activities are some of the constraints in budget limitations. There are several technical problems in PJAS supervision, namely some not knowing the role in PJAS supervision; lack of coordination in the implementation of PJAS supervision programs; limited number of human resources, budgets, and infrastructure; and the presence of food sellers outside the school environment (Febrianis, 2023).

In this study, the authors provide recommendations for the implementation of the Safe PJAS program to be more effective and sustainable, among others: (1) Badan POM can improve coordination and communication with the Ministry of Education and Culture so that the materials contained in the Safe PJAS Program can be included in the independent learning curriculum to be socialized and taught to all schools in Indonesia; (2) Increase advocacy to get local government support in allocating a budgets for improving canteen facilities and infrastructure and to replicate the Safe PJAS program.

4. Conclusion

There was an increase in knowledge, attitudes, and behavior of school children regarding PJAS safety after receiving the Safe PJAS intervention program at their school. The

increased occurred in all regencies in Southeast Sulawesi that were intervened, both Wakatobi and Central Buton. However, out of 12 schools, there were 3 schools that did not see an increase in knowledge or attitudes after being intervened with the Safe PJAS Program.

The Safe PJAS program at Indonesian FDA Regional Office in Kendari in 2023 was declared effective as assessed by the increase in Knowledge, Attitide amd Behavior of the school children who were intervened. This increase is due to the active role of food safety cadres in school in developing and implementing food safety program action plans through direct face-to-face socialization, food safety videos, installation of banners and posters in the school environment, and monitoring snack foods in school canteen. This effort can be improved through innovation by integrating programs and using educational and persuasive media. This Safe PJAS Program can be replicated by the City/Regency Government so that the impact felt by school children will be broader.

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