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ENDLINE SURVEY ON THE NUTRITIONAL STATUS OF PRIMARY SCHOOL-AGE CHILDREN AND ITS DETERMINANTS IN CENTRAL JAVA PROVINCE

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Abbreviations and acronyms

BAPPEDA	*Badan Perencanaan Pembangunan Daerah* (regional development planning body)
BAZ	BMI-for-age z-scores
BIAS	*Bulan Imunisasi Anak Sekolah* (immunization month for school children)
BMI	Body mass index
BPOM	*Badan Pengawasan Obat dan Makanan* (National Agency of Drug and Food Control)
DE	Design effect
DHO	District Health Office
DEO	District Educational Office
DoE	District of Education
FFQ	Food frequency questionnaire
FGD	Focus group discussion
HFIAS	Household Food Insecurity Access Scale
IDI	In-depth interview
IDDS	Individual dietary diversity score
IEC	Information education communication
IFA	Iron folic acid
KAP	Knowledge attitude practices
MoECRT RI	Ministry of Education, Culture, Research and Technology, Republic of Indonesia
MoH RI	Ministry of Health, Republic of Indonesia

MoRA	Ministry of Religious Affairs
MI	Madrasah Ibtidaiyah
OPD	*Organisasi Perangkat Daerah* (local government organization)
PB	*Petualangan Bergizi*
PHBS	*Pola Hidup Bersih dan Sehat* (healthy and clean lifestyle)
Puskesmas	*Pusat Kesehatan Masyarakat* (primary health centre)
TEM	Technical error of measurement
TPG	*Tenaga Pelaksana Gizi* (nutritionist)
TP UKS/M	*Tim Pembina Usaha Kesehatan Sekolah/Madrasah* (coordinating team for school health programme)
SD	*Sekolah Dasar* (elementary school)
S.D.	Standard deviation
SDN	*Sekolah Dasar Negeri* (public elementary school)
SDS	*Sekolah Dasar Swasta* (private elementary school)
SEAMEO RECFON	Southeast Asia Ministry of Education Organization-Regional Centre for Food and Nutrition
SKI	*Survei Kesehatan Indonesia* (Indonesian health survey)
SOP	Standard operating procedure
SPSS	Statistical package for the social sciences
SSB	Sugar-sweetened beverages
UKS/M	*Usaha Kesehatan Sekolah/Madrasah* (school health programme)
UNICEF	United Nations Children's Fund
VIM	Variable indicator matrix
WHO	World Health Organization

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Executive summary

Background

To address persistent nutritional challenges and suboptimal balanced nutrition practices among school-aged children in Indonesia, UNICEF launched a pilot intervention in 2022 to improve school food environments and promote healthy lifestyles among primary school students. The initiative integrated nutrition education, the promotion of physical activity, and the enhancement of school food environments—particularly canteens and school gardens—and aligned closely with the three core components of the school health programme (*Usaha Kesehatan Sekolah/Madrasa*h, UKS/M) of the Government of Indonesia

Initially piloted in 48 primary schools in Tegal District, Central Java Province, the programme was scaled up in 2023–2024 to increase focus on the prevention of overweight and obesity. The expansion included Semarang City, Surakarta City, and Kudus District—areas selected due to their high prevalence of childhood overweight.

A baseline survey was conducted in January 2024 to assess the nutritional status, knowledge, attitudes, and practices (KAP) related to balanced nutrition among students, parents/caregivers, and school personnel in the four locations.

This report presents findings from the endline survey conducted by UNICEF in January 2025, in collaboration with SEAMEO RECFON, to evaluate the programme's impact, capture lessons learned, and generate evidence to support its potential expansion with government endorsement. As with the baseline, the endline employed a mixed methods, cross-sectional survey design involving the same 40 elementary schools.

Of the 798 student-parent pairs who participated in the baseline, the endline survey successfully collected data from 773 Grade 5 students and 781 parents, reflecting an attrition rate of 3.13 per cent—well below the generally accepted threshold of 10 per cent.

Qualitative data were collected through focus group discussions (FGDs) and key informant interviews with a range of stakeholders, including UKS/M teachers, school committees, canteen staff, district UKS/M teams, healthcare workers, and street food vendors. Direct observations of school food environments were also conducted. The qualitative inquiry explored perceptions of the *Petualangan Bergizi* (PB) programme's impact on the school food environment, nutrition education delivery, referral systems for malnourished children, and its overall acceptance within schools.

Key results

The overall effect of the intervention on improving the nutritional status of children remains inconclusive, as the decrease in obesity prevalence was accompanied by an increase in the prevalence of overweight. Given the short duration of the intervention, this outcome is not unexpected. The intervention was designed primarily to influence risk factors for overweight and obesity—such as dietary and physical activity knowledge, attitudes, and practices—among children, parents, and other target groups, rather than to effect immediate changes in children's nutritional status. These intermediate outcomes are discussed in more detail below.

Students' and parents' KAP on balanced nutrition and obesity

- Overall, KAP scores among students in intervention schools were significantly higher than those in control schools at endline. The proportion of students with poor knowledge was lower in intervention schools (24.8 per cent) compared to control schools (35.7 per cent). Similarly, poor attitudes were observed in 19.6 per cent vs. 29.3 per cent, and poor practices in 56.1 per cent vs. 70.7 per cent, respectively.
- Within-group comparisons showed significant improvements in student KAP in intervention schools: 50.9 per cent improved their knowledge, 42 per cent their attitudes, and 34.5 per cent their practices. In contrast, students in control schools showed modest gains in knowledge, with limited improvements in practice.
    - Improvement in children's nutritional **knowledge** included the importance of consuming a diverse diet, awareness of the need to limit foods high in fats, sugar, and salt, and reading food labels on packaged foods.
      Children showed improved **attitudes** towards healthy eating, including finding it easier to consume a more diverse diet, eat fruits, choose water over sweetened drinks, and reduce their intake of savoury snacks and foods high in salt.
    - Improvements were observed in children's **practices**, with more students consuming breakfast, drinking the recommended amount of water, reading food labels on packaged foods, eating a more diverse diet, and reducing their consumption of instant noodles. Changes were also observed in the source of children's food, with an increase in children buying snacks from the school canteens, and a reduction in those buying from street vendors.
- Among parents, limited differences in KAP were observed at endline between intervention and control schools. Improvements were modest, with fewer than 25 per cent of parents improving their attitudes and fewer than 10 per cent improving their practices.
- Multivariate analysis identified three key factors significantly associated with improved dietary practices among children:
    - Participation in PB (1.57 times more likely to show better practices than non-participants).
    - Higher knowledge levels (2 to 3 times more likely to have better practices than those with poor knowledge).
    - More positive attitudes (1.4 to 2 times more likely to have better practices than those with poor attitudes).
      Food security status approached statistical significance ($p = 0.057$), suggesting that children from food-insecure households may face additional barriers in adopting healthier practices.

What worked in the implementation of *Petualangan Bergizi*

- Cascade training effectively improved the capacity and confidence of district facilitators and teachers.
- Scheduled joint monitoring, followed by reflective discussions, helped to identify school-level challenges, and generate practical recommendations.
- Gradual improvements to canteen offerings—guided by district facilitators—enabled schools to start with achievable changes, helping to sustain motivation.
- Shared breakfast activities, where students brought food from home, were implemented in most intervention schools, and strengthened community engagement, parental involvement, and healthy breakfast habits.
- Nutrition education delivered through games and IEC materials was well received, engaging, and easy for schools to adopt.
- Student *Kapten Bergizi* champions enjoyed their roles, especially in facilitating PB games. However, continued support through regular training—ideally involving both teachers and health centre staff—is needed.

Areas for improvement in the implementation of *Petualangan Bergizi*

- Programme timelines should be better aligned with the academic calendar to ensure smoother integration with school activities.
- Information-sharing between trained health centre staff and other relevant personnel was inconsistent, which limited programme understanding and ownership. A lack of trained staff also constrained the integration of PB into the UKS/M structure.
- Canteen mentoring needs strengthening. Schools need clearer guidance to translate general messages—like reducing sweet drinks and fried foods—into specific, actionable changes to menus.
- Street food vendors around schools were not systematically engaged, despite their significant influence on children's eating habits.
- The referral system for malnourished children was weak or absent and received insufficient attention during both the training of trainers (ToT) and programme monitoring.
- Parental roles, particularly in preparing breakfast and managing school canteens, should be strengthened to support a healthier home food environment, which is crucial for reinforcing healthy practices in children.

Recommendations and the way forward

A. Recommendations for policy at district level

1. Continue engaging district facilitators as mentors in PB implementation at the school level, recognising their commitment and critical role. Scheduled joint monitoring by facilitators should be maintained as a core programme element.
2. Sustain and strengthen teacher capacity and engagement through regular training and peer-to-peer knowledge-sharing to ensure the quality and continuity of PB activities, given the wide student reach.
3. Formally integrate PB into schools' annual academic calendar to ensure programme sustainability and institutionalisation. To support this, the District Education Office (DEO) and Ministry of Religious Affairs (Kemenag) should issue official letters legitimising PB as part of the UKS/M programme and related school activities.
4. Strengthen healthy school food environments by applying the eight key success factors for healthy school canteens. This includes clearly setting, socialising, and enforcing canteen rules, and gradually introducing healthier food options to ease transition and increase student acceptance.

B. Recommendations for programme learning and strengthening

1. Align programme implementation with the academic calendar, ideally launching activities at the beginning of each school semester to maximise integration and planning.
2. Ensure knowledge and skills transfer at the health centre (*puskesmas*) level, with at least two trained staff per facility to ensure continuity and complementary expertise. This is particularly important for the multisectoral UKS/M framework.
3. Emphasise the implementation of the overweight and obesity referral protocol during PB training and monitoring. This should refer to the Ministry of Health's 2024 Health Screening Guideline to ensure the proper identification and referral of at-risk children.
4. Facilitate the development of a strategy or agreement to guide street food vendors, who significantly influence children's food choices. As no single authority currently regulates this area, a coordinated local strategy is needed.
5. Provide structured and regular coaching for *Kapten Bergizi* following initial training. This should involve health centre staff as key resource persons alongside teachers to reinforce their role and support ongoing capacity building.
6. Promote meaningful parental engagement by designing regular activities that actively involve parents. Health centres should be mobilised to support and co-lead these efforts to reinforce healthy practices at home.
7. Facilitate systematic learning exchange platforms to promote the sharing of experiences, good practices, and behaviour change strategies across all schools that are implementing PB.
8. Scale up the programme by building on existing promising practices and documented outcomes, with appropriate adaptation to the local context and capacity.

CHAPTER 1

Introduction

1.1 Background

Ensuring good nutrition during childhood is crucial for optimal growth, health, and well-being. Proper nutrition not only supports children's physical development but also enhances their school performance and educational outcomes, which ultimately contribute to a nation's economic and social progress (WHO, 2020). However, in Indonesia, the triple burden of malnutrition remains prevalent in this age group. According to the 2023 Indonesia Health Survey, 19 per cent of school-age children (5 to 12 years) are stunted, and 20 per cent are affected by overweight or obesity (MoH RI, 2024). These national statistics highlight a growing concern over the poor dietary habits and sedentary lifestyles among Indonesian school children.

In line with these trends, a 2024 UNICEF study conducted in four regions of Central Java showed that that 59.6 per cent of students had good nutritional status, while 11.9 per cent were underweight, and 28.5 per cent were categorized as having overweight (13.3 per cent) or obesity (15.2 per cent). Additionally, limited KAP related to balanced nutrition were observed among students and their parents.

Given that more than 99 per cent of primary school-aged children are enrolled in schools in Indonesia (National Statistical Agency, 2023), schools offer a critical setting for delivering nutrition education and promoting healthy lifestyles. As an integral part of the community, schools provide a structured environment where children spend a significant amount of time, making them ideal venues for fostering positive dietary habits and encouraging physical activity (WHO, 2020). There are strong global and national commitments to establishing school-based health and nutrition promotion programmes that support students in making healthy choices.

At the national level, Indonesia has implemented the school health programme, *Usaha Kesehatan Sekolah/Madrasah* (UKS/M), which promotes student health through a combination of health education, health services, and the maintenance of a healthy school environment. These activities, known as the 'UKS Triad,' aim to instil healthy behaviours early, improve student health outcomes, and foster a conducive learning environment.

In 2022, UNICEF launched a pilot intervention to improve school food environments and raise awareness of healthy lifestyles among primary school children. This initiative involved creating nutrition education materials and promoting physical activity, as well as enhancing school food environments through improvements in canteens and school gardens. This pilot programme aligns with UKS/M's three pillars: (1) Health education, (2) health services, and (3) healthy school environments. Initially implemented in 48 primary schools in the Tegal District of Central Java Province, the pilot programme was scaled up in 2023-2024 to address overweight and prevent obesity. This expanded programme now includes Semarang City, Surakarta City, and Kudus District, which were selected due to the high prevalence rates of children with overweight and obesity. A baseline survey assessing nutritional status, KAP on balanced nutrition among children, parents/caregivers, and school staff in the four sites was conducted in January 2024. Following the completion of the intervention in November 2024, an endline study was conducted to evaluate the programme's impact, document lessons learned, and use the evidence to advocate for its expansion to additional areas, with government support.

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1.2 Objective

An endline survey was conducted to evaluate the effectiveness of an integrated package of nutrition interventions for school children in four districts of Central Java, Indonesia.

Specifically, in the four intervention areas, the study assessed the following:

1. Socio-demographic characteristics of children and their families.
2. Children's nutritional status and household food security.
3. Children's morbidity and health-seeking behaviour.
4. Nutrition KAP of children and their parents.
5. Nutrition services and programmes for school children provided at the public health centre (PHC) level, including the referral system for those with overweight or obesity.
6. Perceptions of teachers supporting the national school/madrasah health effort (UKS/M) related to the intervention, including changes in its implementation and in the local school food environments.
7. Perceptions of school canteen managers on changes in the school food environment.
8. Practices of school canteen staff and local street food vendors related to nutrition and food safety.
9. Local government staff's perceptions on the intervention, including changes in school-based nutrition programmes and students' nutrition practices.
10. Factors associated with the risk of overweight and obesity among students.
11. Factors associated with improved balanced nutrition practices among students.

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CHAPTER 2

Methods

2.1 Methodology summary

This study was an endline assessment of a randomized-controlled intervention in schools across four locations, and included quantitative and qualitative approaches. Data were collected from elementary schools in two cities (Semarang and Surakarta) and two districts (Tegal and Kudus) in Central Java province, where the pilot intervention package was implemented. The methodology follows the one used in the baseline study conducted in 2024[1], and is summarised in Table 0-1. Figure 1 presents the assessment framework that guided the study.

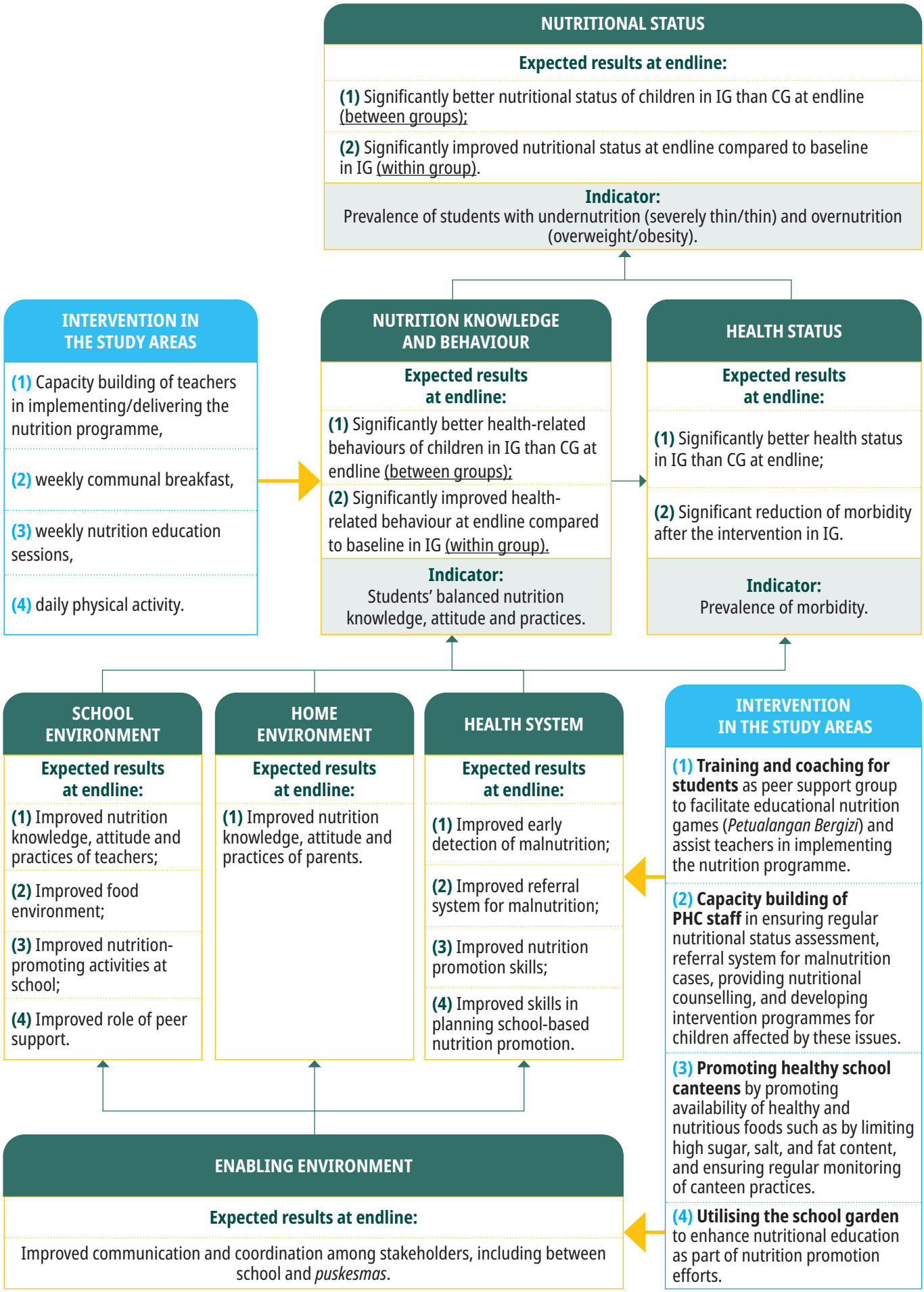
TABLE 1. Methodology summary

No	Aspect	Notes
1	Respondents	**Quantitative:** Grade 5 primary school children who participated in the 2024 baseline study (N=773, out of 798 at baseline) and their parents. **Qualitative:** UKS/M teachers, PHC staff, canteen managers, food handlers, street vendors near the schools, and local stakeholders (UKS/M district coordinators).
2	Sample size	• Followed the sample size calculation used in the previous baseline study. In total, 798 Grade 5 students (400 in intervention schools and 398 in control schools). • The sample size was calculated using the formula for group comparison based on three outcomes, i.e., physical activity behaviour, consumption of sugar-sweetened beverages/ SSBs, knowledge of healthy eating (Oddo et al, 2022) and knowledge of optimal diet (Solis et al, 2015), with 95 per cent confidence interval, 80 per cent power of study, 0.03 intra-cluster correlation, 15 per cent effect size, 10 per cent attrition rate. The study and sample do not allow comparison of the four study areas.
3	Sampling procedure	• In each city and district, 10 schools were selected (5 as intervention schools and 5 as control schools) with 20 subjects per school, balanced between male and female students. • All schools participated in the baseline survey conducted in 2024, a combination of public and private elementary schools, and Islamic schools/madrasah, with proportional sampling. The list of selected schools was shared with the district education office and district offices of MoRA for review and approval.

[1] For additional details see: UNICEF. 2024. Baseline survey on the nutritional status of primary school-age children and its determinants in Central Java province. Available at: https://uni.cf/3Z78VU1

No	Aspect	Notes
4	Variables and indicators	• The questionnaire was aligned with those used in the baseline study to ensure that the impact of the intervention was accurately measured by comparing baseline and endline data using the same variables and indicators. • A pre-tested additional section, focusing on exposure to and acceptance of the nutrition intervention package, was applied for students in the intervention schools. • Detailed information on the variables and indicators are provided in **Annex 2 (Variables and Indicator Matrix).**
5	Data collection procedures	**Quantitative data collection** • Conducted through interviews using a pre-tested structured questionnaire. Students' body weight and height were measured using standardized equipment, and followed standard procedures of WHO (2006). Results were categorized based on the WHO Growth Standards (2006). • Students' dietary diversity was assessed by conducting a single 24-hour dietary recall, using the nine food groups in the Individual Dietary Diversity Score (IDDS) (FAO, 2010). Additionally, their consumption of unhealthy foods, including SSBs and salty, sugary and high-fat snacks was also assessed. **Qualitative data collection** • Focus Group Discussions (FGD). In each city/district, FGDs were conducted separately for school committee members, UKS/M teachers, and school canteen managers of the intervention schools and district TP UKS/M. • In-depth interviews (IDI). In each city/district, IDIs were conducted with PHC staff (the nutritionist/UKS unit staff/sanitarian), food handlers at the school canteen, and street food vendors in intervention and control schools. IDIs were also conducted with members of peer support in intervention schools, UKS/M teachers, school committee members, and school canteen managers at control schools. • Direct observation to assess the situation of the canteen, street food vendors outside the school (including nearby houses that sell food/beverages to students).
6	Quality assurance	• Included using pre-tested study tools, selecting experienced team members, providing training, conducting anthropometry standardization assessment tests for all enumerators, establishing small teams for easy monitoring, organizing daily review meetings during data collection, and performing double data entry to minimize errors. • For the anthropometry standardization assessment test, the team demonstrated high precision and accuracy for both body weight and height measurements. The average technical error of measurement for body weight was 0.01 kg (team A) and 0.04 kg (team B); and 0.02 cm (team A) and 0.08 cm (team B) for height. Detailed information is provided in **Annex 6 (Anthropometry standardization results).**

Figure 1. Assessment framework for the integrated package of nutrition interventions for primary school-age children (modified from UNSCN, 2017)



2.2 Ethical considerations and local authorities permit

This study received clearance from the ethical committee at the Faculty of Medicine, Universitas Indonesia (approval number KET-1717/UN2.F1/ETIK/PPM.00.02/2024, protocol number 24-11-1733) (**Annex 1**). All participants gave written informed consent and written consent was also obtained from students' parents. Approval from local education offices and schools was also secured before data collection.

2.3 Data analysis

2.3.1 QUANTITATIVE DATA

Data entry, cleaning, and statistical analysis were performed using double entry in the statistical package for the social sciences (SPSS) for Windows Version 28.0. Double-checking for missing data, extreme values, and consistency was conducted to ensure data accuracy and validity. Tests for normality distribution were carried out using the Kolmogorov-Smirnov test, with $p > 0.05$ indicating normally distributed data.

Descriptive data were analysed using a univariate test. Continuous data are presented using the mean or median, depending on normality, while categorical data are reported as frequencies and percentages. Bivariate analysis was conducted using a t-test or chi-square test (depending on the data type) to compare students' KAP related to variables of interest between the intervention and control groups.

Multivariate analysis was performed using logistic regression to assess the factors associated with KAP. To highlight the impact of the nutrition intervention package on students' KAP regarding balanced nutrition, data analysis focused on changes within each group before and after the intervention, and between intervention and control groups.

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TABLE 2. Scoring system and its categorization for KAP of students and parents

Respondent	Variable	Scoring system	Categorization
Students	Knowledge	Based on 21 questions assessing nutritional knowledge. Each correct answer was scored 1, resulting in a maximum possible score of 21 (Table 10). The correct answers are detailed in the Results Section (Table 11).	Poor: <60% of max score Medium: 60-80% of max score Good: >80% of max score
	Attitudes	Based on 21 questions assessing attitudes toward balanced nutrition. Each favourable attitude was scored 1, for a maximum possible score of 21 (Table 10). The favourable attitudes are listed in the Results Section (Table 12).	
	Practices	Based on 10 questions covering various practices related to eating and physical activity. Each good practice was scored 1, for a maximum possible score of 10. Good practices are listed in the Results Section (Table 13).	
Parents	Knowledge	Based on 5 questions. Each correct answer was scored 1, for a maximum possible score of 5 (Table 10). The correct answers are listed in the Results Section (Table 16).	
	Attitudes	Based on 10 questions. Each favourable attitude was scored 1, for a maximum possible score of 10 (Table 10). Details of the favourable attitudes are listed in the Results Section (Table 17).	
	Practices	Based on 7 questions. Positive practices included the availability of vegetables and fruit, with correct scores given to those who chose 'always' or 'sometimes'. Negative practices included the availability of fried foods, sugary drinks, sweet snacks, salty snacks, and instant noodles, with correct scores given to those who chose 'never', 'rarely', or 'sometimes'. Each good practice was scored 1, for a maximum possible score of 7 (Table 10). Details of the good practices are listed in the Results Section (Table 18).	
KAP improvement		[a] Improved knowledge refers to an enhancement in students' and parents' knowledge status from baseline to endline. This improvement is identified through shifts in knowledge levels from poor to medium, poor to good, or medium to good. Thus, 'improved knowledge' reflects a significant increase in students' and parents' understanding, indicating the programme's effectiveness in elevating their knowledge to a higher level. [b] Improved attitude refers to a positive shift in students' and parents' attitude status from baseline to endline. This improvement is identified through changes in attitude levels from poor to medium, poor to good, or medium to good. Thus, 'improved attitude' reflects a significant enhancement in students' and parents' perspectives or behaviours, indicating the programme's effectiveness in fostering more positive attitudes. [c] Improved practice refers to a positive shift in students' and parents' practice status from baseline to endline. This improvement is identified through changes in practice levels from poor to medium, poor to good, or medium to good. Thus, 'improved practice' reflects a meaningful enhancement in students' and parents' actions or behaviours, indicating the programme's effectiveness in promoting healthier or more beneficial practices. **Explanation of statistical test used** *Independent T-test; ** Anova two-way repeated measurement; ^paired T-test; cs=Chi square test; m Mc-Nemar Test.	

2.3.2 QUALITATIVE DATA (FGD AND IN-DEPTH INTERVIEWS)

Data analysis was conducted in two distinct stages. The first stage occurred in the field and focused on organising summaries of responses from each informant into matrices, with a separate matrix developed for each type of respondent/informant. The primary objective was to ensure data completeness and confirm that each topic outlined in the variable indicator matrix (VIM) had been thoroughly explored by the respondent/informant. This phase also aimed to uncover preliminary findings regarding key issues of interest, including initial patterns of similarities and differences across respondents. Note-takers were tasked with creating the summary response matrices during the FGDs or in-depth interviews. The matrices were then reviewed and discussed by the PI/Co-PI, moderator/interviewer, and note-taker, while the team was still in the field.

The second stage involved a desk-based analysis of the results. This step was guided by the study objectives presented in the VIM and focused on verifying information in the summary matrix and providing more detailed explanations of the observed findings and preliminary patterns. Verification and more detailed information were obtained by reviewing the transcription of the FGDs and in-depth interviews.

To emphasize the significant changes linked to the nutrition intervention package, PB), the analysis concentrated on three key areas, as detailed in the table below.

TABLE 3. Focus of qualitative analysis

No	Key areas	Details
A	**Perceived impact on food environment**	
1	Changes in food environment (school canteen, food vendors outside the school).	● Availability of foods/beverages high in sugar/salt/fat. ● Food safety. ● Availability of vegetables and fruits.
2	Changes in food environment at home (prepared at home, bought from outside).	● Availability of foods/beverages high in sugar/salt/fat. ● Food safety. ● Availability of vegetables and fruits.
3	Perceived changes to students' practices on balanced nutrition.	● Snacking habit and food preference (focus on foods/beverages high in sugar, salt, fat; vegetables and fruits). ● Breakfast habits.
B	**Perceived impact on delivery of nutrition education at school and referral system for malnourished children**	
1	Perceived changes in attitude and practices of UKS/M teachers in facilitating nutrition education at school.	● **Attitude:** Teacher's confidence, attitude (favourable/unfavourable or optimistic/ pessimistic) ● **Practices:** Regularity, variation of activities and use of education materials, engagement with students, collaboration with other teachers, integration with class activities.
2	Perceived peer support involvement in facilitating nutrition education at school.	● Examples of involvement, added value of their involvement. ● Acceptance by their peers.
3	Health screening.	● Access to and understanding of nutrition-related data. ● The use of data for nutrition education at school. ● Referral system for malnourished students.
4	Coordination among stakeholders.	● Between school and *puskesmas.* ● Among multi-sectoral UKS/M district officers.
C	**Nutrition intervention package: PB**	
1	Activities and responses.	● Training received by the respondents. ● Nutrition education activities at school. ● Opinion regarding those activities (participation of students/parents/teachers).
2	Perceived benefits of the intervention.	● Perceived benefits of the intervention given existing challenges.
3	Room for improvement.	● Necessary improvement. ● Input for sustainability.

CHAPTER 3

Results

3.1 Quantitative findings

3.1.1 RESPONSE RATE

During the endline data collection, 773 out of 798 Grade 5 students who participated in the baseline survey were successfully interviewed. This represents an attrition rate of 3.1 per cent—well below the commonly accepted threshold of 10 per cent—indicating strong respondent retention and, in turn, enhancing the reliability and consistency of the data.

The primary reasons for student attrition included school transfers (n=10), relocation to their family's hometown (n=1), lack of parental consent (n=1), absence due to illness on the day of data collection (n=11), and school-approved leave for unspecified reasons (n=2). To maximise the response rate, the research team undertook several follow-up efforts, including visiting the homes of absent students (with parental consent) and returning to schools at a later date. As a result, four additional students were interviewed—three at their homes and one at school.

In addition to student data, the study collected information from 781 parents, assessed 39 school food environments, and interviewed 39 school canteen food sellers and 29 food vendors operating outside school premises. Qualitative data collection included four FGDs with 23 district TP UKS/M and Bappeda officials; four FGDs with 20 UKS/M teachers; four FGDs with 20 school committee members; four FGDs with 20 school canteen managers; and 12 IDIs with *puskesmas* staff (one to two participants per interview), including nutritionists and UKS/M personnel.

TABLE 4. Summary of total number of respondents, FGDs, IDIs, and observation by study areas and survey round

No	Type of data at school level	Survey round	Number of subjects/activities				
			Semarang	Surakarta	Tegal	Kudus	Total
1	Grade 5 student questionnaire	Baseline	198	200	200	200	798
		Endline	192	191	194	196	773
2	Parent questionnaire	Baseline	195	200	197	198	790
		Endline	194	194	194	199	781
3	Observation checklist of school facilities including food environment	Baseline	10	10	10	10	40
		Endline	10	10	9	10	39
4	IDI with food seller at school canteen	Baseline	10	9	6	10	35
		Endline	10	9	10	10	39
5	IDI with food vendors outside school premises	Baseline	7	7	7	8	29
		Endline	9	5	6	9	29
6	IDI interview with *Kapten Bergizi*	Baseline	-	-	-	-	-
		Endline	10	10	10	9	39

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No	Type of data at city/district level	Survey round	Number of subjects/activities				
			Semarang	Surakarta	Tegal	Kudus	Total
1	FGD with district TP UKS/M		1	1	1	1	4
2	FGD with UKS/M teacher		1	1	1	1	4
3	FGD with school committee		1	1	1	1	4
4	FGD with school canteen manager		1	1	1	1	4
6	IDI with *puskesmas* staff		3	3	3	3	12

Note: One school in Tegal (SDN Kemantran 1) lacked observational data on the food environment because data collection took place in the afternoon, after school hours, when the canteen was already closed.

As shown in the above table, 781 parent questionnaires were collected – eight more than the number of student questionnaires. This discrepancy occurred because the parent questionnaires were distributed with the research consent forms in advance, and were collected by the school before the data collection day. Consequently, some parent questionnaires had already been submitted, but the corresponding students were absent on the data collection day and could not be followed up for interviews.

In each school, the plan was to interview one food seller at the school canteen and one street food vendor who sold drinks/foods outside the school. Nevertheless, three schools did not have a school canteen; and in 11 schools, no food vendors were observed during the data collection. The condition of schools, where no food vendors were observed outside the premises during the endline assessment, remained the same as observed during the baseline.

3.1.2 CHARACTERISTICS OF THE STUDENTS

Students in the intervention and control groups presented similar sociodemographic characteristics. The average age was 11 years, and gender distribution showed no significant differences. However, the control group reported significantly higher child morbidity in the two weeks prior to the survey, indicating potential health condition variations between the groups.

Child health-seeking behaviour, including health facility visits and traditional medicine use, was comparable between the groups. Similarly, there were no significant differences in the disability screening results assessed using the Washington Group/UNICEF Module on Child Functioning questionnaire. Most students reported no difficulties across all categories, with only a small percentage experiencing minor challenges. Mobility difficulties were slightly higher in the control group (3.5 per cent vs. 1.8 per cent, p = 0.104), with two students in the control group reporting complete immobility. However, this difference was not statistically significant.

About one third of the students in both the intervention and control groups self-reported cognitive difficulties, including 'some difficulties' in remembering and concentrating (33.3 per cent and 31.3 per cent respectively, p = 0.115). Self-care difficulties were the least reported, with only 1.0 per cent in the intervention group and 1.6 per cent in the control group having some difficulty (p = 0.452). Communication difficulties were slightly higher in the control group (8.1 per cent vs. 9.5 per cent, p = 0.270), though the prevalence remained low overall. In summary, the groups were well-matched, except for a higher rate of recent illnesses in the control group.

TABLE 5. Students' sociodemographic characteristics at endline

Variable	Intervention (n=383)	Control (n=389)	Total (n=772)	p-value[1]
Age (years), *mean±S.D.*	11.113±0.83	11.08±1.26	11.11±1.06	1.000
Gender, *n(%)*				
Boys	214 (53.5)	178 (47.8)	392 (50.8)	0.117
Girls	186 (46.5)	194 (52.2)	380 (49.2)	
Pocket money per day (IDR), median *(min-max)*	10000 (0-20000)	8000 (0-62000)	10000 (0-62000)	0.259
Child morbidity in the 2 weeks prior to the survey, *n(%)*	186 (48.6)	219 (56.3)	405 (52.5)	0.031*
Child health-seeking behaviour, *n(%)*				
Sought treatment in health facility	239 (59.8)	219 (58.9)	458 (59.3)	
Took medicine purchased by parents and/or received traditional massage	126 (31.5)	126 (33.9)	252 (32.6)	.640
Not seeking any medication	35 (8.8)	27 (7.3)	62 (8.0)	
DISABILITY SCREENING				
VISION. Wearing glasses, *n(%)*				
Yes	37 (9.3)	35 (9.4)	72 (9.3)	.940
No	363(90.8)	337(90.6)	700 (90.7)	
VISION. Difficulty in seeing, *n(%)*				
No difficulty	358 (89.5)	343 (92.5)	701 (90.9)	0.093
Some difficulty	38 (9.5)	28 (7.5)	66 (8.6)	
A lot of difficulty	4 (1.0)	0 (.0)	4 (.5)	
Cannot do at all	0 (.0)	0 (.0)	0 (.0)	
HEARING. Wearing a hearing aid, *n(%)*				
Yes	9 (2.3)	7 (1.9)	16 (2.1)	.720
No	391 (97.8)	365 (98.1)	756 (97.9)	
HEARING. Difficulty in hearing, *n(%)*				
No difficulty	386 (96.5)	356 (96.2)	742 (96.4)	0.333
Some difficulty	14 (3.5)	12 (3.2)	26 (3.4)	
A lot of difficulty	0 (.0)	0 (.0)	0 (.0)	
Cannot do at all	0 (.0)	2 (.5)	2 (.3)	
MOBILITY. Difficulty in walking, *n(%)*				
No difficulty	392 (98.2)	356 (96.0)	748 (97.1)	0.104
Some difficulty	7 (1.8)	13 (3.5)	20 (2.6)	
A lot of difficulty	0 (.0)	0 (.0)	0 (.0)	
Cannot do at all	0 (.0)	2 (.5)	2 (.3)	
COGNITION. Difficulty in remembering or concentrating, *n(%)*				
No difficulty	263 (65.8)	248 (66.7)	511 (66.2)	0.115
Some difficulty	133 (33.3)	113 (30.4)	246 (31.9)	
A lot of difficulty	4 (1.0)	11 (3.0)	15 (1.9)	
Cannot do at all	0 (.0)	0 (.0)	0 (.0)	
SELF-CARE. Difficulty in self-caring, *n(%)*				
No difficulty	396 (99.0)	366 (98.4)	762 (98.7)	0.452
Some difficulty	4 (1.0)	6 (1.6)	10 (1.3)	
A lot of difficulty	0 (.0)	0 (.0)	0 (.0)	
Cannot do at all	0 (.0)	0 (.0)	0 (.0)	
COMMUNICATION. Difficulty in communicating, *n(%)*				
No difficulty	361 (90.5)	339 (91.4)	700 (90.9)	0.27
Some difficulty	38 (9.5)	30 (8.1)	68 (8.8)	
A lot of difficulty	0 (.0)	2 (.5)	2 (.3)	
Cannot do at all	0 (.0)	0 (.0)	0 (.0)	

*p<0.05, statistically significant

3.1.3 CHARACTERISTICS OF THE PARENTS

The table presents the sociodemographic characteristics of parents by treatment group, showing no significant differences across all variables. The average age of fathers and mothers was similar between the intervention (43±6 years for fathers, 39±6 years for mothers) and control groups (42±6 years for fathers, 39±6 years for mothers), with p-values of 0.852 and 0.831, respectively. Educational backgrounds were also comparable, with most fathers and mothers having completed high school or university education.

Regarding occupation, a high proportion of fathers worked in the private sector (34.2 per cent in the intervention group vs. 37.3 per cent in the control group), while most mothers were housewives (38.1 per cent in the intervention group vs. 37.7 per cent in the control group, p = 0.781). Household composition was similar, with an average of 5±2 members per household in both groups (p = 0.920). Socioeconomic status, based on the DHS wealth index, did not differ significantly, though there was a slightly higher proportion of households in the highest tertile in the intervention group (36.3 per cent vs. 33.1 per cent).

Food security status was relatively consistent across groups, with 80.2 per cent of intervention households and 74.8 per cent of control households classified as food secure (p = 0.232). Mild, moderate, and severe food insecurity were reported at low rates in both groups, indicating overall stability in access to food. These findings suggest that the intervention and control groups were well-matched in terms of parental sociodemographic characteristics, minimizing potential confounding effects in analyses of intervention outcomes.

TABLE 6. Parents' sociodemographic characteristics by group of treatment

Variable	Intervention	Control	Total	p-value[1]
Age (years) of father, *mean±S.D.*	43±6(n=389)	43±6(n=346)	43±6 (n=718)	0.852
Age (years) of mother, *mean±S.D.*	39±6(n=386)	39±6(n=379)	39±6 (n=761)	0.831
Educational background of father, *n(%)*				
• No school	8 (2.0)	3 (.8)	11 (1.4)	0.489
• Elementary school	51 (12.8)	47 (12.6)	98 (12.7)	
• Junior high school	66 (16.5)	60 (16.1)	126 (16.3)	
• Senior high school	147 (36.8)	157 (42.2)	304 (39.4)	
• University (under or postgraduate)	114 (28.5)	95 (25.5)	209 (27.1)	
• Not answering	14 (3.5)	10 (2.7)	24 (3.1)	
Educational background of mother, *n(%)*				
• No school	5 (1.3)	0 (.0)	5 (.6)	0.164
• Elementary school	47 (11.8)	42 (11.3)	89 (11.5)	
• Junior high school	66 (16.5)	62 (16.7)	128 (16.6)	
• Senior high school	145 (36.3)	157 (42.2)	302 (39.1)	
• University (under or postgraduate)	126 (31.5)	104 (28.0)	230 (29.8)	
• Not answering	11 (2.8)	7 (1.9)	18 (2.3)	
Occupation of father, *n(%)*				
• Not working	32 (8.0)	47 (12.6)	79 (10.2)	0.315
• Government employee	21 (5.3)	24 (6.5)	45 (5.8)	
• Private sector	131 (32.8)	113 (30.4)	244 (31.6)	
• Farmer	5 (1.3)	0 (.0)	5 (.6)	
• Entrepreneur	211 (52.8)	188 (50.5)	399 (51.7)	
Occupation of mother, *n(%)*				
• Housewife or not working	146 (36.5)	138 (37.1)	284 (36.8)	0.781
• Government employee	18 (4.5)	13 (3.5)	31 (4.0)	
• Private sector	74 (18.5)	65 (17.5)	139 (18.0)	
• Farmer	0 (.0)	1 (.3)	1 (.1)	
• Entrepreneur	162 (40.5)	155 (41.7)	317 (41.1)	
Number of household members, *mean±S.D.*	5±2	5±1	5±2	0.920
Household socioeconomic status, *n(%)* (based on DHS wealth index: ownership of selected assets, housing condition, and types of water access)				
• Highest tertile	139 (36.3)	120 (30.8)	259 (33.5)	0.189
• Medium tertile	123 (32.1)	146 (37.5)	269 (34.8)	
• Lowest tertile	121 (31.6)	123 (31.6)	244 (31.6)	
Household food security status, *n(%)*				
• Food secure	307 (80.2)	291 (74.8)	598 (77.5)	0.232
• Mildly food-insecure	35 (9.1)	50 (12.9)	85 (11.0)	
• Moderately food-insecure	25 (6.5)	25 (6.4)	50 (6.5)	
• Severely food-insecure	16 (4.2)	23 (5.9)	39 (5.1)	

3.1.4 NUTRITIONAL STATUS OF STUDENTS BY INTERVENTION GROUP

At baseline, there were no significant differences between groups (p = 0.178) and most students had normal BAZ: 62.0 per cent in the intervention group and 57.3 per cent in the control group. In both groups, a smaller proportion of students presented overweight (12.8 per cent and 13.8 per cent) or with obesity (16.0 per cent and 14.7 per cent). By endline, the intervention group showed a significant increase in overweight cases (18.6 per cent) and a reduction in obesity (13.4 per cent), while the control group remained relatively unchanged.

The within-group analysis shows a significant change in BMI categories over time in the intervention group (p = 0.042) but not in the control group (p = 0.425). The median BAZ also improved significantly in the intervention group, increasing from -0.21 (Q1-Q3: -1.23, 1.23) at baseline to 0.07 (-1.08, 1.34) at endline (p = 0.022). Meanwhile, the control group did not show a statistically significant change (p = 0.351).

Overall, the findings suggest that the intervention had a positive impact on students' BAZ, leading to a more favourable distribution of nutritional status. The significant difference in the final scores between intervention and control groups (p = 0.02) further supports the effectiveness of the intervention in promoting healthier growth patterns among students.

TABLE 7. Students' nutritional status based on BMI for Age indicator (WHO, 2006) by intervention group

Anthropometry		Group intervention						p-value between intervention control group
		Intervention		Control		Total		
		n	%	n	%	n	%	
Baseline	Very thin	8	(2.0)	10	(2.5)	18	(2.3)	0.178
	Thin	29	(7.2)	48	(12.1)	77	(9.6)	
	Normal BAZ	248	(62.0)	228	(57.3)	476	(59.6)	
	Overweight	51	(12.8)	55	(13.8)	106	(13.3)	
	Obesity	64	(16.0)	57	(14.3)	121	(15.2)	
Endline	Very thin	8	(2.1)	10	(2.6)	18	(2.3)	0.008*
	Thin	21	(5.5)	47	(12.1)	68	(8.9)	
	Normal BAZ	230	(60.4)	227	(58.7)	455	(59.4)	
	Overweight	71	(18.6)	50	(12.9)	121	(15.8)	
	Obesity	51	(13.4)	53	(13.7)	104	(13.6)	
p-value before after within group		0.042		0.425		0.380		
		Median (Q1-Q3)		Median (Q1-Q3)		Median (Q1-Q3)		
BMI for Age z-score,	Baseline	-0.21	-1.23, 1.23	-0.48	-1.45, 1.23	-.033	-1.35, 1.23	0.089
	Endline	0.07	-1.08, 1.34	-0.38	-1.47, 1.14	-0.14	-1.34, 1.24	0.02*
p-value before after within group		0.022		0.351		0.327		

*p<0.05: statistically significant

3.1.5 NUTRITIONAL STATUS CHANGE BETWEEN BASELINE AND ENDLINE MEASUREMENTS

Table 3.1.5 below shows the changes in each category of nutritional status at the endline compared to baseline. Specifically, **Table 8** shows that of the 26 children in intervention schools who were thin at baseline, 14 still presented as thin, 3 became very thin, and 9 had normal BAZ at the endline. Among the 50 children with overweight at the baseline, 40 remained overweight and 8 had normal BAZ at the endline. Of the 60 children with obesity at the baseline, 48 remained obese, 11 were overweight and 1 had normal BAZ at the endline. The changes were significant in the intervention schools, whereas no significant changes were observed in the control schools.

TABLE 8. **Students' nutritional status change between baseline and endline measurements**

Anthropometry		Endline					Total
		Very thin	Thin	Normal weight	Overweight	Obesity	
INTERVENTION GROUP							
Baseline	Very thin	4	2	2	0	0	8
	Thin	3	14	9	0	0	26
	Normal weight	1	5	210	20	1	235
	Overweight	0	0	8	40	2	50
	Obesity	0	0	1	11	48	60
Total		8	21	228	71	51	379
CONTROL GROUP							
Endline	Very thin	4	4	0	0	0	8
	Thin	5	23	17	0	0	45
	Normal weight	1	20	198	5	0	224
	Overweight	0	0	12	37	5	54
	Obesity	0	0	0	8	48	56
Total		10	47	227	50	53	387

* Mc Nemar test p-value =0.042

** Green indicates improved nutritional status at endline compared to baseline (change from obesity to overweight or healthy weight); yellow indicates worsened nutritional status at endline compared to baseline (from overweight to obesity); grey indicates unchanged nutritional status.

3.1.6 NUTRITIONAL STATUS OF STUDENTS BY CHILD'S GENDER

The nutritional status differed significantly between boys and girls at baseline and endline. The analysis of BAZ by gender shows that at both baseline and endline, boys had a higher prevalence of underweight (very thin and thin) and obesity compared to girls. At baseline, 19.1 per cent of boys and 11.0 per cent of girls had obesity, while 63.3 per cent of girls had a normal BAZ, compared to 56.1 per cent of boys. By the endline, obesity decreased slightly in both genders (16.6 per cent in boys and 10.3 per cent in girls), while the proportion of children with overweight increased among boys, from 11.0 per cent to 15.9 per cent. The percentage of children classified as 'very thin' remained stable, while thinness slightly decreased among girls. Despite these changes, there were no statistically significant differences within groups before and after the intervention in BAZ ($p > 0.05$).

TABLE 9. Students' nutritional status based on BAZ (WHO, 2006) by child's gender

Nutritional status		Gender						p-value between intervention control group
		Boys		Girls		Total		
		n	%	n	%	n	%	
Baseline	Very thin	12	2.9%	6	1.5%	18	(2.3)	
	Thin	44	10.8%	33	8.5%	77	(9.6)	
	Normal BAZ	229	56.1%	247	63.3%	476	(59.6)	0.003*
	Overweight	45	11.0%	61	15.6%	106	(13.3)	
	Obesity	78	19.1%	43	11.0%	121	(15.2)	
Endline	Very thin	12	3.1%	6	1.6%	18	(2.3)	
	Thin	44	11.3%	24	6.4%	68	(8.9)	
	Normal BAZ	208	53.2%	249	66.0%	455	(59.4)	0.001*
	Overweight	62	15.9%	59	15.6%	121	(15.8)	
	Obesity	65	16.6%	39	10.3%	104	(13.6)	
p-value before after within group		0.161		0.560		0.380		
		Median (Q1-Q3)		Median (Q1-Q3)		Median (Q1-Q3)		
BAZ	Baseline	-0.28	-1.40 - 1.42	-0.37	-1.34 – 1.09	-.033	-1.35-1.23	0.435
	Endline	-1.00	-1.45 – 1.50	-0.17	-1.29-1.03	-0.14	-1.34-1.24	0.489
p-value before after within group		0.859		0.217		0.327		

*p<0.05: statistically significant

3.1.7 SUMMARY OF STUDENTS' AND PARENTS' KAP RELATED TO BALANCED NUTRITION AND OVERWEIGHT

There were notable improvements at baseline and endline, particularly in the intervention group, in both students' and parents' KAP related to balanced nutrition.

Summary of students' KAP on balanced nutrition and overweight

Among students in the intervention group, knowledge levels significantly improved at endline compared to baseline. The proportion classified as having 'poor' knowledge decreased from 62.3 per cent to 24.8 per cent, and those with 'good' knowledge increased from 4.0 per cent to 22.5 per cent ($p < 0.001$). The control group showed less improvement, with a higher percentage of students remaining in the 'poor' knowledge category at endline (35.7 per cent). The difference in knowledge improvement between intervention and control groups was statistically significant ($p = 0.015$).

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Attitudes towards balanced nutrition also improved more in the intervention group. The proportion of students with 'poor' attitudes decreased from 32.0 per cent to 19.6 per cent, while those with 'good' attitudes increased from 21.3 per cent to 45.7 per cent ($p < 0.001$). The control group also saw an increase in the 'good' category (from 19.8 to 31.4 per cent), but a higher proportion (29.3 per cent) remained in the 'poor' attitude category at endline. Similarly, the percentage of students with improved attitudes was higher in the intervention group (42.0 per cent) compared to the control (32.9 per cent, $p = 0.008$).

Regarding practices, the intervention group showed a greater reduction in 'poor' nutritional practices, from 78.3 per cent at baseline to 56.1 per cent at endline, compared to a smaller decrease in the control group (82.5 to 70.7 per cent, $p = 0.001$). The proportion of students with 'good' practices increased to 13.3 per cent in the intervention group but remained low at 6.4 per cent in the control group. Overall, students in the intervention group had significantly better practice improvements (34.5 per cent improved vs. 21.3 per cent in control, $p = 0.01$).

Summary of parents' KAP on balanced nutrition and overweight

Changes in KAP among parents were more modest. Parental knowledge improved significantly within the intervention group ($p < 0.001$), with a decrease in the 'poor' category from 49.6 per cent to 38.4 per cent. No significant difference was observed between the intervention and control groups ($p = 0.144$). Attitude improvements were also limited, as the proportion of parents in the 'poor' category slightly decreased in the intervention group (40.7 per cent to 39.4 per cent) and in the control group (46.3 to 47.3 per cent, $p = 0.039$). However, overall attitude improvements were not significantly different between groups.

Parental practices showed minimal improvement, with the majority remaining in the 'poor' category at endline (81.7 per cent in the intervention group and 86.1 per cent in the control group). While there was a significant within-group improvement in the intervention group ($p = 0.021$), the difference between the groups was not statistically significant ($p = 0.468$).

TABLE 10. Summary of students' and parents' KAP on balanced nutrition at baseline and endline, by treatment group

Knowledge, Attitude, Practices (KAP) related to balanced nutrition		Intervention group						p-value[1] between intervention control group
		Intervention		Control		Total		
		n	%	n	%	n	%	
STUDENTS								
Knowledge								
Baseline	Poor	249	62.3%	262	65.8%	511	64.0%	0.572
	Medium	135	33.8%	122	30.7%	257	32.2%	
	Good	16	4.0%	14	3.5%	30	3.8%	
Endline	Poor	95	24.8%	139	35.7%	234	30.4%	<0.001*
	Moderate	202	52.7%	191	49.1%	391	50.8%	
	Good	86	22.5%	59	15.2%	145	18.8%	
Improvement	Improved	195	50.9%	164	42.2%	357	46.4%	0.015*
	No change or decreased	188	49.1%	225	57.8%	413	53.6%	
p-value[2] before after within group		<0.001*		<0.001*		<0.001*		
Attitudes								
Baseline	Poor	128	32.0%	137	34.4%	265	33.2%	0.745
	Medium	187	46.8%	182	45.7%	369	46.2%	
	Good	85	21.3%	79	19.8%	164	20.6%	
Endline	Poor	75	19.6%	114	29.3%	189	24.5%	0.001*
	Moderate	133	34.7%	153	39.3%	284	36.9%	
	Good	175	45.7%	122	31.4%	297	38.6%	
Improvement	Improved	168	42.0%	131	32.9%	299	37.5%	0.008*
	No change or decreased	232	58.0%	267	67.1%	499	62.5%	
p-value[2] before after within group		<0.001		0.002		<0.001		
Practices								
Baseline	Poor	300	78.3%	313	82.5%	613	79.4%	0.455
	Moderate	71	18.5%	69	17.7%	140	18.1%	
	Good	12	3.1%	7	1.8%	19	2.5%	
Endline	Poor	215	56.1%	275	70.7%	490	63.5%	0.001*
	Moderate	117	30.5%	89	22.9%	206	26.7%	
	Good	51	13.3%	25	6.4%	76	9.8%	
Improvement	Improved	132	34.5%	83	21.3%	215	27.8%	0.01
	No change or decreased	251	65.5%	306	78.7%	557	72.2%	
p-value[2] before after within group		0.001		0.001		0.001		

Knowledge, Attitude, Practices (KAP) related to balanced nutrition		Intervention group						p-value[1] between intervention control group
		Intervention		Control		Total		
		n	%	n	%	n	%	
PARENTS								
Knowledge								
Baseline	Poor	190	49.6%	185	47.6%	375	48.6%	0.847
	Medium	108	28.2%	115	29.6%	223	28.9%	
	Good	85	22.2%	89	22.9%	174	22.5%	
Endline	Poor	147	38.4%	176	45.2%	323	41.8%	0.144
	Medium	168	43.9%	155	39.8%	323	41.8%	
	Good	68	17.8%	58	14.9%	126	16.3%	
Improvement	Improved	118	30.8%	104	26.7%	222	28.8%	0.211
	No change-decreased	265	69.2%	285	73.3%	550	71.2%	
p-value[2] before after within group		<0.001*		0.005		<0.001*		
Attitude								
Baseline	Poor	156	40.7%	180	46.3%	336	43.5%	0.285
	Medium	128	33.4%	121	31.1%	249	32.3%	
	Good	99	25.8%	88	22.6%	187	24.2%	
Endline	Poor	151	39.4%	184	47.3%	335	43.4%	0.039*
	Medium	154	40.2%	124	31.9%	278	36.0%	
	Good	78	20.4%	81	20.8%	159	20.6%	
Improvement	Improved	90	23.5%	84	21.6%	174	22.5%	0.527
	No change-decreased	293	76.5%	305	78.4%	598	77.5%	
p-value[2] before after within group		0.076		0.502		0.149		
Practice								
Baseline	Poor	334	(87.2)	328	(84.3)	662	(85.8)	0.298
	Medium	46	(12.0)	58	(14.9)	104	(13.5)	
	Good	3	(.8)	3	(.8)	6	(.8)	
Endline	Poor	313	(81.7)	335	(86.1)	648	(83.9)	0.468
	Medium	67	(17.5)	52	(13.4)	119	(15.4)	
	Good	3	(.8)	2	(.5)	5	(.6)	
Improvement	Improved	32	(8.4)	34	(8.7)	66	(8.5)	0.848
	No change-decreased	351	(91.6)	355	(91.3)	706	(91.5)	
p-value[2] before after within group		0.021*		0.664		0.159		

[1] p-value <0.05 indicates significant difference between intervention and control groups.
[2] p-value <0.05 indicates significant difference between before (baseline) and after (endline) intervention within group.

* Blue-shaded cells highlight significant results within group before and after intervention
** Yellow-shaded cells highlight significant results between group after the intervention.
*** Practices were scored as follows: Dietary diversity (**good**: dietary diversity score ≥ 6); meal frequency (**good**: 3 times); breakfast habits (**good**: breakfast every day before 9am); snack habits (**risky**: consumption of sweet drinks); drinking water (**good**: >7 glasses per daily); reading food labels (**good**: always and sometimes); handwashing and hygienic practices (**good**: wash hands in at least 3 of the 6 occasions mentioned); physical activity (**good**: exercise 3 to 6 times a week with minimum of 30 minutes per session); sedentary activities (**risky**: recreational screen time ≥120 minutes per day) and bodyweight monitoring (**good**: bodyweight was measured in the previous six months).

3.1.8 STUDENTS' KNOWLEDGE OF BALANCED NUTRITION AND OVERWEIGHT

Table 11 presents students' knowledge of balanced nutrition at baseline and endline for intervention and control groups. Several items, particularly those highlighted in grey, indicate significant improvements in knowledge within the intervention group compared to the control group. Notably, knowledge of the importance of consuming a variety of foods, the necessity of drinking at least seven glasses of water per day and limiting certain food ingredients at the top of the Food Pyramid improved significantly in the intervention group (p-values = 0.050, 0.024, 0.023, and 0.038).

A key finding is that misconceptions about nutrition, such as replacing vegetables with fruit or only drinking milk for breakfast, decreased more significantly in the intervention group. For example, the percentage of students who correctly answered the question on whether drinking only milk for breakfast is sufficient increased from 29.5 per cent to 51.8 per cent in the intervention group, compared to an increase from 34.4 to 43.5 per cent in the control group ($p = 0.023$). Additionally, awareness about washing hands not only when visibly dirty, increased significantly ($p = 0.003$), suggesting better hygiene awareness following the intervention.

However, other aspects, such as knowledge of physical activity and sugary food consumption, did not show significant change between groups. Similarly, multiple-choice questions, which included items on food groups and diverse meals, did not exhibit notable improvements.

Notably, students' knowledge of carbohydrate sources beyond rice improved significantly in the intervention group, increasing from 43.3 per cent at baseline to 66.5 per cent at endline ($p = 0.000$). Awareness of reading food labels on packaged foods also improved significantly ($p = 0.029$) within the intervention group, highlighting the positive impact of the intervention on specific aspects of nutritional knowledge.

Although improvements were seen across both groups, some knowledge areas, such as understanding the causes of obesity, risks of overweight and obesity, and the benefits of breakfast, did not show significant differences between groups ($p > 0.05$). This suggests that while the intervention was effective in certain domains, additional reinforcement may be needed to strengthen awareness of these broader nutritional concepts. Interestingly, knowledge about preventing overweight and obesity was already high at baseline and remained consistently high at endline, indicating that students had a good foundational understanding of weight management.

Overall, the intervention appeared to be successful in improving students' knowledge of certain nutritional topics, particularly in recognizing diverse carbohydrate sources and reading food labels. However, further strategies may be required to enhance awareness of obesity-related risks and the benefits of breakfast. Future interventions could incorporate more interactive or experiential learning approaches to reinforce these key nutritional concepts.

TABLE 11. Students' knowledge on balanced nutrition at baseline and endline, by treatment group

Knowledge on balanced nutrition	Correct answer	Survey round	Intervention group						p-value between intervention control group
			Intervention		Control		Total		
			n	%	n	%	n	%	
True/false questions									
#SK1. If you are not used to having breakfast, you can replace it with a larger lunch	False	Baseline	135	33.8%	123	30.9%	258	32.3%	0.390
		Endline	161	40.3%	125	33.6%	286	37.0%	0.050*
#SK2. If we don't like vegetables, we can replace them with fruit because the nutritional content is the same	False	Baseline	32	8.0%	40	10.1%	72	9.0%	0.312
		Endline	51	12.8%	29	7.8%	80	10.4%	0.024*
#SK3. Only drinking milk at breakfast is enough because milk contains all the nutrients our bodies need	False	Baseline	118	29.5%	137	34.4%	255	32.0%	0.136
		Endline	207	51.8%	162	43.5%	369	47.8%	0.023*
#SK4. Consuming sugary foods and drinks too often can cause obesity	True	Baseline	262	65.5%	256	64.3%	518	64.9%	0.727
		Endline	322	80.5%	300	80.6%	622	80.6%	0.959
#SK5. We should drink at least 7 glasses of water per day	True	Baseline	310	77.5%	287	72.1%	597	74.8%	0.079
		Endline	319	79.8%	281	75.5%	600	77.7%	0.160
#SK6. We need to do physical activity only when we are overweight	False	Baseline	246	61.5%	229	57.5%	475	59.5%	0.254
		Endline	310	77.5%	276	74.2%	586	75.9%	0.283
#SK7. Cleaning the house and gardening are examples of physical activity	True	Baseline	320	80.0%	309	77.6%	629	78.8%	0.414
		Endline	323	80.8%	304	81.7%	627	81.2%	0.730
#SK8. We wash our hands only when they look dirty	False	Baseline	258	64.5%	215	54.0%	473	59.3%	0.003*
		Endline	313	78.3%	289	77.7%	602	78.0%	0.851
#SK9. We can know our nutritional status based on our weight and height	True	Baseline	314	78.5%	304	76.4%	618	77.4%	0.474
		Endline	295	73.8%	280	75.3%	575	74.5%	0.629
#SK10. Food ingredients that should be consumed in limited amount based on the Food Pyramid, except	Fibre	Baseline	110	27.5%	104	26.1%	214	26.8%	0.662
		Endline	253	63.3%	208	55.9%	461	59.7%	0.038*

Knowledge on balanced nutrition	Correct answer	Survey round	Intervention group						p-value between intervention control group
			Intervention		Control		Total		
			n	%	n	%	n	%	
Multiple-choice questions									
#SK11. In the My Plate guide, the portion of staple food consumption should be equal to the portion of	Vegetables	Baseline	227	56.8%	199	50.0%	426	53.4%	0.056
		Endline	227	56.8%	210	56.5%	437	56.6%	0.933
#SK12. Example of diverse eating at its best	Rice, fried fish, spinach vegetable, banana	Baseline	208	52.0%	188	47.2%	396	49.6%	0.178
		Endline	241	60.3%	212	57.0%	453	58.7%	0.358
#SK13. One of the characteristics of healthy food	Safe	Baseline	302	75.5%	300	75.4%	602	75.4%	0.968
		Endline	345	86.3%	311	83.6%	656	85.0%	0.304
#SK14. Being overweight can be caused by	Frequent consumption of sugary drinks	Baseline	243	60.8%	245	61.6%	488	61.2%	0.815
		Endline	329	82.3%	286	76.9%	615	79.7%	0.064
#SK15. Apart from rice, staple foods that contain a lot of carbohydrates are	Potatoes and cassava	Baseline	173	43.3%	185	46.5%	358	44.9%	0.359
		Endline	266	66.5%	199	53.5%	465	60.2%	0.001*
#SK16. The following are the benefits of breakfast	All are correct (energy source, increase concentration, prevent obesity)	Baseline	75	18.8%	93	23.4%	168	21.1%	0.110
		Endline	105	26.3%	104	28.0%	209	27.1%	0.514
#SK17. Examples of unhealthy snacking practice	Choosing sugary soft drinks as snacks	Baseline	312	78.0%	308	77.4%	620	77.7%	0.835
		Endline	323	80.8%	311	83.6%	634	82.1%	0.395
#SK18. Information on the food label of a packaged food/drink	Food/drink prices	Baseline	122	30.5%	94	23.6%	216	27.1%	0.029*
		Endline	231	57.8%	190	51.1%	421	54.5%	0.155
#SK19. Risks of overweight and obesity	Increase risk of chronic condition/reduce quality of life/premature death)	Baseline	208	52.0%	195	49.0%	403	50.5%	0.396
		Endline	266	66.5%	258	69.4%	524	67.9%	0.396
#SK20. Causes of overweight and obesity	Increased/excessive intake of energy- dense foods/lack of or decreased physical activity	Baseline	337	84.3%	334	83.9%	671	84.1%	0.898
		Endline	378	94.5%	345	92.7%	723	93.7%	0.317
#SK21. How to prevent overweight and obesity	Reduce energy or fatty and sugary foods intake/ eat more often vegetables and fruits - legume - wholegrain products/ increase physical activity level/engage in regular physical activity	Baseline	361	90.3%	347	87.2%	708	88.7%	0.171
		Endline	375	93.8%	352	94.6%	727	94.2%	0.584

*p<0.05: statistically significant
* Blue-shaded cells highlight significant results within group before and after intervention
** Yellow-shaded cells highlight significant results between group after the intervention.

3.1.9 STUDENTS' ATTITUDES RELATED TO BALANCED NUTRITION AND OVERWEIGHT

Table 12 presents students' attitudes toward balanced nutrition at baseline and endline, comparing intervention and control groups. Notably, students' difficulty in eating a variety of foods decreased significantly (p = 0.017), suggesting the intervention effectively promoted dietary diversity. Additionally, there was a marked improvement in fruit consumption habits, with a significant increase in students eating fruit at least twice daily (p = 0.031). These findings indicate that the intervention positively influenced students' willingness to adopt healthier dietary behaviours.

Another key area of improvement was students' preference for drinking water over sweetened beverages (p = 0.003). This suggests that the intervention successfully encouraged healthier hydration choices, which is crucial for overall nutrition and weight management. Additionally, students reported an increased ability to reduce their consumption of salty foods and snacks (p = 0.034), which aligns with better awareness of the health risks associated with excessive sodium intake. These positive shifts in attitude indicate a growing acceptance of healthier eating patterns.

Despite these improvements, some attitudes, such as difficulty in reducing instant noodle consumption and perceptions of school canteen food, did not show significant changes (p > 0.05). Students' difficulty in washing hands with soap and water before eating significantly decreased (p = 0.001), indicating that the intervention successfully promoted better hygiene practices. Other aspects of students' attitudes, such as the importance of maintaining a normal body weight, recognizing overweight and obesity as concerns, and emotional well-being (e.g., discussing feelings with friends and family), did not show significant changes over time. This indicates that while the intervention may have had some impact on hygiene-related behaviours, its influence on broader aspects of health perception and self-awareness regarding weight was limited.

TABLE 12. Students' favourable attitude on balanced nutrition at baseline and endline, by treatment group

Attitude on balanced nutrition	Favourable attitude	Survey round	Intervention group						p-value between intervention control group
			Intervention		Control		Total		
			n	%	n	%	n	%	
#SA1: I find it difficult to eat breakfast every day	Disagree	Baseline	266	66.5%	262	65.8%	528	66.2%	0.841
		Endline	290	72.5%	262	70.4%	552	71.5%	0.524
#SA2: I find it difficult to eat a variety of foods	Disagree	Baseline	225	56.3%	224	56.3%	449	56.3%	0.993
		Endline	286	71.5%	236	63.4%	522	67.6%	0.017*
#SA3: I find it difficult to eat vegetables at every meal	Disagree	Baseline	264	66.0%	258	64.8%	522	65.4%	0.727
		Endline	286	71.5%	263	70.7%	549	71.1%	0.806
#SA4: I feel like almost all vegetables taste good	Agree	Baseline	317	79.3%	303	76.1%	620	77.7%	0.29
		Endline	292	73.0%	254	68.3%	546	70.7%	0.15
#SA5: I find it difficult to eat fruit at least twice a day	Disagree	Baseline	210	52.5%	236	59.3%	446	55.9%	0.053
		Endline	291	72.8%	244	65.6%	535	69.3%	0.031*
#SA6: I can drink at least 7 glasses of water every day	Agree	Baseline	284	71.0%	251	63.1%	535	67.0%	0.017*
		Endline	316	79.0%	273	73.4%	589	76.3%	0.122
#SA7: I find it difficult to choose water compared to other sweet drinks	Disagree	Baseline	255	63.8%	241	60.6%	496	62.2%	0.352
		Endline	312	78.0%	255	68.5%	567	73.4%	0.003*

Attitude on balanced nutrition	Favourable attitude	Survey round	Intervention group						p-value between intervention control group
			Intervention		Control		Total		
			n	%	n	%	n	%	
#SA8: I can easily reduce my consumption of fried foods	Agree	Baseline	282	70.5%	283	71.1%	565	70.8%	0.851
		Endline	335	83.8%	286	76.9%	621	80.4%	0.038*
#SA9: I find it difficult to reduce the consumption of salty foods/snacks	Disagree	Baseline	194	48.5%	168	42.2%	362	45.4%	0.074
		Endline	223	55.8%	187	50.3%	410	53.1%	0.193
#SA10: I find it difficult to reduce my consumption of instant noodles	Disagree	Baseline	186	46.5%	182	45.7%	368	46.1%	0.827
		Endline	251	62.8%	217	58.3%	468	60.6%	0.209
#SA11: The food available in my school canteen is according to my wishes	Agree	Baseline	253	63.3%	222	55.8%	475	59.5%	0.032*
		Endline	242	60.5%	216	58.1%	458	59.3%	0.474
#SA12: The food sold in my school canteen is healthy and safe food	Agree	Baseline	275	68.8%	247	62.1%	522	65.4%	0.047*
		Endline	265	66.3%	246	66.1%	511	66.2%	0.972
#SA13: I find it difficult to do routine physical activity every day for at least 30 minutes	Disagree	Baseline	203	50.8%	219	55.0%	422	52.9%	0.226
		Endline	255	63.8%	226	60.8%	481	62.3%	0.42
#SA14: I prefer playing with gadgets (cellphone, tablet, computer) in my free time compared to cycling or playing outside with friends	Disagree	Baseline	292	73.0%	266	66.8%	558	69.9%	0.068
		Endline	285	71.3%	272	73.1%	557	72.2%	0.563
#SA15: I find it not difficult to wash my hands with soap and running water before eating	Agree	Baseline	309	77.3%	297	74.6%	606	75.9%	0.385
		Endline	350	87.5%	290	78.0%	640	82.9%	0.001*,
#SA16: Maintaining a normal body weight is important for our optimal health	Agree	Baseline	361	90.3%	345	86.7%	706	88.5%	0.115
		Endline	366	91.5%	343	92.2%	709	91.8%	0.721
#SA17: I feel like my weight is good	Agree	Baseline	262	65.5%	242	60.8%	504	63.2%	0.169
		Endline	211	52.8%	200	53.8%	411	53.2%	0.778
#SA18: I can easily sleep at least 8 hours every day	Agree	Baseline	262	65.5%	273	68.6%	535	67.0%	0.353
		Endline	291	72.8%	256	68.8%	547	70.9%	0.23
#SA19: When we feel depressed and sad, we can tell our family and friends	Agree	Baseline	314	78.5%	309	77.6%	623	78.1%	0.769
		Endline	302	75.5%	270	72.6%	572	74.1%	0.355
#SA20: We should not label (judge/call) our friends based on their physical appearance	Agree	Baseline	316	79.0%	323	81.2%	639	80.1%	0.446
		Endline	360	90.0%	321	86.3%	681	88.2%	0.077
#SA21: Overweight and obesity is a serious concern	Agree	Baseline	249	62.3%	255	64.1%	504	63.2%	0.594
		Endline	299	74.8%	259	69.6%	558	72.3%	0.112

*p<0.05: statistically significant
* Blue-shaded cells highlight significant results within group before and after intervention
** Yellow-shaded cells highlight significant results between group after the intervention.

3.1.10 STUDENTS' PRACTICES RELATED TO BALANCED NUTRITION AND OVERWEIGHT

At endline, students in the intervention group showed significant improvements in key balanced nutrition practices compared to the control group. The proportion of students who had breakfast daily before 9 am increased in the intervention group (from 72.5 per cent to 76.2 per cent) compared to the control group (68.6 to 68.1 per cent) (p=0.012). Water intake (≥7 glasses/day) improved more in the intervention group (28.5 to 57.2 per cent) than in the control group (20.9 to 40.9 per cent) (p=0.001).

More students in the intervention group read food labels (35.2 to 49.6 per cent) compared to the control group (38.8 to 37.8 per cent) (p=0.001) and practice handwashing at least three out of six critical times (23.2 to 40.5 per cent vs. 23.9 to 24.7 per cent) (p=0.001). Dietary diversity (score ≥6) was also significantly higher in the intervention group at both baseline (42.3 per cent vs. 34.2 per cent, p=0.019) and endline (45.2 vs. 32.6 per cent, p=0.001). While meal frequency (82.8 per cent in both groups at endline) improved, it was not *intervention specific*. Snacking habits, physical activity, and sedentary behaviour did not show significant differences.

TABLE 13. Summary of students' balanced nutrition practices at baseline and endline, by treatment group

Students' good balanced nutrition practices		Intervention group						p-value between intervention and control group
		Intervention		Control		Total		
		n	%	n	%	n	%	
Meal frequency (Students have 3 times in a day)	Baseline	278	69.5%	271	68.1%	549	68.8%	0.667
	Endline	317	82.8%	322	82.8%	639	82.8%	0.997
Breakfast (Have breakfast every day before 9 am)	Baseline	290	72.5%	273	68.6%	563	70.6%	0.226
	Endline	292	76.2%	265	68.1%	557	72.2%	0.012*
Snacking (Did not consume sweet snacks and sugary drinks)	Baseline	80	20.9%	91	23.4%	171	22.2%	0.402
	Endline	119	31.1%	110	28.3%	229	29.7%	0.396
Drink plain water (Consumed plain water ≥ 7 glasses per day)	Baseline	114	28.5%	83	20.9%	197	24.7%	0.012*
	Endline	219	57.2%	159	40.9%	378	49.0%	0.001*
Read food label (Always/sometimes read food labels when buying/consuming packaged food/drinks)	Baseline	135	35.2%	151	38.8%	286	37.0%	0.305
	Endline	190	49.6%	147	37.8%	337	43.7%	0.001*
Washing hands (Minimally 3 out of 6 mentioned times)	Baseline	89	23.2%	93	23.9%	182	23.9%	0.826
	Endline	155	40.5%	96	24.7%	251	32.5%	0.001*
Physical activity (Exercise 3-6 times a week @ >=30 minutes)	Baseline	82	20.5%	74	18.6%	156	19.5%	0.497
	Endline	112	29.2%	110	28.3%	222	28.8%	0.767
Sedentary activity (Recreational screen time <2 hours)	Baseline	154	38.5%	128	32.2%	282	35.3%	0.061
	Endline	174	45.4%	195	50.1%	369	47.8%	0.191
Body weight monitoring (Body weight was measured in the last 6 months)	Baseline	266	66.5%	226	56.8%	492	61.7%	0.005*
	Endline	262	68.4%	257	66.1%	519	67.2%	0.489
Dietary Diversity (Dietary diversity score ≥6)	Baseline	169	42.3%	136	34.2%	305	38.2%	0.019*
	Endline	173	45.2%	127	32.6%	300	38.9%	0.001*

*p<0.05 indicates statistically significant difference
The blue colour indicates significant results within group before and after intervention
The yellow colour indicates significant results between group after the intervention.

3.1.11 DIETARY DIVERSITY

The analysis of students' dietary diversity – based on 24-hour dietary recall at baseline and endline – indicates positive changes in the intervention group. At baseline, a higher proportion of students in the intervention group (43.1 per cent) met the minimum dietary diversity score compared to the control group (34.4 per cent) (p=0.014). This trend continued at endline, where 45.2 per cent of students in the intervention group met the dietary diversity criteria compared to 32.6 per cent in the control group (p<0.001).

Further analysis of the food groups consumed shows significant improvements in the intervention group. The consumption of milk and milk products was higher in the intervention group at baseline (36.0 per cent vs. 27.0 per cent, p=0.007), although this difference was not significant at endline. Similarly, egg consumption was higher in the intervention group at baseline (63.7 vs. 56.6 per cent, p=0.042), but both groups showed similar consumption levels at endline. More notably, the intervention group showed increases in the consumption of dark green leafy vegetables (52.7 per cent vs. 42.7 per cent, p=0.005), vitamin A-rich fruits and vegetables (47.5 vs. 40.1 per cent, p=0.038), and other fruits (38.4 vs. 27.0 per cent, p=0.001) at endline, indicating a positive shift towards a more diverse diet.

In contrast, there were no significant differences in the consumption of sweet foods and drinks between the intervention and control groups, nor were there significant changes within each group from baseline to endline. However, instant noodle consumption was lower in the intervention group compared to the control group at endline (18.6 per cent vs. 28.2 per cent, *p*=0.002).

Overall, the intervention was effective in improving dietary diversity and promoting healthier eating habits. However, while fruit and vegetable consumption increased, the intake of protein-rich foods such as meat, eggs, and dairy require further attention.

TABLE 14. Students' dietary diversity based on 24-hour dietary recall at baseline and endline, by treatment group

Variables		Intervention group						p-value between intervention and control group
		Intervention		Control		Total		
		n	%	n	%	n	%	
Number of food groups consumed, median(Q1-Q3)	Baseline	5 (0-9)		5 (0-10)		5 (0-10)		0.876
	Endline	5 (2-10)		5 (2-9)		5 (2-10)		0.723
Met minimum dietary diversity score, n(%)	Baseline	165	43.1%	134	34.4%	299	38.7%	.014*
	Endline	173	45.2%	127	32.6%	300	38.9%	.000*
Consumed the following food group, n(%)								
Grains, white roots, tubers, plantains	Baseline	383	100.0%	388	99.7%	771	99.9%	0.321
	Endline	383	100.0%	387	99.5%	770	99.7%	0.16
Pulses (beans, peas and lentils)	Baseline	211	55.1%	202	51.9%	413	53.5%	.378
	Endline	223	58.2%	204	52.4%	427	55.3%	.106
Nuts and seeds	Baseline	6	1.6%	11	2.8%	17	2.2%	.233
	Endline	9	2.3%	6	1.5%	15	1.9%	.416
Milk and milk products	Baseline	138	36.0%	105	27.0%	243	31.5%	.007*
	Endline	114	29.8%	103	26.5%	217	28.1%	.310

Variables		Intervention group						p-value between intervention and control group
		Intervention		Control		Total		
		n	%	n	%	n	%	
Meat, poultry, and fish	Baseline	338	88.3%	344	88.4%	682	88.3%	.937
	Endline	345	90.1%	342	87.9%	687	89.0%	.338
Eggs	Baseline	244	63.7%	220	56.6%	464	60.1%	.042*
	Endline	252	65.8%	253	65.0%	505	65.4%	.825
Dark green leafy vegetables	Baseline	175	45.8%	153	39.3%	328	42.5%	.069
	Endline	202	52.7%	166	42.7%	368	47.7%	0.005*
Other vitamin A-rich fruits and vegetables	Baseline	180	47.0%	167	42.9%	347	44.9%	0.256
	Endline	182	47.5%	156	40.1%	338	43.8%	0.038*
Other vegetables	Baseline	170	44.4%	154	39.7%	324	42.0%	.187
	Endline	188	49.1%	175	45.0%	363	47.0%	.254
Other fruits	Baseline	161	42.0%	152	39.1%	313	40.5%	.402
	Endline	147	38.4%	105	27.0%	252	32.6%	.001*
Consumed the following less healthy foods, n(%)								
Sweet foods	Baseline	203	53.0%	198	50.9%	401	51.9%	.559
	Endline	199	52.2%	171	44.1%	370	48.1%	.024*
Sweet drinks	Baseline	283	73.9%	277	71.2%	560	72.5%	.404
	Endline	233	61.0%	247	63.5%	480	62.3%	.474
Sweet foods and beverages	Baseline	158	41.3%	142	36.5%	300	38.9%	0.176
	Endline	113	29.5%	105	27.0%	218	28.2%	0.411
Fried snacks	Baseline	163	42.6%	171	44.0%	334	43.3%	.695
	Endline	171	44.6%	194	49.9%	365	47.3%	.146
Salty foods	Baseline	153	39.9%	143	36.8%	296	38.3%	.363
	Endline	128	33.4%	153	39.3%	281	36.4%	.088
Instant noodle	Baseline	102	26.6%	112	28.8%	214	27.7%	.503
	Endline	71	18.6%	109	28.2%	180	23.4%	0.002*

*p<0.05 indicates statistically significant difference
The blue colour indicates significant results within group before and after intervention
The yellow colour indicates significant results between group after the intervention.

3.1.12 HABITUAL FOOD CONSUMPTION

The habitual food consumption patterns of students over the previous week at baseline and endline reveals several key trends. Regarding snacking frequency, at baseline, 53 per cent of students in the intervention group reported snacking every day, compared to 50.9 per cent in the control group. At endline, daily snacking decreased slightly to 44.1 per cent in the intervention group and 46.0 per cent in the control group. The proportion of students who snacked occasionally (4 to 6 times per week) increased slightly in both groups, while those who rarely snacked (1 to 3 times per week) increased more in the intervention group (from 18.8 per cent to 23.0 per cent) compared to the control group (from 15.4 to 17.7 per cent). These changes were not statistically significant, indicating a relatively stable pattern of snacking behaviour between baseline and endline.

Examining specific snack consumption, the intake of sweet snacks declined slightly in both groups. At endline, 35.8 per cent of students in the intervention group and 39.6 per cent in the control group consumed sweet snacks. Sugary drink consumption also decreased in both groups. At endline, 52.2 per cent of students in the intervention group and 50.4 per cent in the control group consumed sugary drinks. Interestingly, while the consumption of fried snacks was significantly higher in the control group at baseline (22.9 per cent vs. 16.7 per cent, p=0.032), at endline, both groups showed an increase, with a higher proportion still in the control group (31.9 per cent vs. 25.3 per cent, p=0.044). This suggests that fried snacks remained a popular choice despite some dietary changes.

The places where students purchased their snacks also shifted significantly. At baseline, about 40.7 per cent of intervention students bought snacks from the school canteen, which increased significantly to 55.9 per cent at endline (p=0.004). In contrast, the percentage of students buying snacks from vendors near their homes decreased from 37.9 per cent to 29.0 per cent in the intervention group, while in the control group, this remained high (39.1 per cent at endline). These findings indicate that the intervention may have influenced students to purchase more snacks from school canteens rather than from external vendors.

Overall, while some reductions in unhealthy snack consumption were observed, particularly in relation to sweet snacks and sugary drinks, the consumption of fried snacks remained high.

TABLE 15. Habitual food consumption of students at baseline and endline, by treatment group

Student's snacking habit		Intervention group						p-value between intervention and control group
		Intervention		Control		Total		
		n	%	n	%	n	%	
Frequency of snacking: baseline	Every day	203	53.0%	198	50.9%	401	51.9%	.117
	Occasionally (4 to 6 times in a week)	101	26.4%	128	32.9%	229	29.7%	
	Rarely (1 to 3 times in a week)	72	18.8%	60	15.4%	132	17.1%	
	Never	7	1.8%	3	.8%	10	1.3%	
Frequency of snacking: endline	Every day	169	44.1%	179	46.0%	348	45.1%	.219
	Occasionally (4 to 6 times in a week)	117	30.5%	135	34.7%	252	32.6%	
	Rarely (1 to 3 times in a week)	88	23.0%	69	17.7%	157	20.3%	
	Never	9	2.3%	6	1.5%	15	1.9%	
Sweet snacks	Baseline	152	39.7%	161	41.5%	313	40.6%	.609
	Endline	137	35.8%	154	39.6%	291	37.7%	.274

Student's snacking habit		Intervention group						p-value between intervention and control group
		Intervention		Control		Total		
		n	%	n	%	n	%	
Biscuits	Baseline	22	5.7%	33	8.5%	55	7.1%	.139
	Endline	23	6.0%	30	7.7%	53	6.9%	.348
Bread, cake	Baseline	57	14.9%	74	19.0%	131	17.0%	.125
	Endline	60	16.5%	59	16.1%	119	16.3%	.881
Sugary drinks	Baseline	240	62.7%	225	57.8%	465	60.2%	.171
	Endline	200	52.2%	196	50.4%	396	51.3%	.610
Milk, yogurt	Baseline	38	9.9%	31	8.0%	69	8.9%	.342
	Endline	38	9.9%	37	9.5%	75	9.7%	.847
Carbonated soft drinks	Baseline	4	1.0%	4	1.0%	8	1.0%	0.982
	Endline	1	.3%	3	.8%	4	.5%	0.324
Chips, snacks	Baseline	188	49.1%	214	55.0%	402	52.1%	.099
	Endline	185	48.3%	162	41.6%	347	44.9%	.063
Fried snacks	Baseline	64	16.7%	89	22.9%	153	19.8%	.032*
	Endline	97	25.3%	124	31.9%	221	28.6%	.044*
Fried foods	Baseline	131	34.2%	119	30.6%	250	32.4%	.284
	Endline	92	24.0%	95	24.4%	187	24.2%	.897
Others	Baseline	0	0.0%	0	0.0%	0	0.0%	
	Endline	134	35.1%	119	30.8%	253	32.9%	.210
Usual places where the students buy snacks: baseline	In the school canteen	156	40.7%	158	40.6%	314	40.7%	0.217
	At the food vendors outside/around the school	62	16.2%	55	14.1%	117	15.2%	
	At the food vendors near the house	145	37.9%	166	42.7%	311	40.3%	
	Purchased by parents	13	3.4%	8	2.1%	21	2.7%	
	Irrelevant due to never snacking	7	1.8%	2	.5%	9	1.2%	
Usual places where the students buy snacks: endline	In the school canteen	214	55.9%	179	46.0%	393	50.9%	.004*
	At the food vendors outside/around the school	38	9.9%	49	12.6%	87	11.3%	
	At the food vendors near the house	111	29.0%	152	39.1%	263	34.1%	
	Purchased by parents	16	4.2%	6	1.5%	22	2.8%	
	Irrelevant due to never snacking	4	1.0%	3	.8%	7	.9%	

*) grey background indicates significant p-value (p<0.05) between baseline and endline within group.

3.1.13 PARENTS' KNOWLEDGE OF BALANCED NUTRITION

The table presents an analysis of parents' knowledge of balanced nutrition, focusing on significant changes between baseline and endline within the intervention or control groups. First, the understanding that packaged tea is not a nutritious source of energy significantly improved within the intervention group, increasing from 90.6 per cent at baseline to 96.3 per cent at endline. The difference between intervention group was also significant (p=0.030). This suggests that the intervention was effective in clarifying misconceptions about the nutritional content of packaged beverages, potentially leading to better dietary choices for children. Similarly, awareness that 'reduced quality of life is one impact of obesity' increased between intervention and control groups, albeit by a small percentage.

Despite these improvements, other aspects of parental knowledge, such as the belief that fruits can replace vegetables due to similar nutrient content, and the importance of balancing energy intake and expenditure in preventing obesity, remained largely unchanged.

TABLE 16. Parents' knowledge of balanced nutrition at baseline and endline, by treatment group

Knowledge	Correct answer		Parents who answered correctly						p-value between intervention control group
			Intervention		Control		Total		
			n	%	n	%	n	%	
1. A child whose parents are not obese will have no risk of overweight/ obesity	False	Baseline	172	44.9%	174	44.7%	346	44.8%	.960
		Endline	189	49.3%	169	43.4%	358	46.4%	.100
2. If a child does not like vegetables, we can replace them with fruits because they have similar nutrient content	False	Baseline	307	80.2%	322	82.8%	629	81.5%	.349
		Endline	318	83.0%	317	81.5%	635	82.3%	.576
3. In general, packaged tea does not contain calories	False	Baseline	347	90.6%	353	90.7%	700	90.7%	.945
		Endline	369	96.3%	361	92.8%	730	94.6%	.030*
4. Reduced quality of life is one impact of obesity	True	Baseline	81	21.1%	83	21.3%	164	21.2%	.949
		Endline	85	22.2%	60	15.4%	145	18.8%	.016*
5. The key to preventing obesity is to balance energy intake and expenditure	True	Baseline	80	20.9%	98	25.2%	178	23.1%	.156
		Endline	90	23.5%	101	26.0%	191	24.7%	.427

*) grey background indicates significant p-value (p<0.05) between baseline and endline within group.

3.1.14 PARENTS' ATTITUDES RELATED TO BALANCED NUTRITION

The findings from the table below indicate notable improvements in parents' attitudes toward balanced nutrition, particularly in the intervention group. A significant increase was observed in the proportion of parents who found it easier to prepare a complete breakfast for their child every day, rising from 73.1 per cent at baseline to 77.3 per cent at endline (p = 0.037), suggesting that the intervention positively influenced breakfast preparation habits.

Additionally, parents in the intervention group showed significant improvement in their ability to regulate their children's snack habits. Those finding it 'not difficult' slightly decreased but remained higher than the control group (51.2 per cent at baseline to 49.9 per cent at endline, p = 0.032).

There was a slight increase in parents who found it easier to encourage their child to exercise at least three to five days a week – from 39.9 per cent to 40.5 per cent in the intervention group, while the control group declined from 37.8 per cent to 31.6 per cent (p = 0.010).

No significant differences were found between groups regarding perceptions of childhood obesity as a nutritional issue, the likelihood of their child becoming obese, or the perceived seriousness of obesity's impact.

TABLE 17. Parents' attitude related to balanced nutrition at baseline and endline, by treatment group

Attitude		Intervention group						p-value between intervention and control group
		Intervention		Control		Total		
		n	%	n	%	n	%	
1. It is not difficult for me to prepare breakfast for my child every day with a complete meal (rice, side dishes, vegetables)	Baseline	280	73.1%	276	71.0%	556	72.0%	.506
	Endline	296	77.3%	275	70.7%	571	74.0%	.037*
2. It is not difficult for me to ask my child to have breakfast every day with a complete meal (rice, side dishes, vegetables)	Baseline	253	66.1%	235	60.4%	488	63.2%	.104
	Endline	261	68.1%	245	63.0%	506	65.5%	.131
3. It is not difficult for me to regulate my child's snack habits (frequency of snacks and types of food/drinks purchased)	Baseline	196	51.2%	186	47.8%	382	49.5%	.351
	Endline	191	49.9%	164	42.2%	355	46.0%	.032*
4. It is not difficult for me to get my child to eat vegetables at every meal	Baseline	181	47.3%	178	45.8%	359	46.5%	.676
	Endline	205	53.5%	200	51.4%	405	52.5%	.557
5. It is not difficult for me to get my child to eat fruit twice every day	Baseline	181	47.3%	189	48.6%	370	47.9%	.712
	Endline	187	48.8%	181	46.5%	368	47.7%	.523
6. It is not difficult for me to get my child to exercise at least 3 to 5 days a week	Baseline	153	39.9%	147	37.8%	300	38.9%	.538
	Endline	155	40.5%	123	31.6%	278	36.0%	.010*
7. Obesity among elementary school children is a nutrition issue	Baseline	284	74.2%	275	70.7%	559	72.4%	.283
	Endline	265	69.2%	265	68.1%	530	68.7%	.749
8. How likely do you think your child is to become overweight/obese?	Baseline	330	86.2%	330	84.8%	660	85.5%	.600
	Endline	97	25.3%	105	27.0%	202	26.2%	.599
9. How serious do you think the impact of obesity on elementary school children is?	Baseline	131	34.2%	123	31.6%	254	32.9%	.445
	Endline	240	62.7%	226	58.1%	466	60.4%	.195
10. Obesity is preventable	Baseline	210	54.8%	204	52.4%	414	53.6%	.506
	Endline	357	93.2%	360	92.5%	717	92.9%	.719

*) grey background indicates significant p-value (p<0.05) between baseline and endline within group.

3.1.15 PARENTS' PRACTICES RELATED TO BALANCED NUTRITION

The findings from table below highlight several aspects of parents' practices regarding balanced nutrition at both baseline and endline in the intervention and control groups. There were no significant changes in the main sources of household food or the frequency of ordering ready-made food online, with both groups showing consistently high percentages at endline (97.1 per cent in the intervention group and 96.4 per cent in the control group). However, a significant improvement was observed in the availability of fruits in the household during the last week, increasing from 25.3 per cent at baseline to 34.2 per cent at endline in the intervention group ($p = 0.004$), while the control group remained relatively unchanged. Meanwhile, the availability of vegetables also increased in both groups, though the difference was not statistically significant.

Regarding the unavailability of less healthy food items such as fried foods, sugary drinks, sweet snacks, salty snacks, and instant noodles, there were no significant changes between baseline and endline in either group. Although some minor improvements were observed, such as a slight increase in households reporting no sweet snacks, these changes were not statistically meaningful.

TABLE 18. Parents' balanced nutrition practices at baseline and endline, by treatment group

Practice		Intervention group						p-value between intervention and control group
		Intervention		Control		Total		
		n	%	n	%	n	%	
1. Source of foods in the household	Baseline	173	(45.2)	197	(50.6)	370	(47.9)	.128
	Endline	175	(45.7)	175	(45.0)	350	(45.3)	.844
2. Frequency of buying ready-made food online last week	Baseline	350	(91.4)	353	(90.7)	703	(91.1)	.756
	Endline	372	(97.1)	375	(96.4)	747	(96.8)	.568
3. Availability of vegetables in the house during the last week	Baseline	233	(60.8)	220	(56.6)	453	(58.7)	.227
	Endline	260	(67.9)	241	(62.0)	501	(64.9)	.084
4. Availability of fruits in the house during the last week	Baseline	97	(25.3)	92	(23.7)	189	(24.5)	.588
	Endline	131	(34.2)	96	(24.7)	227	(29.4)	.004*
5. Unavailability of fried foods in the house during the last week	Baseline	6	(1.6)	4	(1.0)	10	(1.3)	0.508
	Endline	0	(.0)	2	(.5)	2	(.3)	0.16
6. Unavailability of sugary drinks in the house during the last week	Baseline	8	(2.1)	9	(2.3)	17	(2.2)	.831
	Endline	7	(1.8)	9	(2.3)	16	(2.1)	.636
7. Unavailability of sweet snacks in the house during the last week	Baseline	7	(1.8)	12	(3.1)	19	(2.5)	.260
	Endline	15	(3.9)	13	(3.3)	28	(3.6)	.669
8. Unavailability of salty snacks in the house during the last week	Baseline	18	(4.7)	17	(4.4)	35	(4.5)	.826
	Endline	15	(3.9)	15	(3.9)	30	(3.9)	.965
9. Unavailability of instant noodle in the house during the last week	Baseline	13	(3.4)	13	(3.3)	26	(3.4)	.968
	Endline	15	(3.9)	11	(2.8)	26	(3.4)	.402

*) grey background indicates significant p-value ($p<0.05$) between baseline and endline within group.

3.1.16 PARENTS' PRACTICES RELATED TO BALANCED NUTRITION

The table presents a multivariate analysis of factors contributing to overweight and obesity among students. While the intervention group had a slightly higher prevalence (31.9 per cent) than the control group (26.5 per cent), the difference was not statistically significant. Males had a higher overweight-obesity rate (32.2 per cent) compared to females (26.0 per cent), and being female was associated with a significantly lower risk (adjusted OR = 0.68, p = 0.024).

Children of working mothers had a higher prevalence of overweight-obesity (32.2 per cent vs. 24.6 per cent) and were more likely to be overweight-obese (OR = 1.48, p = 0.021). Socioeconomic status also played a role, with children from medium and high-income households facing increased risk (OR = 1.53 and 1.59, respectively, p = 0.048), suggesting that wealthier families may have lifestyles that contribute to obesity.

Interestingly, higher parental knowledge was associated with higher overweight-obesity risk (OR = 1.83 for medium and 2.32 for good knowledge, p = 0.001), contradicting expectations. To explain this finding, we conducted further analysis by exploring knowledge questions for parents that are related to obesity. Among parents of overweight/obese children, 54.7 per cent correctly recognized the influence of parental obesity on child obesity risk, compared to 43.0 per cent in the non-overweight/obese group (p = 0.003). Likewise, 35.6 per cent correctly identified the importance of energy balance for obesity prevention, compared to 20.3 per cent in the non-overweight/obese group (p = 0.001). These findings suggest that personal experience with their child's obesity may increase parental awareness of related health risks.

In conclusion, overweight/obesity is influenced by multiple factors including gender, maternal employment, socioeconomic status, and parental knowledge. Effective interventions should go beyond education, and address lifestyle and environmental factors to encourage healthier behaviours at both household and community levels.

TABLE 19. Associated factors linked to students' nutritional status

Variable	Overweight-obesity		No overweight-obesity		Total	p-value bivariate	p-value regression	Adjusted OR
	n	%	n	%	n			
Group								
Intervention	122	31.9%	261	68.1%	383	0.100		
Control	103	26.5%	286	73.5%	389			
Gender								
Male	127	32.2%	268	67.8%	395	0.060	0.024	Ref
Female	98	26.0%	279	74.0%	377			0.68 (0.49-0.95)
Educational background of parents (mother)								
Lower	51	22.6%	175	77.4%	226	0.018		
Medium	88	29.6%	209	70.4%	297			
High	75	34.7%	141	65.3%	216			
Occupation of parents (mother)								
Not working	76	24.6%	233	75.4%	309	0.023	0.021	Ref
Working	149	32.2%	314	67.8%	463			1.48 (1.06-2.08)
Socioeconomic status of household (tertile)								
Lowest	58	22.4%	201	77.6%	259	0.011	0.048	Ref
Medium	84	31.2%	185	68.8%	269			1.53 (1.02-2.30)
Highest	83	34.0%	161	66.0%	244			1.59 (1.05-2.39)
Parents' knowledge level endline								
Poor	75	23.2%	248	76.8%	323	0.001	0.001	Ref
Medium	94	29.1%	229	70.9%	323			1.83(1.23-2.74)
Good	56	44.4%	70	55.6%	126			2.32(1.43-3.77)
Parents' knowledge improvement								
Improved	79	35.6%	143	64.4%	222	0.012		
No change-decreased	146	26.5%	404	73.5%	550			

Adjusted by intervention group, students' characteristics (use of social media, pocket money, exercise frequency); household characteristics (parents' age, education, and occupation, household member); students' KAP at endline.

3.1.17 MULTIVARIATE ANALYSIS OF CONTRIBUTING FACTORS TO IMPROVEMENTS IN CHILDREN'S NUTRITION PRACTICES

Table 20 analyses factors that contribute to improvements in children's nutrition practices. The intervention group showed greater improvement (34.5 per cent vs. 21.3 per cent, p = 0.001), as children in this group were 1.57 times more likely to improve their practices. Parental age and education levels did not show significant associations, while food security status approached significance (p = 0.057), suggesting that children in food-insecure households may face challenges in behaviour change.

Children's knowledge played a crucial role, with children with moderate and good knowledge levels significantly more likely to show improved practices (OR =2.05 and OR = 3.02, p = 0.001, respectively). Similarly, children whose knowledge levels improved from baseline to endline also had higher practice improvement (32.0 per cent vs. 24.2 per cent, p = 0.016).

Attitude also strongly influenced improvement in children's nutrition practices. Children with moderate (OR = 1.42) and good (OR = 1.98, p = 0.012) attitudes were more likely to improve. Likewise, children whose attitudes improved were more likely to adopt better practices (32.8 per cent vs. 24.7 per cent, p = 0.015).

TABLE 20. Factors contributing to improvement in children's practices

Variable	Child practice improvement					p-value bivariate	p-value regression	Adjusted OR
	Increased		No change-decreased		Total			
	n	%	n	%	n			
Group intervention								
Intervention	132	34.5%	251	65.5%	383	0.001	0.009	1.57 (1.11-2.22)
Control	83	21.3%	306	78.7%	389			Ref
Parents' education (mother)								
Lower	59	26.1%	167	73.9%	226	0.076		
Medium	73	24.6%	224	75.4%	297			
High	72	33.3%	144	66.7%	216			
Food security category								
Food secure	178	29.8%	420	70.2%	598	0.057		
Mildly food insecure	15	17.6%	70	82.4%	85			
Moderately food insecure	15	30.0%	35	70.0%	50			
Severely food insecure	7	17.9%	32	82.1%	39			
Child knowledge level endline								
Poor	38	16.2%	196	83.8%	234	0.001	0.001	Ref
Moderate	118	30.0%	275	70.0%	393			2.05 (1.32-3.18)
Good	59	40.7%	86	59.3%	145			3.02 (1.79-5.07)
Child knowledge improvement (endline compared to baseline)								
Improved	115	32.0%	244	68.0%	359	0.016		
No change - decreased	100	24.2%	313	75.8%	413			
Child attitude endline								
Poor	35	18.5%	154	81.5%	189	<0.001	0.012	Ref
Moderate	72	25.2%	214	74.8%	286			1.42 (0.88-2.30)
Good	108	36.4%	189	63.6%	297			1.98 (1.24-3.15)
Child attitude improvement								
Improved	98	32.8%	201	67.2%	299	0.015		
No change - decreased	117	24.7%	356	75.3%	473			

Adjusted by students' characteristics (use of social media, pocket money, exercise frequency); household characteristics (parents' age, father's education and occupation, household member); parents' knowledge, attitude and practices at endline.

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3.2 Qualitative findings

3.2.1 GENERAL CHARACTERISTICS OF RESPONDENTS

The respondents in this study included various stakeholders involved in the UKS/M programme such as UKS/M teachers, school committee members, school canteen managers, TP UKS/M representatives at the district and city levels, UKS/M coordinators, and nutritionists at *puskesmas.* These stakeholders participated in FGDs and IDIs as described in the qualitative methodology section. Additionally, *Kapten Bergizi* students were also included as respondents. Of the 190 respondents in this study, 70 were male/boys and 120 were female/girls. The breakdown of respondents – based on their categories, gender, and intervention/control group status – is presented in the table below.

TABLE 21. Characteristics of respondents

Respondent category	Male/boy	Female/girl	Total
UKS/M teachers made up a significant portion, with 42 participants (**22 males and 20 females**) from both intervention and control groups	5 (SMG), 8 (SRK), 5 (KDS), 4 (TGL)	5 (SMG), 4 (SRK), 5 (KDS), 6 (TGL)	**42**
School canteen managers were represented by 42 respondents (**9 males and 33 females**)	0 (SMG), 7 (SRK), 1 (KDS), 1 (TGL)	10 (SMG), 5 (SRK), 9 (KDS), 9 (TGL)	**42**
School committee members, only included from the intervention group, numbered 20 participants (**8 males and 12 females**)	2 (SMG), 1 (SRK), 1 (KDS), 4 (TGL)	3 (SMG), 4 (SRK), 4 (KDS), 1 (TGL)	**20**
TP UKS/M at district/city level were represented by 23 TP UKS/M representatives (**11 males and 12 females**)	3 (SMG), 3 (SRK), 2 (KDS), 3 (TGL)	4 (SMG), 2 (SRK), 3 (KDS), 3 (TGL)	**23**
***Puskesmas* staff** were represented by 24 UKS/M coordinators or nutritionists (**1 male and 23 females**)	0 (SMG), 0 (SRK), 1 (KDS), 0 (TGL)	6 (SMG), 6 (SRK), 5 (KDS), 6 (TGL)	**24**
Kapten Bergizi students accounted for 39 respondents (**19 boys and 20 girls**)	4 (SMG), 5 (SRK), 5 (KDS), 5 (TGL)	6 (SMG), 5 (SRK), 4 (KDS), 5 (TGL)	**39**
Total respondents	**70**	**120**	**190**

3.2.2 TRAINING ON NUTRITION AND OBESITY PREVENTION FOR THE SCHOOL COMMUNITY

KEY FINDINGS

1. **Training for district/city facilitators:** A five-day facilitator training strengthened multi-sectoral collaboration on UKS/M and obesity prevention, using interactive games and illustrated modules to enhance nutrition education and promote healthier school environments. Details on topics included in the training are in **Box 1.**

2. **Training for the PB programme at school level:** The PB training effectively enhanced the capacity of school teachers, including UKS/M teachers, home class teachers, and school canteen managers, by providing structured knowledge on nutrition, physical activity, hygiene, and mental health. Interactive microteaching, mentoring *Kapten Bergizi*.

3.2.2.1 Training for district/city facilitators

Training for district/city facilitators was a key component of the PB programme and aimed to equip participants with the knowledge and skills necessary to effectively implement the programme at the district/city level. Conducted over five days in Semarang City, it involved participants from various institutions, including the provincial and district/city school health unit (UKS) teams (TP UKS/M). These teams comprised representatives from the Bureau of People's Welfare (Biro Kesra) of the Regional Secretariat, the Regional Development Planning Agency (Bappeda), the education office, the health office, the Regional Office of the Ministry of Religious Affairs (Kemenag), and three to five *puskesmas* that oversee the intervention schools in each district/city. Each institution sent one representative, except for the district/city health office, which sent two representatives as candidates for the district/city-level facilitators of PB. The majority of *puskesmas* representatives were either public health nutritionists (TPG) or individuals responsible for the UKS/M programme.

Following the district-level facilitator training, the Surakarta City Health Office strengthened local support for the PB programme. In addition to providing cascade training to teachers and student nutrition captains in intervention schools, the health office also organized a dedicated training session for staff from intervention area *puskesmas*. This training, held at the district health office, aimed to build a network of co-facilitators at the community level who could assist with school-based activities. Participants included three representatives from each *puskesmas*, typically consisting of a school dental nurse (UKS), health promotion officer, and a nutritionist. This initiative ensures programme continuity, especially in situations where district facilitators are unable to attend school activities.

BOX 1.

FACILITATOR ORIENTATION TOPICS FOR THE UKS/M TEAM ON NUTRITION INTERVENTION PACKAGE FOR THE PREVENTION OF OVERWEIGHT AND OBESITY IN PRIMARY SCHOOL CHILDREN

Topics related to the UKS/M programme:

1. UKS/M and Healthy Madrasah Schools
2. School/Madrasah Nutrition Programme and Explanation of the Modelling Plan
3. Nutrition Education in Primary Schools/Madrasahs and Student-Led Nutrition Introduction
4. Nutrition Services in Primary Schools/Madrasahs
5. Fostering a Healthy School Environment in Primary Schools/Madrasah

Topics related to the *Petualangan Bergizi* programme:

1. Nutrition and Food Groups, Balanced Nutrition Messages, 'My Plate' Concept, and the Importance of Breakfast
2. Reading Food Labels and School Snacks
3. Physical Activity
4. Hygiene Behaviours
5. Self-Care and Caring for Others
6. Building Healthy Habits
7. Twenty Nutrition-related Games
8. Strategies for Preventing and Controlling Obesity in School-Aged Children
9. Diagnosis, Management, and Prevention of Overnutrition and Obesity in School-Aged Children
10. Counselling Techniques for Children with Overnutrition and Obesity, and Mental Health Assessment for Affected Children
11. Physical Exercise for the Prevention and Management of Overnutrition and Obesity
12. Developing a Follow-Up Action Plan (RTL) for the Primary School/Madrasah Nutrition Program

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"The training was held at the health office to help us as facilitators. Sometimes there are school activities we can't attend, so we trained friends from the puskesmas to help out. Each puskesmas sent around three people—one dental nurse for UKS, one health promotion officer, and one nutritionist."

Puskesmas, nutritionist, Surakarta City.

Of the 23 representatives from district/city UKS/M teams who attended the FGD, eight also participated in the facilitator training. In terms of health centre (*puskesmas*) participation, seven out of the 12 *puskesmas* interviewed in this survey had also attended the facilitator training.

The training covered several key areas, including the UKS programme, nutrition, and the PB programme. Specific topics included an overview of the programme, interactive games, microteaching practices, and the development of follow-up action plans. The details of training topics are described in **Box 1**.

Most of the participants from TP UKS/M at district/city level and *puskesmas* reported that the learning materials were designed for ease of understanding by school children.

"In January 2024, the TP UKS/M Kab/Kota received an invitation from the Regional Secretariat (Sekda) of Central Java to participate in a collaborative programme between UNICEF and the Central Java Provincial Government. This programme focused on a nutrition intervention package, specifically addressing obesity and overweight issues among elementary school (SD) children. In Surakarta City, the programme targeted five schools: SD Sampangan, SD Al-Azhar, MI Tamirul, SD Sabranglor, and SD Harjodipuran. As facilitators, representatives from the Surakarta City Government were trained directly by UNICEF. The training covered both technical and knowledge-based aspects, including the programme, Petualangan Bergizi. The learning materials were designed to be easily understood by school children, featuring illustrated modules with engaging stories. Facilitators were taught 18 nutrition-related games, which they later trained teachers to implement in the five schools."

TP UKS/M, Bappeda, Surakarta City.

"A new aspect gained from the training was the educational games for obesity prevention. This made education more engaging and less monotonous for elementary school children."

Puskesmas, nutritionist, Tegal District.

"So, we first received a five-day training there. The training covered both theory and practice. We went through everything together, and during those five days, we learned all the materials. At the end, we developed a follow-up action plan (RTL). The theoretical part included nutrition and UKS (School Health Unit)—everything was discussed in detail. The sessions were also interspersed with games, and we were given an education kit. The training also covered UKS topics, such as the Trias UKS—what it consists of and its components. We discussed what defines a healthy school, including the necessary facilities. For example, the required number of bathrooms based on student population, the percentage of young doctors (student health ambassadors) needed, the canteen standards, and even aspects like school gardens—what kind of land is required and what should be included."

Puskesmas, UKS/M coordinator, Semarang City.

3.2.2.2 Role of TP UKS/M at district/city level and *puskesmas* as facilitators in the *Petualangan Bergizi* programme

The two main roles of TP UKS/M and *puskesmas* as facilitators in the PB programme were: (1) to conduct training on PB in their respective districts/cities for UKS/M teachers and *Kapten Bergizi* (nutrition captains) who were responsible for leading the programme throughout the 2024 academic year in the intervention schools; and (2) to conduct on-the-job training (OJT) three times during the academic year to monitor programme implementation and evaluate the alignment of nutrition education with the provided modules.

TABLE 22. Perceived main roles of programme facilitators at district/city level

Main roles of programme facilitator at district/city level	Quotes
Training for UKS/M teachers and *Kapten Bergizi*	*"As facilitators for the Petualangan Bergizi programme, the team in Kudus District organized training for UKS teachers, followed by a joint training session for UKS teachers and students, where the Petualangan Bergizi programme was introduced. After the training, a session schedule was developed to ensure the programme's implementation in schools."* TP UKS/M, health office, Kudus District.
On-the-job training as part of programme monitoring and evaluation	*"Serving as a district/city facilitator to train teacher facilitators and Kapten Bergizi, support programme implementation, and conduct monitoring and evaluation (OJT) at two designated schools in the area: SDN Muncanglarang and MI Miftahul Ulum."* *Puskesmas*, nutritionist, Tegal District.
	"Facilitators provided guidance to schools (teachers) on managing nutritious meal plans for students, including promoting healthy food choices and discouraging random snacking, ensuring better health control." TP UKS/M, Regional Office of the Ministry of Religious Affairs, Surakarta City.
	"Facilitators were evenly distributed across the five schools, with two facilitators assigned to each school. They conducted on-the-job training three times during the academic year. Each session included follow-up meetings with UNICEF to report progress. Furthermore, the TP UKS held two meetings throughout the year to monitor and evaluate the programme's implementation." TP UKS/M, Bappeda, Surakarta City.

TABLE 23. **Perceived effectiveness of role implementation**

Effectiveness of role implementation	Quotes
Puskesmas: Applying new knowledge through training of trainers (TOT) for UKS teachers	*"Being a resource person for teachers and nutrition captain, suggesting PMT menus as healthy snack alternatives in the canteen, and assisting in sourcing plant seeds from the relevant government office."* *Puskesmas*, UKS/M coordinator, Semarang.
	"We delivered training to teachers in five schools in the form of TOT. UKS teachers and classroom teachers were trained so they could effectively teach nutrition education to students." *Puskesmas*, nutritionist, Kudus.
TP UKS/M: Positive response and enthusiasm from schools during training	*"Overall, the programme has been running well. There were no challenges in training the teachers, and the schools responded positively and enthusiastically."* TP UKS/M, Bappeda, Kudus.
TP UKS/M: Effective teamwork between district/city facilitators	*"During monitoring and evaluation, the process was effective because there were two facilitators for each school. This allowed for continuity, as one facilitator could step in if the other was unavailable."* TP UKS/M, health office, Semarang.
TP UKS/M: Effective implementation and broader coverage across grade levels	*"Based on the available materials, they are well-suited for 4th-grade students. The implementation has been effective, and in some schools, the programme has even been extended to all grade levels, not just the target classes. Parents are also becoming more aware of the importance of providing breakfast for their children."*
	"In my second year overseeing MI Miftahul Ulum, we faced challenges since the school does not have a canteen—all food vendors operate outside the school. On Fridays, when there is no food sold, teachers take the initiative to prepare snacks for students. Socialization efforts have also been carried out with food vendors. While they acknowledge the importance of providing healthier options, they are still focused on profitability. We cannot immediately impose strict bans on them." TP UKS/M, Sekda-Kesra, Tegal.
TP UKS/M: Successful OJT implementation through smooth coordination with intervention schools	*"During on-the-job training, facilitators observed teachers implementing the programme, Petualangan Bergizi effectively. Coordination through WhatsApp groups also supported smooth communication and updates."* TP UKS/M, health office, Kudus.
TP UKS/M: Effective monitoring using provided instruments	*"The on-the-job training included specific instruments to assess schools' progress in implementing the Petualangan Bergizi programme. In most schools, the programme has been running smoothly. Additionally, the implementation of Petualangan Bergizi contributes to improving indicators for a healthy city, particularly in relation to UKS activities in schools."* TP UKS/M, Bappeda, Surakarta.

Some participants from TP UKS/M in Semarang City said that the capacity-building and socialization efforts were insufficient to fully prepare them for their roles. The reasons for this included:

1. **Limited preparation time**
   Participants faced challenges due to the short preparation period after the training. With minimal time to internalize the material and plan for implementation, many struggled when transitioning from training to practice. They were required to cover extensive content from the PB book, with its multiple chapters, and immediately apply it in real classroom settings. This lack of preparation led to inconsistencies in how facilitators delivered the material to teachers.

   "The preparation time after training was too short, so we weren't fully ready. When we started implementing it, we struggled to figure out how to apply it in practice. The Petualangan Bergizi book has so many chapters—11 in total—and we were expected to cover everything. When we had to immediately demonstrate it to teachers, our delivery varied from one person to another."

   TP UKS/M, health office, Semarang City.

2. **Incomplete training coverage**
   Due to time constraints, the training did not comprehensively cover all chapters or modules, requiring participants to learn some parts on their own. This led to confusion, especially when they had to apply the knowledge directly.

   "The material from UNICEF wasn't fully covered because there wasn't enough time during the training. We were just told to study the rest on our own."

   TP UKS/M, health office, Semarang City.

3. **Lack of basic nutrition knowledge**
   Some facilitators, particularly those without a background in health or nutrition, struggled due to a lack of foundational knowledge, which was not adequately addressed in the training.

   "We don't have a basic understanding of nutrition. Those in the health office might already be familiar with this field, but for us, it was completely new."

   TP UKS/M, education office, Semarang City.

3.2.2.3 Training for the *Petualangan Bergizi* programme at school level

The PB training at the district/city level was designed to equip participants with the knowledge and skills needed to effectively implement the programme in schools. Conducted over four days, the training brought together representatives from each intervention school, including one UKS/M teacher, one Grade 4 homeroom teacher, and one Grade 5 homeroom teacher. To ensure that all teachers were informed, those who attended the training shared the modules and key content with their colleagues who were unable to participate, allowing for broader engagement in PB activities at school.

Among the 20 UKS/M teacher representatives who took part in the FGD, 15 received PB training—four from Semarang, five from Surakarta, two from Kudus, and four from Tegal.

The training covered four key areas of nutrition and health, including: (i) healthy eating patterns; (ii) physical activity; (iii) hygiene and healthy living behaviour; and (4) mental health.

"After the training, Alhamdulillah, what we gained, as far as I remember, were four important points ... The first was healthy living, food, and eating patterns, followed by physical activity, personal hygiene, and finally, mental health."

UKS/M teacher, public school, Semarang City.

Participants were introduced to the PB programme, including the activities to be conducted, the roles of facilitators at school level, and how to mentor the *Kapten Bergizi*. Additionally, the training focused on skills development, particularly on how to deliver the programme's materials and nutrition-related games through microteaching sessions. Many participants said that they gained general knowledge about nutrition, learned how to use the PB modules, and understood the programme's activities and how to guide the *Kapten Bergizi*.

"We were provided with general knowledge about nutrition, the Petualangan Bergizi module, how to use the module, the programmes to be implemented, and how to guide the Kapten Bergizi. The training also taught us how to deliver the materials and games to students. The Kapten Bergizi were trained on how to share the materials with their peers. The school informed parents about the module, which includes examples of nutritious foods, through WhatsApp groups, as a reference for preparing their children's meals."

UKS/M teacher, public school, Kudus District.

"We assist the Kapten Bergizi, monitor programme implementation, and coordinate with other teachers, especially homeroom teachers, to conduct material sessions and games in the classroom."

UKS/M teacher, Islamic private school, Surakarta.

In addition to the capacity building initiatives provided through the PB programme, two intervention schools in Semarang and Surakarta also received support from other organizations.

- In Semarang, SDN Pekunden collaborated with the Food Security Office (*Dinas Ketahanan Pangan*) to provide nutrition education and monitor food quality in schools.
- In Surakarta, SDN Sampangan partnered with Gita Pertiwi, an NGO, to enhance food safety in school canteens. Their activities included:
  - Training and mentoring for canteen staff.
  - Monitoring food quality in school canteens.
  - Establishing a Healthy Canteen Management Team to ensure food safety compliance.

Health centre staff involved in intervention schools also participated in additional training programmes, including: (i) PMBA (infant and young child feeding) and nutrition counselling training – conducted by Balai Pelatihan Kesehatan (Bapelkes) in an offline session with nine health centres (*puskesmas*), and (ii) disaster nutrition training – organized by Bapelkes, focusing on nutrition management in emergencies.

"In 2024, we were fortunate to receive PMBA training. We practiced hands-on skills related to unhealthy snacks, portion control, and balanced nutrition. This training was conducted by Bapelkes (health training centre)."

Puskesmas, intervention, UKS/M coordinator, Tegal.

"Other training in 2024 covered disaster nutrition, severe malnutrition management, and breastfeeding counselling."

Puskesmas, intervention, nutritionist, Tegal.

Some of the local *puskesmas* received specialised training even though they were assigned to the control group, following invitations from the Ministry of Health (*Kemenkes*). One of these was a school-age and adolescent health service training, conducted in October 2024:

"In October, we were selected to attend a one-week training on school-age and adolescent health services. The training was organized by the Ministry of Health, with invitations sent through the Central Java Provincial Health Office, which then appointed Tegal Regency to send one representative puskesmas—ours, Kedungbanteng. The training covered UKS policies, school-age and adolescent health services, health screening procedures, nutritional status assessment, and mental health screening. There was also a field practice session at a school to simulate the implementation of health screenings."

Puskesmas, control, UKS/M coordinator, Tegal.

The informant also highlighted that the training sessions enhanced their knowledge of school health services and strengthened their confidence in performing their roles:

"After the training, my confidence improved significantly. Previously, I relied on knowledge passed down from previous programmes, but now I have formal training and clear guidelines. The training provided standardized procedures for school health services, particularly for elementary and Islamic elementary schools (SD and MI). Now I know the standards and in 2025, we can maximize what hasn't been implemented yet."

Puskesmas, control, UKS/M coordinator, Tegal.

3.2.3 KEY OPINIONS ABOUT THE CHANGES IN KAP OF SCHOOL COMMUNITIES

KEY FINDINGS

1. The PB programme led to increased awareness and understanding among UKS/M teachers, school canteen managers, and health workers regarding balanced nutrition, food portioning, and sugar, salt, and fat (GGL) intake.
2. UKS/M teachers enhanced their skills in delivering nutrition education through interactive games and counselling, enabling better communication with students and parents.
3. Health workers gained new insights about managing overnutrition and obesity, marking a shift in focus beyond undernutrition.
4. Although school canteen managers did not receive formal training, they gained key nutrition knowledge through school-wide socialization efforts and guidance from trained teachers. As a result, many implemented healthier food practices such as offering more homemade and traditional snacks, reducing junk food, and promoting fruit consumption. Additionally, some canteen managers advised vendors on prohibited food items, showing increased awareness and commitment to healthier school environments.
5. *Kapten Bergizi* emphasized that a good school canteen should prioritize healthier food options, proper hygiene, and better organization. Their key concerns included increasing fruit and vegetable availability, reducing instant and fried foods, limiting sugary and artificially flavoured snacks, and ensuring food safety through proper packaging and waste management.
6. Teachers, school committees, and health officials observed positive behavioural changes in students, including better nutrition knowledge, improved dietary habits, increased home-packed meals, and greater physical activity.

The opinions about the changes in KAP from the UKS/M teachers, school committee, school canteen coordinators, and *puskesmas* are summarized in the table below.

TABLE 24. Perceived changes in KAP from school communities

Opinion	Quotes
Increased self-awareness of healthy lifestyles	*"First, for myself, I have become more aware of a healthy lifestyle, especially regarding physical activity."* UKS/M teacher, public school, Semarang.
Correct understanding of balanced nutrition	*"Previously, I only knew about the '4 Sehat 5 Sempurna' concept, where milk was considered essential. Now, I've learned about balanced nutrition, including proper portion sizes and the recommended limits for sugar, salt, and fat. Before, we only cared about taste when cooking, but now we pay more attention to how much we use."* UKS/M teacher, Islamic private school, Surakarta. *"We have learned a lot of new things. For example, before, we followed the '4 Sehat 5 Sempurna' concept, but now we focus on balanced nutrition, proper food portions, and the nutritional content of different foods. The educational games introduced in the training helped students understand better. A simple impact is now students know that instant noodles should not be eaten with rice. After the education sessions, they can choose meals that include vegetables and protein."* UKS/M teacher, Islamic private school, Tegal.
Knowledge on sugar, salt, and fat (GGL) limits	*"We gained a lot of knowledge about sugar, salt, and fat limitations, including how to select foods that meet the recommended intake levels."* UKS/M teacher, Islamic private school, Tegal.
Knowledge on proper food portions	*"I learned new knowledge about proper food portions."* UKS/M teacher, public school, Kudus.
Use of educational games for nutrition learning	*"The materials are easier for children to understand because there are clear guidelines, and they enjoy learning through games."* UKS/M teacher, Islamic private school, Surakarta.
Improved skills in delivering nutrition education to students and parents	*"The training was very helpful in delivering nutrition education to students. We now have the knowledge to teach them and to communicate with parents so they can collaborate in preparing nutritious meals for their children."* UKS/M teacher, Islamic private school, Tegal.
New insights and skills for health workers on managing overnutrition and obesity in schools	*"Since I first started working, our focus has always been on undernutrition, malnutrition, and anaemia. But now, we realize that we also need to start paying attention to overnutrition. Knowing how to intervene when issues related to overnutrition arise, even though no cases of overnutrition (obesity) have been identified within the current working scope of the puskesmas."* *Puskesmas*, nutritionist, Kudus.
Improved skills in counselling and communicating about obesity in schools	*"From the training, I learned more in-depth counselling techniques for obesity and other health issues in schools."* *Puskesmas*, health promoter, Kudus.

3.2.3.1 School canteen managers' exposure to nutritional information and key knowledge and skills gained

Although school canteen managers did not receive the same structured training as UKS/M teachers, they were still exposed to nutritional information through school socialization efforts. During the FGD, they said that they had gained knowledge about healthy canteens, selecting healthier food options, and the PB programme through information passed down by UKS/M teachers and grade 4 and 5 homeroom teachers who had attended the training.

"I was not invited to attend the training as a canteen manager. The training was only for grade 4 and 5 teachers in the first semester. However, I received information about the programme from teachers who attended, particularly regarding healthy canteen practices."

School canteen manager, public school, Semarang.

Through discussions in FGDs across the four study areas, school canteen managers highlighted several key takeaways:

Knowledge about healthier food choices for children, including the need to reduce the availability of instant noodles due to preservatives, and limiting the consumption of sugar, salt, and fat, artificial colouring, and spicy foods.

Improved ability to select and provide healthier food options for sale in school canteens.

Involvement in monitoring food vendors within the school environment and providing guidance on what foods are or are not allowed.

"I did not participate in the training, but I received information from teachers who attended UNICEF-led training. UNICEF also visited the school to inform canteen managers about which foods and drinks should be sold and advised us to establish SOPs regarding permitted and prohibited items."

School canteen manager, public school, Kudus.

"There was a school-wide socialization effort to encourage students to shift away from junk food and instead choose traditional or homemade meals."

School canteen manager, Islamic private school, Surakarta.

"Now, we have more homemade menu options. On Fridays, we sell only traditional snacks without packaged snacks like Chiki. Drinks are limited to water and tea. Surprisingly, students have already developed favourite traditional snacks."

School canteen manager, public school, Surakarta.

"Unhealthy snacks and drinks such as packaged chips, Pop Ice, Ale-Ale, and instant noodles have decreased. Instead, we are encouraged to sell fruits. The children have responded positively and enthusiastically to the new menu items because they are creative, tasty, and different from what they've tried before. The canteen menu changes regularly."

School canteen manager, public school, Kudus.

"As a canteen manager, I have already advised food vendors about prohibited food items such as powdered ice drinks. The vendors were cooperative and followed the guidelines."

School canteen manager, public school, Tegal.

3.2.3.2 Students' perspectives on characteristics of a good school canteen

During discussions with *Kapten Bergizi,* they shared their views on the characteristics of a good school canteen. Their perspectives emphasized healthier food options, better hygiene, and improved organization in canteen operations. Many students expressed the need for canteens to sell more fruit and vegetables while reducing instant, fried, and overly processed foods. They also highlighted the importance of food safety, proper packaging, and better waste management.

The table below presents the key characteristics of a good canteen according to *Kapten Bergizi*.

TABLE 25. Perceived key characteristics of a good canteen

Key characteristics of a good canteen	*Kapten Bergizi* quotes
More frequent fruit sales	*"Fruits should be sold more often, not just twice a week."* *Kapten Bergizi*, Boy and Girl, Kudus
	"The canteen should sell food with lots of vegetables and nutritious meals, not just trending or viral snacks." *Kapten Bergizi*, Boy, Kudus
Offer a variety of food options	*"Previously, the snack options were limited, like wafers. We want more variety in canteen snacks, not the same things all the time—like fried crispy chicken. But if that's all that's available, it's okay, we just have to be grateful for it."* *Kapten Bergizi,* Girl, Surakarta
Reduce sugary food and drinks	*"Packaged drinks should not be sold because they contain too much sugar. Instead, the canteen should offer fresh fruit juice for a healthier option."* *Kapten Bergizi,* Boy, Semarang.
Reduce instant food and fried food	*"Pop Mie should be limited, especially the spicy ones, because someone once had a stomach ache after eating it."* *Kapten Bergizi,* Boy, Surakarta.
Reduce spicy food	*"Maklor (fried macaroni) should not be sold because it's too spicy."* *Kapten Bergizi,* Boy, Surakarta
Reduce food with artificial seasonings	*"There should be fewer Chiki snacks because some still contain seasoning powder, like kiloan chips with MSG. It's better to reduce them because they can hurt the throat."* *Kapten Bergizi,* Boy, Surakarta
Safe food packaging	*"Staples should not be used because they are dangerous, especially for younger students in Grade 1."* *Kapten Bergizi,* Girl, Semarang
	"Food should be covered so that flies don't land on it." *Kapten Bergizi,* Boy, Surakarta
Other concerns	*"Some students don't throw their trash in the bin, so they get scolded because it can cause mosquito breeding."* *Kapten Bergizi,* Boy, Surakarta
	"Some canteen items are not nutritious, like coffee and crispy chicken." *Kapten Bergizi,* Boy, Kudus
	"There should be a queue system so that students don't get rowdy while buying food. Otherwise, the vendors get confused." *Kapten Bergizi*, Boy, Tegal
	"Sometimes, canteen vendors don't check the labels when buying packaged food in bulk. By the time we notice, it turns out to be unhealthy. Since break time is short, we rush to buy snacks without checking the labels." *Kapten Bergizi,* Girl, Surakarta

3.2.3.3 Key opinions about perceived changes in students' KAP and dietary practices at home

The table below highlights key findings regarding students' KAP towards nutrition and dietary habits at home, as observed by teachers, school committees, and health officials. The findings suggest positive behavioural changes in students, including improved knowledge about healthy and unhealthy foods, better dietary habits, increased consumption of home-packed meals, and greater participation in physical activities.

TABLE 26. Perceived changes in students' KAP and dietary practices at home

Key opinion	Findings	Quotes
Students' knowledge of unhealthy snacks and their effect on the body	Students learned about nutrition through interactive activities, including games that demonstrated the effects of mixed foods inside the stomach.	*"The students at SD Pekunden have received nutrition education and engaged in a game illustrating the effects of different foods inside the stomach."* TP UKS/M, education office, Semarang.
Understanding unhealthy snack choices through experiential learning	Schools incorporated hands-on educational games inspired by *Emo-Demo,* where students mixed unhealthy snacks and observed the unpleasant smell, reinforcing awareness of unhealthy food digestion.	*"We modified the educational game about snacks by combining movement-based activities with an experiment where unhealthy snacks were mixed, creating a strong, unpleasant odour—helping children visualize how unhealthy food affects the body."* TP UKS/M, education office, Semarang.
Improved eating habits, especially breakfast habits	More students now eat a complete breakfast, including vegetables and fruits, following the *Isi Piringku* guidelines.	*"Students have developed a routine of eating breakfast with a complete meal, including vegetables and fruits."* *Puskesmas*, nutritionist, Tegal.
	Schools have successfully implemented structured breakfast activities combined with physical exercises, even for younger students (grades 1 to 6).	*"We have now successfully implemented a routine of joint breakfast sessions along with exercise activities, even for first graders."* *Puskesmas*, nutritionist, Tegal.
Increased habit of bringing healthy lunchboxes	Students bring packed meals more regularly, although daily monitoring remains a challenge. They have improved their ability to make healthy food choices outside school.	*"Students now bring their own lunch more frequently, though we cannot monitor it every day. However, they have learned how to choose healthier food outside of school."* TP UKS/M, health office, Semarang.
Reduced consumption of unhealthy snacks	The habit of bringing lunchboxes has reduced students' purchases of unhealthy snacks. Awareness of reducing sugary drinks such as tea is also increasing, with some parents replacing it with fruit juice.	*"Bringing lunchboxes has reduced children's snacking habits. We also encourage reducing tea consumption as it affects iron absorption. Ideally, replacing it with fruit juice would be better, but many children still prefer flavoured drinks over plain water. Those who drink plain water often come from families who prioritize health education."* TP UKS/M, health office, Surakarta.

Key opinion	Findings	Quotes
Better selection of healthier meals and snacks	Some schools have become more selective in their food choices, rejecting offers from commercial companies that promote sugary products.	*"At SDN Muncanglarang, the school rejected a collaboration offer from an ice cream company, demonstrating their commitment to promoting healthier snack choices."* *Puskesmas*, nutritionist, Tegal.
	Children are making better food choices, opting for healthier alternatives.	*"Before, children loved crispy fried crumbs, but now they are reducing them. They used to prefer chicken heads, but now they choose chicken breasts. They also seek out vegetables. Even fathers have started avoiding sugary drinks."* School committee, public school, Surakarta.
	Children are learning to cook healthier meals at home.	*"My child enjoys cooking at home. Previously, they only knew how to fry tofu, but now they mix tofu with vegetables."* School committee, public school, Surakarta.
Increased student participation in physical activities	Students engage in regular physical activities, such as morning exercises beyond regular PE classes, with a nutrition captain leading these activities.	*"In addition to regular PE classes, students now engage in morning exercises and stretching breaks between classes, led by a 'nutrition captain,' which helps boost their confidence in leading activities."* TP UKS/M, health office, Kudus.
	Traditional games and movement-based activities are also incorporated, particularly in rural areas where students already walk long distances to school.	*"Students in Bumijawa, who mostly live in mountainous areas, already engage in physical activity as they walk long distances to school. Additionally, traditional games and movement-based play activities are encouraged to keep them active."* *Puskesmas*, nutritionist, Tegal.
Improving other habits	Students are finishing their meals at home and at school.	*"Children can now finish their meals, both at home and at school."* School committee, Islamic private school, Semarang.
	Significant improvements in eating habits at home, including consistent breakfast routines and family mealtime.	*"The changes have been significant. My grandchildren used to struggle with eating at home but now, thanks to the programme, they have developed a routine of having breakfast every morning with the family. They also wash their dishes after eating. These habits were reinforced at school through teacher guidance and have now become a part of their daily routine. They can now distinguish a complete meal."* School committee, public school, Tegal.

During discussions, *Kapten Bergizi* shared their perspectives on how students' KAP regarding nutrition and healthy lifestyles have evolved. Their insights highlight improvements in understanding balanced nutrition, making healthier food choices, engaging in physical activities, and influencing their peers towards healthier habits.

The table below summarizes their key observations along with direct quotes.

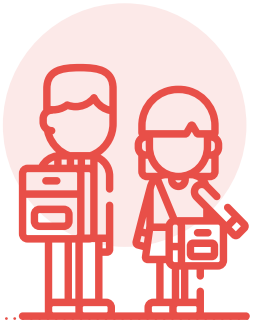
TABLE 27. Perceived changes on *Kapten Bergizi's* KAP-related nutrition and health

Category	Key changes	Quotes
Knowledge	Healthy food awareness	*"We learned about healthy foods like vegetables and fruits, reducing packaged foods like nuggets and sausages, and drinking eight glasses of water a day."* *Kapten Bergizi*, girl, Islamic private school, Semarang. *"The knowledge we gained is really helpful. Now we know that our diet should include carbohydrates, proteins, vitamins, and that physical activity is important."* *Kapten Bergizi*, girl, Islamic private school, Tegal.
	Healthy breakfast	*"We learned about a nutritious breakfast—meals containing carbohydrates, proteins, vegetables, fruits, and drinking water."* *Kapten Bergizi*, boy, public school, Kudus.
	Healthy snacks and food labelling awareness	*"Now I understand balanced meals. When buying snacks, I check the packaging to see if it's expired, if it's halal, and I read the ingredients. I also avoid powdered drinks, artificial colours, and sweeteners."* *Kapten Bergizi*, boy, Islamic private school, Tegal.
	Physical activity awareness	*"I learned about the benefits of exercise to keep my body healthy and strong."* *Kapten Bergizi*, boy, public school, Semarang.
	Nutrition-related games	*"I gained a lot of new knowledge. There are 20 games, but the most interesting and frequently played one is 'Tumpas Cacing.' When I was in Grade 4, we played it often during second recess. We also played guessing games about plant-based and animal-based proteins. We were taught to check for halal labels, food names, ingredients, and expiration dates."* *Kapten Bergizi*, boy, public school, Tegal.
Skills	Confidence in leading nutrition games as a peer educator	*"I became more confident in helping friends during games and supporting them. The topics we learned encouraged healthy habits, like avoiding preservatives in snacks (Chiki). Before, I used to buy snacks randomly, but now I avoid those and always check expiration dates."* *Kapten Bergizi*, girl, Islamic private school, Semarang.
	Confidence in peer support for monitoring eating habits	*"I can now advise my friends on healthy eating, such as eating more vegetables and not buying snacks outside too often because they contain seasonings and sauces."* *Kapten Bergizi*, girl, public school, Semarang. *"I help guide my friends to bring complete lunchboxes and eat together."* *Kapten Bergizi*, girl, public school, Tegal.
Practices	Reducing unhealthy snacks (salty and fried food)	*"When my friends are with me, they listen and avoid buying Chiki or fried snacks. They still eat some packaged snacks, but not as often as before."* *Kapten Bergizi*, girl, Islamic private school, Semarang.
	Including vegetables in lunchboxes	*"My friends now bring healthy lunchboxes with vegetables and fruits."* *Kapten Bergizi*, girl, Islamic private school, Semarang.
	Adopting healthier eating habits	*"Some who didn't like vegetables before have started to enjoy them. They also try to live a healthier lifestyle by exercising, waking up early, and drinking six to eight glasses of water a day. Now, I like vegetables more and drink more water."* *Kapten Bergizi*, boy, public school, Surakarta.

3.2.4 IMPLEMENTATION OF THE *PETUALANGAN BERGIZI* PROGRAMME

KEY FINDINGS

1. The PB programme is well accepted. The 'breakfast together' activity, where students bring meals from home, was considered the most successful activity due to high student enthusiasm, fun, and its effectiveness in establishing a breakfast habit. The habit of drinking plain water has also been successful, with facilities like dispensers in classrooms contributing to this.
2. The school garden activity was not as successful due to the limited plant care skills of students and the lack of space.
3. Time proved to be the main challenge for PB. The school agenda was already full before the programme was introduced, and its launch in the middle of the year made schedule adjustments difficult. Students' food preferences and the food environment also posed challenges.
4. Schools suggested improvements to the PB programme, which included better time management by starting at the beginning of the academic year, *Kapten Bergizi* training with guest resource persons, programme evaluation and sharing of good practices, policy integration, improved food environment, and provision of IEC materials.
5. Key lessons from the programme include raising awareness to encourage behavioural change through engaging activities that build students' habits, improving the school food environment (especially the canteen), and the importance of adequate teacher training.



The schools involved in the intervention were enthusiastic about sharing their experiences of the implementation of PB. According to the school staff, the programme had a positive impact on students' knowledge, attitudes, and behaviours, as well as on the teachers' ability and confidence in delivering nutrition education through varied and feasible activities. These benefits will be detailed further in the KAP section of this report.

This section focuses on activities that, in general, the school staff reported as having been successful, those that need improvement, best practices and lessons learned, challenges faced during implementation, and recommendations for future programme implementation.

3.2.4.1 *Petualangan Bergizi* activities that were successfully implemented in schools

Most of the intervention schools reported that the 'breakfast together' activity, where students bring meals from home, had been successful. Reasons for this success included the high level of student enthusiasm, the fun nature of the activity, and its effectiveness in establishing a breakfast habit among students.

"The mandatory Saturday breakfast programme has become a hit, with children always eager to participate."

UKS teacher, Tegal

"The breakfast activity has now expanded to other classes, though on different days. This has motivated students who previously struggled to have breakfast, as they were encouraged by seeing their peers and the school canteen adapting to the 'healthy canteen' guidelines."

UKS teacher, Kudus

"Parents have also been supportive. In our school, students used to bring meals wrapped in plastic. Now, they prepare meals in lunchboxes with a more balanced nutritional menu, including eggs and vegetables."

UKS teacher, Kudus

The habit of drinking plain water was also successful in many schools. The provision of facilities such as dispensers in classrooms, encouraging students to bring water from home, and the use of personal water bottles all contributed to this success. The high activity level of students during school hours also increased their need for hydration.

Several schools also mentioned that nutrition education has been running smoothly, especially because it is delivered through engaging games. In one school, they invited parents to participate in the implementation of the programme.

"Every day, we lead the nutrition games with the Kapten Bergizi. The school also provides traditional games like engklek, ular tangga, and hulahop."

UKS teacher, Tegal

"For the nutrition education targeted at Grade 4 students, we invited parents to the school for a face-to-face socialization session to discuss the nutrition education their children would receive."

UKS teacher, Kudus

Physical activities were successfully integrated into physical education classes and extracurricular activities. During breaks, students are active, engaging in activities like running or traditional games. Additionally, schools have designated specific days, such as 'Healthy Fridays', to encourage physical activity.

"Senam (gymnastics) is held every Friday, but with the introduction of the programme, the schedule has been diversified. For instance, in the first week, there's gymnastics, in the second week, a leisurely walk, and environmental cleanliness activities."

UKS teacher, Tegal

3.2.4.2 *Petualangan Bergizi* activities that faced challenges

Many schools reported that the implementation of the school garden was unsuccessful because of students' limited skills in plant care and insufficient space in the school yard.

"The plants in the school garden often die quickly, even after being replaced several times, because the children only water them without performing more in-depth care."

UKS teacher, Semarang

"The small size of the school yard and overwatering by students have hindered the growth of the plants."

UKS teacher, Solo

"The garden thrived during fasting month and before it, due to favourable weather. However, it became neglected when the teachers' focus shifted to other school programmes, and with the onset of the rainy season."

UKS teacher, Kudus

Nutrition education is also challenging in most schools due to it taking up lesson time, inadequate facilities, and the less-than-optimal involvement of the nutrition captains.

"The Kapten Bergizi who guide the games have very soft voices, and they are not loud enough. As a result, the students in the back are not interested in listening. They are always accompanied by the class teacher."

UKS teacher, Solo

"Some games have never been played at school because the required props are unavailable, such as the cup stacking game. Additionally, the nutrition captains are still insufficiently trained, as they still rely on the teachers and have not fully mastered the material."

UKS teacher, Tegal

3.2.4.3 Challenges in implementing the *Petualangan Bergizi* programme in schools

Time constraints were found to be the main challenge in most schools. Given that the programme began in the middle of the school year, an already-full agenda was in place, which made it difficult for schools to adjust their set schedules. However, the schools made an effort by, for example, rescheduling teaching hours so that students could stay longer at school, compressing the grade 4 and 5 schedules, using the physical education (PE) session, and utilizing the first and second session on Saturdays, which are more flexible.

As the PB programme aims to improve students' KAP on balanced nutrition, another challenge raised by schools is that their food environment is not yet optimal. (These details are provided in section 3.3 of this report.)

During implementation—especially early on—schools struggled to translate training messages into clear guidelines for canteen food. Teachers found advice like 'avoid foods high in sugar, salt, or fried' difficult to apply, as most available options did not meet the criteria. Despite their willingness to comply, they were left with limited food and beverage choices.

"At the beginning, we were really confused. We wanted to sell pudding, but it contained sugar and milk. That's not allowed, right? Someone wanted to sell kebabs, but the meat is smoked and processed, which isn't healthy. But the kebabs have lots of veggies, right? They also said, 'The meat is just for flavour, ma'am.' Then there were burgers made with nuggets—but the nuggets were homemade. So yeah, we were pretty confused about what's considered healthy and what's not, because it all seemed contradictory."

Canteen coordinator, Semarang

Schools were advised during PB training to contact their assigned health centres for questions. However, some schools received no response or follow-up. Hesitant to follow up—assuming *puskesmas* staff were busy—they turned to other sources, such as UNICEF implementing partners or fellow intervention schools. One school raised questions during a *puskesmas* visit, but felt that the advice received was too general.

"Last month, the puskesmas came to the canteen to take food samples. So, I took the chance to ask, 'Out of all these snacks, which ones do you think shouldn't be sold?' They just said, it 'looked good'. They didn't really point out any specific items to avoid. Just the usual advice—like reducing the sweetness in drinks."

Canteen coordinator, Kudus

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Some examples of implementation challenges are highlighted in the table below.

TABLE 28. Perceived barriers in the implementation of *Petualangan Bergizi* in schools

Barriers	Quotes
Limited time and packed school agenda	*"The class teachers feel rushed and overwhelmed because this activity starts in the middle of the term, and with the additional subjects like ICT and English, it forces them to sacrifice the next lesson's hours for nutrition education."* UKS teacher, Semarang. *"The nutrition education activities were conducted on Fridays. It, however, sacrificed math lessons. Also, since each teacher has their own responsibilities, they cannot monitor these activities continuously."* UKS teacher, Solo. *"The teachers participating in the training have teaching responsibilities, so the time is tight. Additionally, we have two types of classes (bilingual and tahfidz) that have different schedules, and sometimes conflicting."* UKS teacher, Semarang. *"The activities are included in the physical education lessons, and some students protested due to the reduced time for the physical activities. The suggestion is to incorporate it into the curriculum."* UKS teacher, Kudus.
Timeline for starting PB activities not aligned with the school's existing schedule	*"This is a new programme, and one of the challenges faced is the conflict between the PB activities and the already planned curriculum. The teaching schedule had already been set, leaving around 20 to 30 per cent of educational material unfinished."* UKS teacher, Kudus. *"The intervention period began in the second semester, but by the end of the academic year, there were many other activities such as exams, student orientation (MPLS), and so on. It would be better if the programme started at the beginning of the school year."* UKS teacher, Solo.
Student's food preference and unhealthy food environment	*"Many students still buy snacks from outside. The snacks provided by parents are not necessarily aligned with the healthy canteen's goals. Parents tend to buy ready-made snacks because the school is near the market."* UKS teacher, Solo. *"Even though students are aware that unhealthy food is not good for them, they continue to choose it, often selecting snacks they find tastier. Some students prefer foods with larger quantities and better taste, even if they are not healthy."* UKS teacher, Tegal.

A few schools mentioned challenges related to parental participation, particularly the low attendance during socialization events. However, schools also acknowledge the significant role of parents in other aspects. For example, parents are involved in managing the school canteen by ensuring that the food sold is healthy. The school committee has also communicated the importance of a healthy canteen directly to the foundation that manages it. Additionally, parents show their support by providing dispensers in classrooms to facilitate the habit of drinking water among students. They also prepare students' breakfasts for the 'breakfast together' programme and monitor students' breakfast habits, which are shared by class teachers in a parent WhatsApp group.

Although shared breakfast and physical activities were considered the most successful activities of the PB programme, one school reported difficulty in implementing the breakfast due to conflicts with school activities and a lack of parental participation. Similarly, the physical activities agenda was reported as less optimal in one school due to unconducive conditions at the school.

"Physical activities are limited due to many areas being paved with bricks, which raises concerns that students might accidentally be injured. Additionally, students are reluctant to participate in exercise activities. To address this, we improvised by holding ice-breaking sessions twice a day using the sound system."

UKS teacher, Kudus

3.2.4.4 Suggestions for the *Petualangan Bergizi* programme

The school proposed six key suggestions for the implementation of the PB programme in future. These focused on sustainability, broader coverage, better time management, *Kapten Bergizi* training, programme evaluation, school policies, and the types of activities and facilities available at school.

TABLE 29. Suggestions for Pertualangan Bergizi programme

No	Suggestions	Quotes
1	**Sustainability and wider coverage:** The programme should be expanded to other schools, involve all classes, and provide training for teachers who have not yet participated.	*"The programme should be expanded to other schools: The model should be like that of a Sekolah Penggerak. There should be coordination with the forum of elementary school teacher meetings."* School in Solo. *"Expanding the target across all grade levels: The programme should not be limited to grades 4 and 5, as the habits established over the past three years require adaptation."* School in Kudus. *"It is important to regularly conduct training for teachers, as they rotate every year. Teachers who have received training should share the knowledge with other teachers to ensure continuity."* School in Semarang.
2	**Schedule:** The nutrition education should be distributed across two semesters, with the implementation starting at the beginning of the academic year.	*"The material consists of 11 topics. Instead of rushing to complete everything, it would be better to schedule, for example, topics 1 to 5 in the first semester, and continue with the remaining topics in the second semester."* UKS teacher, Solo. *"If a programme like this is implemented, it would be better to start at the beginning of the academic year so that it can be more easily scheduled in accordance with the academic calendar."* UKS teacher, Solo.
3	**Training for nutrition captains:** the duration should be extended, with refresher training sessions, and external experts as guest speakers.	*"The training for the Kapten Bergizi should ideally be conducted by external parties, not just from the school itself, to prevent the children from getting bored."* UKS teacher, Solo. *"The nutrition training for the Kapten Bergizi covering 12 games is not sufficient within a two-day duration, so they don't fully master the material. There should also be a refresher training."* UKS teacher, Tegal and Solo.
4	**Programme evaluation and sharing good practices**	*"Evaluation of the programme over a one-semester period from the school to improve the programme."* UKS teacher, Kudus. *"Sharing experiences from MI Islamiyah Brekat as they received the best school evaluation for this programme."* UKS teacher, Kudus. *"Collaboration with puskesmas and other parties is necessary for regular monitoring."* UKS teacher, Solo.
5	**School policy:** incorporated into the school's annual agenda, with active involvement from the school principal.	*"Include it in the school's annual programme so that it runs every day (incorporated into the school agenda)."* UKS teacher, Kudus. *"Involve the school principals because they are the decision makers, especially regarding time and the canteen; without the principal's intervention, it cannot be done."* UKS teacher, Semarang.
6	**Facilities and support:** socialization and IEC materials.	*"The puskesmas should hold socialization sessions on selling snacks and conduct inspections."* UKS teacher, Tegal. *"Provide guidelines and props for educational materials."* UKS teacher, Solo.

3.2.4.5 Good practices from the *Petualangan Bergizi* programme

Based on their experience of running the programme for a year, the intervention schools identified key learnings that represent good practice.

1. **Create awareness to encourage behavioural change through habit formation.**
   The series of activities implemented in the school are believed to have successfully provided enough exposure to foster awareness of health and hygiene among students. This awareness, combined with regular activities such as shared breakfasts and physical activities, led to visible behavioural changes. For example, students became more selective in choosing the food they consume, including the snacks they brought to school for breakfast. Additionally, the shared breakfast sessions encouraged children who were not accustomed to eating breakfast to start doing so, as it became a shared, fun activity with friends.
2. Student awareness was further supported by changes in the food environment, particularly through strengthening the school canteen to offer healthier food and beverage options for students.
3. The capacity of the teachers, through adequate training, is important to facilitate activities at school.
4. The shared breakfast programme created a moment to translate knowledge into practice.
5. Collaboration among the school community, such as involving teachers and parents in strengthening the healthy canteen initiative, yielded positive results. Similarly, support from foundations was beneficial for private schools.
6. In addition to promoting better breakfast and eating habits, the practice of bringing breakfast from home fostered a strong sense of togetherness among the school community.
7. This programme serves as a reference when planning for a programme at school, i.e., encouraging the implementation of programmes in stages, with careful planning, rather than simply delivering content.

This activity motivated schools to be creative and innovative. For example, to reduce the habit of buying food outside the school, one madrasah in Kudus implemented a lunch programme and introduced a policy that prohibits students from bringing pocket money.

3.2.5 ROLE OF *PETUALANGAN BERGIZI* IN STRENGTHENING THE UKS/M PROGRAMME

PB has played a significant role in strengthening the UKS/M programme, with notable successes and some challenges, as reported by TP UKS/M and school communities across Semarang, Surakarta, Kudus, and Tegal. Key findings highlight the programme's impact on nutrition, learning, and school health practices, and present areas for improvement.

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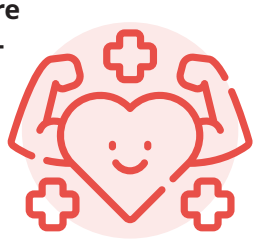
TABLE 30. **Perceptions on the impact of the PB pilot on strengthening the UKS/M programme**

Strengthening the UKS/M programme	Quotes
Puskesmas: Better understanding of the UKS system and its role in healthy schools	*"I used to not understand the UKS system well, but after the training, I learned that there are standards for a healthy school. There are responsibilities for the health centre, UKS teachers, sanitation, and others."* *Puskesmas*, nutritionist, Kudus City.
TP UKS/M: Schools better understand their roles and responsibilities in the UKS/M programme	*"This programme has been very helpful in strengthening the role of UKS/M in schools. With the health office (Dinkes) often seen as the programme holder, schools have gained a better understanding of their roles and responsibilities in the programme."* TP UKS/M, health office, Tegal District.
TP UKS/M: Health literacy delivered by teachers	*"Teachers are now equipped to deliver health literacy to students, covering simple topics such as hygiene and nutrition. This means schools no longer need to wait for health workers (nakes) to convey health messages."* TP UKS/M, health office, Tegal District.
TP UKS/M: Successful implementation of nutrition education sessions	*"The OJT report assesses the sustainability and implementation of several programme activities, including the completeness of the Petualangan Bergizi sessions (nutrition education)."* TP UKS/M, Bappeda, Surakarta City.
TP UKS/M: Coaching on providing healthy and safe food in schools	*"Puskesmas staff conducted coaching on food safety for food vendors (PKL). They informed canteen managers and UKS teachers about selling healthy food, emphasizing the need for training and certification in food safety."* TP UKS/M, health office, Kudus District.
TP UKS/M: Smoother coordination between *puskesmas* and schools	*"Coordination between puskesmas and schools has become smoother, especially during health screenings. This has facilitated the process of health facilitation in schools."* TP UKS/M, health office, Tegal District.
TP UKS/M: *Kapten Bergizi* serve as peer leaders, encouraging healthy practices among students	*"Kapten Bergizi act as role models for their peers, promoting healthy practices among students."* TP UKS/M, health office, Semarang City.
Puskesmas: Better understanding on obesity intervention	*"Knowing how to intervene when issues related to overnutrition arise, even though no cases of overnutrition (obesity) have been identified within the current working scope of the puskesmas."* *Puskesmas*, UKS/M coordinator, Kudus District.
Puskesmas: Improved skills in counselling and communicating about obesity in schools	*"From the training, I learned more in-depth counselling techniques for obesity and other health issues in schools."* *Puskesmas*, health promoter, Kudus City.
TP UKS/M: Implementation of Trias UKS/M contributes to student attendance rates	*"The implementation of Trias UKS/M (education, services, and school environment development) has had a significant impact, including an increase in student attendance rates."* TP UKS/M, health office, Tegal District.
TP UKS/M: The programme enhances students' learning abilities by promoting healthy eating habits	*"It supports the development of outstanding children through good nutrition, which enhances their learning process and ability to absorb lessons at school."* TP UKS/M, Regional Office of the Ministry of Religious Affairs, Semarang City.
TP UKS/M: Improving indicators of UKS/M activities	*"Additionally, the implementation of Petualangan Bergizi contributes to improving indicators for a healthy city, particularly in relation to UKS activities in schools."* TP UKS/M, Bappeda, Surakarta City.

3.2.6 CHANGES IN REFERRAL SYSTEM ON OBESITY CASES

KEY FINDINGS

1. Across the four study areas, the referral system for overweight and obesity cases in schools has **not shown significant improvement** at endline. The key issues remain:
   - Referrals are still conducted informally through verbal communication.
   - There is no availability of standardized procedures, forms, or official tracking mechanisms.
2. The actions taken by ***puskesmas* when identifying obesity cases in school children remain unchanged**, including:
   - Informing parents through the school and advising them to seek medical care at their preferred healthcare facility.
   - Providing direct education during health screenings at school, which remains the most common strategy.
3. The **challenges within the obesity referral system also remain the same as at baseline**, particularly the **misalignment between students' registered healthcare facilities and school-based referrals**, making it difficult for *puskesmas* to track and ensure follow-up treatment.



Across the four study areas, the referral system for overweight and obesity cases in schools has not improved significantly and remains largely unstructured. Referrals are still conducted informally through verbal communication without standardized procedures, forms, or official tracking mechanisms. When a student is identified as obese, UKS teachers inform parents and advise them to seek medical care at their preferred healthcare facility. However, there is no system in place to ensure that these students receive the necessary follow-up care.

"If there is a referral, so far it has only been verbal. There are many challenges, including determining where the child should be referred. If they already have their own designated healthcare facility, we just direct them there."

Puskesmas, health promoter, Kudus District

A key challenge of misalignment between students' registered healthcare facilities and school-based referrals persists. Since not all students are registered at the local *puskesmas*, referrals often lead to different healthcare facilities based on BPJS registration, making it difficult for *puskesmas* to track and ensure follow-up treatment. Additionally, there is no proper documentation or monitoring of students who receive further care. While the *puskesmas* recognizes the need for a standardized referral system, such a system has yet to be implemented.

"Schools should be able to refer students to the puskesmas, but from the perspective of healthcare services, it must align with the student's registered facility."

Puskesmas, health promoter, Kudus District

However, there is a positive development in Surakarta, where one school demonstrated an effort to address both the nutritional and psychological aspects of obesity. A case was identified through the on-the-job training (OJT) programme, where a student with obesity faced social exclusion. The school responded by involving the local *puskesmas*, highlighting the need for psychological support alongside nutritional intervention.

"During OJT, we discovered an obese student who felt socially isolated. The school eventually referred the student to the puskesmas for further support. This case revealed that beyond nutritional issues, psychological support is also necessary."

TP UKS/M, Bappeda, Surakarta City

In general, counselling for overweight and obesity cases remains limited, with direct education during health screening at school being the most commonly applied strategy. Given the inefficacy of the referral system and the low follow-up rate among students, health workers prefer to provide education during check-ups as a more immediate and effective intervention.

"We apply the knowledge gained by providing direct education during health examinations. Since the referral system is not functioning effectively and students often do not attend follow-up appointments, direct education is the best alternative."

Puskesmas, nutritionist, Surakarta City

3.2.7 CHANGES IN THE FOOD ENVIRONMENT AT SCHOOLS

KEY FINDINGS

1. **School canteen rules** at intervention schools are not formalized in writing but are communicated verbally by the principal to the school community, including the canteen operators/food suppliers, and by teachers to parents via WhatsApp groups.

2. **Changes in the food and drinks available at intervention school canteens**
   - **Reduced/removed** less nutritious or unhealthy foods, including salty snacks, sugary foods/drinks, fried/fatty foods, unsafe foods/drinks (e.g., bright red sauces, coloured drinks, spicy powder-seasoned foods), and frozen foods (due to preservatives and seasoning powders).
   - **Introduced healthier options** such as homemade drinks with less sugar and no preservatives/artificial colours, mineral water, traditional cakes/snacks, rice with side dishes, fresh-cut fruit, and homemade main meals.

3. **Monitoring implementation**

   School monitoring is done informally through unscheduled visits to the canteen and communication via WhatsApp groups. *Puskesmas* conducts both routine and random visits. Schools hope that *puskesmas* can directly educate vendors and students and provide follow-ups after visits.

4. **Challenges in improving the school food environment**

   A major challenge is the presence of street vendors selling unhealthy food near the school. This issue existed before the PB intervention. The difficulties are:
   - i. Hesitation from schools and *puskesmas* to intervene due to vendors' livelihoods;
   - ii. Difficulty preventing students from buying outside food due to the lack of a permanent canteen;
   - iii. Challenges in restricting vendors, as the school is near a busy area; and
   - iv. Ineffective enforcement due to the large number of students.

5. **Key factors in improving the school food environment in intervention schools**
   - Strong commitment from the principal, supported by the school community.
   - Clear and consistently enforced regulations.
   - Canteen is managed by parents or teachers, not third parties.
   - Sufficient socialization, with the health sector playing a key role in communication.
   - Parental demand and maintaining their trust.
   - Gradual changes communicated respectfully in line with local culture.
   - Regular monitoring, including by *puskesmas*.
   - Availability of necessary facilities.

6. **Key differences between control and intervention schools in the food environment**
   - Most control schools have never received socialization on canteen management.
   - Some schools lack canteen regulations, despite recognizing the need for them.
   - Some schools had no change in food and drink offerings over the past year.
   - Monitoring by *puskesmas* and the school community is less intensive.

The school food environment mainly consists of the school canteen and external food vendors. The following sections highlight the most impactful changes that occurred in intervention school canteens following training and support from the PB programme.

3.2.7.1 Changes in canteen regulations after PB implementation in intervention schools

As observed at baseline, most schools do not have written canteen regulations. Regulations are usually communicated verbally by teachers to the canteen managers, by principals to the school community, and by class teachers to parents via class WhatsApp groups. Most intervention schools have improved their food environments, as detailed in the table below.

TABLE 31. Changes in the management of school food environments

No	Changes in rules	Quotes
a	The canteen management changed from an external party to parents.	*"Our canteen used to be run by an outside vendor, but after some concerns about the food choices—probably due to their focus on profit—the principal handed it back to the parents. We believe parents will offer better food and keep in mind what kids can afford."* PIC canteen, Semarang.
b	The school closed the gate to prevent students from buying food outside.	*"Now, the school gate is closed. We invited outside vendors to supply food inside. The principal told them the food should not contain preservatives, flavour enhancers, or excessive salt and sugar."* PIC canteen, Surakarta.
c	The school has entered into an agreement with the vendors.	*"Vendors sign a written agreement and provide their ID cards. They're not allowed to sell food with preservatives, artificial colours, or spicy powder. They've agreed to take responsibility if any problems come up, which makes them more careful."* UKS teacher, Tegal.
d	Payments at the canteen are made with cards, so students are not allowed to carry cash.	*"Now, payments are made with cards, so students can't carry cash. However, some still buy food in the morning, and we take photos and share them with the homeroom teacher, who then advises the students."* PIC canteen, Surakarta.
e	Snacks and lunch are provided by the school, with parents making payments.	*"Since the programme started, there is no canteen because we provide a daily lunch catering service with a different menu determined by the school. Parents pay once a week for both snacks and lunch catering."* School committee, Kudus.
f	Outside vendors are allowed to supply food and drinks to the canteen under certain conditions.	*"Food must be homemade. We collaborate with BPOM and the puskesmas to promote healthy canteen menus. We also encourage local vendors to sell healthy and clean food, with the incentive of promoting their stalls within the school."* School committee, Kudus.

Some private schools had already implemented canteen/catering rules before PB was introduced. However, it was noted that after the PB programme, food choices became more selective, such as reducing spice levels, cutting sugar, using non-plastic packaging, and offering more variety. Since the children are not allowed to carry cash, they usually buy snacks in the cooperative with their parents after school, making it easier to monitor.

Regarding canteen rules, TP UKS/M Solo reports as follows:

"We guide schools to sell healthy food, preferably traditional over packaged items. Instant foods like noodles should not be sold. This can be followed up by adding these rules to the school's existing regulations."

The DHO of Surakarta acknowledges the challenges of strengthening canteens due to the need for coordination with canteen managers to provide healthy (traditional) food. However, they believe schools are supportive, especially regarding the Healthy School Movement, which limits fast food and sugar consumption to prevent obesity, decreased cognition, and hyperactivity in children.

3.2.7.2 Changes in the food and drinks available in the canteens of intervention schools

Food and drinks that are no longer sold or have reduced availability in the school canteen, and those that are offered as replacements, are listed in the table below. While some unhealthy items have limited availability, they are still sold and have not been removed from the canteen.

TABLE 32. Changes in the food and drinks available at the school canteen

	Food/drinks that are no longer sold or have reduced availability in the school canteen	New food/drinks as replacements
General (in most schools)	• Salty foods (with preservatives): cup noodles, packaged salty chips.	• Homemade iced tea (type and amount of sugar adjusted according to regulations).
	• Sweet foods/sugary drinks: sachet drinks, ready-to-drink packaged beverages, candies.	• Mineral water (sold or provided in the classroom for free as it is purchased using the class funds).
	• Fried/fatty foods: fritters, including crispy tofu.	• Homemade orange juice.
	• Unsafe foods: bright, red-coloured sauces, coloured drinks.	• Homemade fruit juice.
	• Spicy foods: spicy *seblak*, spicy noodle sticks, spicy crackers, spicy macaroni.	• Rice, side dishes, vegetables.
	• Packaged foods that do not have an expiration date.	• Traditional cakes such as *dadar gulung, klepon, jenang mutiara, lemper, pukis.*
		• Main dishes: chicken soto, grilled rice, chicken katsu, grilled chicken, teriyaki.
		• Other homemade snacks: *onigiri,* egg noodles, toasted bread, kebab, risol mayo, pudding/ jelly.
Specific (only in few schools)	• Frozen foods: nuggets, dragon legs, sausages usually served with bright, red-coloured sauces or spicy seasoning powders.	• Homemade drinks: fruit ice, *es kuwut* (melon and lime juice), homemade ice pops.
	• Syrup ice and coloured ice.	• Fruit salad (*rujak*), bananas with chocolate sprinkles.
	• Foods with mayonnaise.	• Cold cut fruits, bananas.
	• Any form of iced tea.	• Boiled corn.

Reducing sugary/salty/fried or fatty foods and introducing homemade and traditional foods were the most common changes reported by the schools. The schools reported that these were consistently highlighted during the training and follow-up visits from the PB team.

"The most noticeable change in our school is that all the factory-made foods are completely gone. I was informed by a teacher who attended a UNICEF training. The main point is that the food should be real food, homemade."

PIC school canteen, Kudus

"Instant noodles are not allowed because of the seasoning. It is salty and contains preservatives. Homemade noodles are allowed because they only contain salt and garlic."

PIC school canteen, Surakarta

"Frozen foods like sausages are now less available. Packaged and sweet drinks are no longer available, and instant noodles are also gone. Snacks like salty chips are still available, though. Now, we sell nasi rames, iced tea, juice, and toasted bread, all homemade."

School committee, Kudus

"The types of food are the same, like fruit ice and milk ice. The children like ice drinks. But now, the iced drinks are homemade by the parents with natural, high-quality ingredients. There are no harmful colourings or sweeteners."

PIC school canteen, Tegal

The changes were also observed by the *Kapten Bergizi* students.

"Now, we have dadar gulung, klepon, and jenang mutiara. On Fridays, there's also satay. Previously, there were chiki and paper-wrapped candies, but they're not allowed anymore because they cause stomach aches and coughing. I prefer the food sold now because it's tastier and more nutritious."

Kapten Bergizi, Tegal

"The food in the canteen is healthier. We no longer sell iced tea and fried foods. Now, we have fruit juice and es kuwut. There are still instant noodles, but it's rare."

Kapten Bergizi, Semarang

Since schools and parents are concerned about spicy-seasoned snacks like noodle sticks, *seblak*, macaroni, crushed noodles, and fried potatoes, these foods were either banned or their availability reduced in the school canteen. Although only reported by a few schools, fresh fruits were sold in the school canteen. To attract the interest of students, it was sold in small cups.

"There are cold fresh fruits sold in the canteen using cups. So, it is easy to be held by the students, and they become interested. The canteen also sells rice and vegetables now. Drinking water is now provided in the classroom."

School committee, Kudus

3.2.7.3 Monitoring implementation in the canteen of intervention schools

Monitoring the implementation of the PB programme is mostly done informally, such as when the principal/UKS teachers or other teachers visit the canteen, including when they shop there. If any food or drink does not meet the new standards, direct reminders are given to the vendors. Additionally, monitoring is also conducted through a WhatsApp group that was specifically created to facilitate communication between the school and the canteen management.

The TP UKS in one city realized that guidance on sugar and salt content has not yet been emphasized in the canteen. What was implemented relates to food safety, such as the cooking oil used, permitted ingredients, and the expiration dates of packaged food and drinks. All respondents agree that monitoring the canteen is crucial to ensuring that the rules about what foods can and cannot be sold are followed.

"Our challenge is indeed in the canteen. The principal often checks and immediately informs if something is not right. 'Don't sell this tomorrow,' for example. But, as they are business owners, they naturally also consider their income. Because, if they sell traditional snacks, children are less interested (compared to foods that are children's favourites and tend to be high in sugar). So, it needs to be monitored."

UKS teacher, Solo

TABLE 33. Monitoring implementation in the canteen of intervention schools

No	Monitoring	Quotes
1	**Monitoring by the school**	
a	Done informally (school head and/or teacher visit the canteen).	*"In our place, the principal and the teachers also buy the food. If something tastes bad or doesn't meet the standards, it will be communicated to the parents. Because the responsibility lies with the parents' representatives. They take turns."* PIC canteen, Surakarta. *"If, for example, they start to not comply, like adding a little colouring, the canteen manager immediately reprimands them. So far, the canteen is safe."* UKS teacher, Kudus.
b	Done through a WhatsApp group involving the UKS teacher, canteen manager, and food vendors.	*"In my place, there is already a WhatsApp group. The canteen rules are continuously reminded in that group. In the canteen, they must sell these items, and candies and salty chips are not allowed. So, everything must be in line with what has been agreed upon. If something is not right, it will be communicated directly in the group."* UKS teacher, Surakarta.
c	Specifically done for certain types of food and drinks that are of particular concern to the school.	*"The monitoring is only for cup noodles and powdered drinks (sachet drinks)."* PIC canteen, Tegal.
2	**Monitoring by health centre**	
a	The focus is on the assessment of the food sold in the canteen, generally those that are spicy and contain colouring.	*"The monitoring is just like that. Foods that are not allowed are identified. Don't use spicy seasonings. When I asked which seasonings are allowed, they said (the flavour) balado from the one brand is okay, but not too much. Other brands should be avoided."* PIC canteen, Tegal. *"Every two months, there's a visit from puskesmas. If something doesn't meet the standards, we inform the parents who make the food. Usually, it's the spicy foods or those with colouring. So, the vendors follow the instructions and change it."* PIC canteen, Surakarta.
3	**Expected monitoring**	
a	The health centre communicates information to vendors and educates the children.	*"We hope puskesmas will also encourage the vendors, and occasionally the children as well. For example, once a month. It's not just the school monitoring, but also from the sub-district or puskesmas."* PIC canteen, Tegal and Surakarta.
b	There is follow-up action after the visit.	*"After the (puskesmas) visits, there should be follow-up action. Right now, there isn't any."* PIC canteen, Tegal.

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3.2.7.4 Key success factors for intervention schools in improving the food environment

Eight key factors underline the success of intervention schools in improving the food environment (Table 3.2.7 4). Effective socialization is believed to be crucial in fostering good understanding among students and the school community. Respondents mentioned that as food suppliers in schools, canteens need time to implement changes. Students initially rejected the changes, which led to a drop in sales, and concerned the vendors. To address this, the vendors used various strategies to encourage students to try the new foods and drinks. These efforts paid off as student acceptance gradually improved, and the new menu items were eventually well-received.

"At first, it was a big deal. They loved cup noodles the most. We told them the noodles were on a break. They were disappointed. Then we asked them to try other foods or drinks, like we offered pudding. The next day, we'd ask again, and we'd just say, 'It's on a break.' Eventually, they stopped asking because they got bored. So, we shifted their attention to the new menu. We, the canteen vendors, communicate with each other, like, 'Tomorrow, I'll sell this new menu,' and others also inform what they'll be selling."

PIC school canteen, Semarang

The initial poor reception from students was expected by the school, which anticipated that the unappealing appearance and unfamiliarity would be challenges in introducing traditional foods to the children. Some schools noted that it took about a month for students to begin accepting the new foods. Positive reception motivated canteen managers and vendors to innovate to keep students interested.

"We were initially doubtful—would the students buy it, would it sell? At first, we only sold a little. But eventually, what was sold at the canteen was purchased by the students. Now, we innovate to keep them interested, like making klepon in different colours to spark curiosity. Thank God, it's going well."

School committee, Surakarta

The concept that healthy food is 'unappealing' is considered inaccurate by some respondents, including teachers and canteen managers. Healthy food can be both delicious and appealing, depending on the creativity of the canteen staff and vendors, as one canteen manager said:

"I think the healthy food provided by suppliers is too limited in variety. Healthy snacks can still be profitable and varied, but the vendors' knowledge is often limited. For example, when we introduced chicken katsu, it sold out quickly. But it didn't last long, so vendors need to be creative with their menu changes."

PIC school canteen, Kudus

Good socialization is also reflected in the teachers' understanding of which foods and drinks are allowed to be sold in the canteen, as mentioned by the DHO of Tegal Regency:

"There was an ice cream producer who wanted to sell at the school cooperative and share the profits. The teacher immediately rejected this offer. This shows that the teacher is well-informed about the negative effects of excess sugar consumption for children, as they've received proper socialization."

DHO, Tegal

The detailed key factors for the success of the school in achieving a healthier food environment at school are explained in the table below.

TABLE 34. Key factors for improving the food environment

No	Key factors	Quotes
1	The commitment of the principal, supported by the school community.	*"The monitoring results show that if the principal or madrasah supports it, the programme runs well. Even outside vendors can be managed. For example, the principal of MI Brekat said, 'If you want to continue selling here, you must follow the rules of this school,' and in the end, the vendors had no choice but to comply."* DHO, Tegal.
		"It's all about teamwork. The principal, the committee, and the teachers. The committee informs the parents to ensure that children always eat healthy food. Consistency is required both at home and at school. If the parents support it, this habit can continue to be instilled." PIC canteen, Surakarta.
2	Clear rules that are applied consistently.	*"The key is clear guidance from the health centre. What is healthy food for children, and what are the real-life examples of that for children in Semarang? What is dangerous? So, we can avoid it. Clear information is needed on why certain foods are not allowed. We also need variety because children get bored quickly. This way, we won't be confused about what to sell, and it will be easier to control."* School committee, Semarang.
		"Schools really have to be brave enough to say no. For example, when we rejected a sponsorship from a brand of powdered sugary drinks, even though the prize was a laptop. But we have the authority, and we've agreed with the parents that there will be no packaged drinks in the canteen." UKS teacher, Solo.
3	The canteen is managed by the parents of the students or teachers, not a third party.	*"Since the canteen is managed by the parents, the school rules can be fulfilled because it allows for more flexibility in managing everything. The canteen used to be run by outsiders. At first, it might not match the children's tastes, but over time, it has improved."* UKS teacher, Semarang.
		"Because our canteen is managed by teachers, the teachers automatically follow the rules of the madrasah. Outsiders are not allowed. If one is allowed, others will want to do the same. It's difficult to manage." UKS teacher, Kudus.
4	Adequate socialization of the school community, including the important role of the *puskesmas* as resource person in socialization.	*"We started by reducing sugary drinks, and now chips are no longer available. Parents have begun providing traditional foods. This was communicated by the canteen manager and the school principal directly to the food vendors."* UKS teacher, Semarang.
		"The vendors were informed about the importance of nutrition for children and the harmful effects of sweet drinks. They are now more cautious when preparing food for the children." UKS teacher, Kudus.
		"This (socialization) should be addressed by an expert. For example, when I suggested limiting instant noodles, the food vendors responded by saying, 'But this noodle has BPOM certification, so it's good, right?' I'm not a health expert. It should be the puskesmas staff who come and explain this." PIC school canteen, Kudus.

No	Key factors	Quotes
5	The demand from parents and maintaining their trust.	*"Parents really want a healthy canteen. The school committee directly asked the foundation to ensure that the food sold in the cafeteria is healthy. From grades 3 to 6, students are allowed to buy snacks."* UKS teacher, Semarang. *"There are no more candy sponsors. Otherwise, parents would later ask, 'Why are you eating candy?' when they know it's not allowed at school. We're worried it might cause problems with parents (if the school being inconsistent), so candy is no longer allowed."* UKS teacher, Tegal.
6	Changes are made gradually and communicated politely in accordance with the local culture.	*"The canteen's revenue decreased when the food was changed because the children's behaviour can't immediately adapt. We advised the canteen to make the changes gradually. Maybe implement the new rules just one or two days a week at first, so the revenue doesn't drop drastically. They agreed, and it worked well."* DHO, Semarang. *"If we push too hard, they will get upset. That's why, as educators, we need to be careful and patient. As people from Java say, we need to find a way, be accepting, and be patient. A small mistake can go viral."* UKS teacher, Solo.
7	Regular monitoring, including by *puskesmas*.	*"Once, we saw spicy macaroni being sold. We stopped the supply. Then it improved. But recently, I saw that there was a red-coloured sauce. That was from the parents as well. So, it really needs to be monitored continuously."* UKS teacher, Surakarta. *"Teachers and the principal often buy food, so they also monitor what is being sold. This makes the vendors more careful about selling any food recklessly."* UKS teacher, Kudus.
8	Availability of necessary facilities.	*"In my school, there is no space for outside vendors because it's used for parking cars. So, the snacks are sold in the canteen or students bring their own lunch from home. This also helps reduce waste. For drinks, there are water dispensers in each class. So, no excuse to buy drinks because you're thirsty. If you don't bring a tumbler, there are glasses in the class."* UKS teacher, Solo. *"Besides the fact that children are not allowed to carry money anymore, we also raised the school walls so it's harder for them to sneak out and buy snacks from vendors outside. In the past, even though it was prohibited, they could still sneak in because the walls were low."* UKS teacher, Kudus.

3.2.7.5 Remaining challenges in improving the food environment in intervention schools

One school in Kudus mentioned that conditions at the school do not allow for implementing a fully healthy canteen every day, so it is only implemented on Fridays.

"In my school, it is quite sensitive to determine which foods are good and which are not. They might take it personally, because I'm the one who is vocal. So, the truly healthy food is only available on Fridays. In my school, it's not as selective as in other schools, and there are still some restrictions, so some food is still allowed (to be sold). The most accurate source would be the puskesmas."

UKS teacher, Kudus

The presence of food vendors outside the school, who tend to sell unhealthy food, is one of the challenges the school faces in creating a good food environment. In general, the school does not directly forbid street vendors from selling outside the school because they pity the vendors, who are trying to make a living. Instead, the school always reminds students not to buy snacks outside and equips them with the ability to choose healthy food. However, since the snacks sold by street vendors are very appealing to students, the habit of buying snacks from these vendors remains a concern for both the school and parents.

TABLE 35. Challenges related to street food vendors

No	Challenges	Quotes
1	Street vendors' livelihoods.	*"Telling the street vendors to stop is really hard, it's difficult to communicate with them. They are trying to earn a living, while we at school want the children to eat healthy food. So, it won't be optimal if they continue buying snacks from the street vendors."* PIC canteen, Tegal *"There has been socialization with the food vendors as well. They are actually aware, but they still think about the profit they need to make. We can't directly forbid the vendors. The important thing is that they have been informed, but the execution is not closely monitored."* Kesra, Tegal.
2	The school does not have a permanent canteen.	*"We don't have a permanent canteen. In front of the school, the school guards and parents' houses open small stalls, which have been there for decade. To maintain a good relationship with them, we only enforce the ban on buying snacks outside once a week."* UKS teacher, Tegal.
3	The school is located near a busy area.	*"There are many vendors selling dishes like cilok, meatball soup, and others. It's a culinary centre because we are near the sports hall and a public park. Outside the school, there are many snacks. We never reprimand them because we also feel it's awkward. They've been there for a long time. So, we are more understanding of the children themselves."* School Committee, Kudus
4	It is not optimal to prohibit students from buying snacks outside because of the large number of students.	*"Actually, in our school, students are not allowed to buy snacks outside. But because the number of students is large and the canteen is only two, they become overwhelmed when they cook for themselves. They sell dishes like soto rice, yellow rice, and fried rice. So sometimes, they still sell macaroni and crispy tofu with spicy seasoning. The children also sometimes buy snacks outside."* School committee, Surakarta.

Some schools ban students from buying snacks outside and report violators to their parents, which they say helps keep vendors away. However, in one city, the UKS/M team feels this approach is too strict and burdensome. A school in Solo takes a different approach—students must report if they buy from street vendors, so the school is not held responsible for any issues. Interestingly, as was the case at baseline, some parents were still seen buying snacks from street vendors at the endline, when picking up their children.

Since the school cannot ban nearby vendors from selling, they created an agreement to stop the sale of harmful food and encourage safer choices. Every Saturday, vendors can leave their homemade, healthy food at the school canteen—as long as it uses real ingredients like sugar instead of artificial sweeteners.

The school suggests that the PB team from UNICEF and its partners visit to provide guidance to the street vendors. Another suggestion is to create a banner to remind students about healthy food and drinks.

"Teachers do remind students, but it's not possible to do so every day. The students still go outside to buy snacks. Maybe a banner could be made about the types of healthy food and drinks, and posted so the rules can be read. There has been some change when things are written and displayed like that. Although there is some healthy eating slogans posted, there still needs to be a banner with clear written information about the types of healthy food displayed right in front of everyone."

UKS teacher, Tegal

Parents have communicated that the food environment at home is already good, as they limit instant noodles, snacks with flavour enhancers, and sugary packaged drinks. Children also rarely buy snacks from shops or kiosks around the house, only when going to the convenient store with parents. However, when the children go for Quran lessons, they are exposed to many food vendors around the area.

"Yes, they do buy snacks at the Quran lesson place. But I've told them not to buy snacks with that green powder that tastes like seaweed. I'm doubtful about the colouring agent in it. You can buy rollade or martabak, I said. But they know they shouldn't buy drinks like iced teacups."

School committee, Kudus.

One key issue discussed with the TP UKS concerned the authority meant to guide or reprimand street vendors—a challenge also raised during the baseline. The DHO noted that managing street vendors is not solely their responsibility; it also involves the DEO and local village or sub-district authorities. While the DHO is willing to support food safety and quality efforts, policies and enforcement are expected from local authorities, such as the DEO or the Ministry of Religious Affairs, which oversee schools and madrasahs. Responses from related agencies vary.

"It should be the DHO because this is a health issue. We might be involved in regulations like proper waste disposal. But food issues are the responsibility of the DHO. Orderliness falls under the village/subdistrict."

Kesra, Semarang.

"There is a regulation that street vendors are not allowed to sell in school areas (but they couldn't explain the specific regulation). We inform the schools so that they can communicate with the vendors. The school will address it."

DEO, Kudus.

The UKS team also believes that there is still no suitable way to regulate and guide street vendors with minimal capital, considering that selling is their livelihood.

"In my opinion, it's the school itself that needs to have discussions related to vendors, especially those outside school hours, but it's also difficult because it concerns their economy. If they are asked to change the sauce, it's still possible. But if they are told not to sell, it's unfortunate. Maybe the focus should be on the ingredients, like the sweeteners, but that would affect the price, and then the kids might not want to buy it."

Bappeda, Semarang.

3.2.7.6 Changes in the food environment in control schools

The analysis of changes in the food environment in control schools focuses on the similarities and differences with the changes in intervention schools. The general similarities are:

1. Most schools do not have written cafeteria rules. These are communicated orally by the school principal and are emphasized repeatedly by the cafeteria manager and the UKS teacher.

2. Some schools only allow teachers and parents to manage the canteen because it is easier to control what foods are sold. This policy has existed for a long time.
3. In some schools, there have been improvements in the food offered at the canteen, such as the availability of more homemade meals, reductions in the sale of fast food such as sausages and sweet beverages (including pre-packaged drinks and sachet drinks), spicy foods, and instant foods. Some schools have started selling fruit juices and fresh-cut fruit.
4. In some schools, unhealthy food and drinks – such as fast food and sugary beverages – are still being sold as they are popular among students.
5. The presence of street vendors, who sell unhealthy food and drinks which are attractive and tasty, makes them popular among students.
6. Several schools mentioned that parents support the changes made in the canteen to make it healthier.

Conversely, there are four main differences between the food environment in the control schools and intervention schools, namely:

1. Most control schools have never received any socialization regarding their canteens, especially about the foods and drinks that may and may not be sold. The socialization they typically receive is related to immunization, health screening preparation, mosquito larvae, tooth brushing, CPR for children, filling out anthropometric data, and handling simple accidents in school such as fainting students. There is no specific guidance from the *puskesmas.*

   "At the very least, once every two months or once a month, there should be some direction. So, the cafeteria managers need to improve. However, maybe the health department hasn't had the chance to do this. There have been a few meetings after COVID, four meetings in total. The results also showed some changes."

   Canteen PIC at school, Solo.

2. Unlike intervention schools that have canteen rules, even if not in the form of written formal rules, several control schools stated that they have not created any canteen rules, even though they are aware that such rules are necessary.

   "As for lunchboxes, there are no regulations. The children are willing to bring their own lunch if given directions, but for now, it is still an initiative from each student."

   UKS teacher and PIC canteen, Tegal.

   "The school struggles to control the canteen, and the children aren't accustomed to choosing healthy foods. It might be possible to enforce regulations related to what snacks are allowed to be sold, but it has never been tried. For example, they discourage buying powdered sugary drink, but the children still buy it as they like it, and the canteen provides it."

   UKS teacher and PIC school canteen, Tegal.

3. Some control schools reported that there have been no changes in the foods and drinks sold in the canteen.

   "It's still the same: noodles, drinks, rice, fried snacks. The outside vendors are still the same; powdered ice is still plentiful, and there are noodles with takoyaki seasoning powder."

   PIC school canteen, Tegal.

   "No changes, still selling cilor, cimol (fried fluor served with powdered spicy seasoning) and similar items."

   PIC school canteen, Semarang.

   "What is sold is almost the same, but there has been a slight change. They now sell bottled water to reduce plastic waste from packaged drinks, a suggestion from the DHO. Children are encouraged to drink mineral water in bottles, which can later be reused for other purposes such as crafts."

   PIC school canteen, Solo.

4. Monitoring of the canteen by the *puskesmas* is considered inadequate.

   "So far, the puskesmas only conducts checks (food sampling). The results are not communicated to the school. However, no guidance is given to the vendors, even though unhealthy snacks are still sold."

   UKS teacher and PIC school canteen, Tegal.

Note that the control schools that are well resourced did not receive training from the *puskesmas* or other parties. Nevertheless, they managed to obtain information from other sources. This included conducting online research and comparative studies by visiting other schools every year, and continuing the good practices set by former school management.

CHAPTER 4

Conclusion and recommendations

4.1 Conclusion

Students' and parents' KAP on balanced nutrition and obesity prevention, and students' nutritional status

- **Students' KAP:** The overall KAP of students in intervention schools were significantly higher than those in control schools at the endline. Within groups, the students' KAP in intervention schools had significantly improved at endline, while the control group showed smaller knowledge gains, with 'good' practices remaining low.
- **Parents' KAP:** KAP among parents was not significantly different between intervention and control schools at the endline. Overall, parents showed limited improvement in attitudes and practices, with more modest changes compared to those of students.
- **Student's nutritional status:** At the endline, the intervention group showed a significant increase in overweight cases and a reduction in obesity, while the control group remained relatively unchanged.

Factors influencing students' practices on balanced nutrition and obesity prevention

- Three key factors significantly contributed to improvements in children's practices: **participation in PB** (1.57 times higher than among non-participants), **better knowledge** (2 to 3 times higher than among children with poor knowledge), and **a more positive attitude** (1.4 to 2 times higher than among children with poor attitudes).
- Food security status approached significance ($p = 0.057$), suggesting that children in food-insecure households may face challenges in behaviour change.

Role of *Petualangan Bergizi* in strengthening the UKS/M programme, including the referral system for overweight and obesity cases

1. Health workers gained new understanding of UKS/M's role in addressing overnutrition and obesity, shifting the focus from undernutrition.
2. The PB supported the second UKS/M pillar—Health Education and Literacy—by delivering engaging nutrition sessions in schools, with teachers leading efforts and *Kapten Bergizi* promoting healthy habits. The third pillar—Healthier School Environment—also improved, reflected in better canteen offerings.
3. The first pillar—Health Services—still needs improvement. Referral systems for overweight and obesity remain unstructured, with no clear procedures or follow-up, and is hindered by inconsistent facility registrations and low parent-child awareness of further care.

Changes in the school food environment following the implementation of *Petualangan Bergizi*

1. As in the baseline, school canteen rules in intervention schools remain informal and are communicated verbally by principals or teachers.
2. Key changes include the reduction or removal of less nutritious items—especially sugary snacks/drinks, red sauces, and spicy powder-seasoned foods—and the introduction of healthier homemade options with less sugar and no additives.

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3. A persistent challenge is the presence of street vendors selling unhealthy food near schools. Schools and PHCs remain hesitant to act due to livelihood concerns and unclear institutional responsibility.
4. Factors supporting a healthier school food environment include: (i) strong principal and community commitment, (ii) clear, enforced rules, (iii) internal canteen management (by parents/ teachers), (iv) effective socialization led by the health sector, (v) parental demand, (vi) culturally respectful, gradual changes, (vii) regular monitoring; and (viii) adequate facilities.

Experiences and acceptance of *Petualangan Bergizi* by schools and district stakeholders

1. PB training effectively built the capacity and confidence of district facilitators to train teachers and support programme implementation, including mentoring the *Kapten Bergizi*.
2. The programme was well-received, with strong school community engagement. The 'breakfast together' activity was especially successful in promoting breakfast habits, while the school garden faced challenges due to limited space and plant care skills.
3. Key challenges included limited time allocation, students' food preferences, and the availability of unhealthy food from nearby street vendors.

4.2 Recommendations

These are grouped into two categories: (a) policy and institutional recommendations for decision-makers at district level and schools, and (b) programmatic recommendations to inform learning and future improvements for UNICEF and the Government of Indonesia.

4.2.1 Recommendations for policymakers at district level and schools

1. **Continue involving district facilitators as mentors in PB at the school level**. To expand school coverage as suggested by stakeholders in the four districts/cities, the number of district facilitators from district government agencies and health centres should be increased. Ensure they are well-equipped to serve as resource persons during training and provide practical guidance throughout programme implementation and monitoring. The scheduled joint monitoring of district facilitators should be maintained.
2. **Maintain and enhance teacher capacity and engagement to ensure quality PB implementation**. Regular training should be provided for classroom teachers and UKS/M coordinators, as PB is intended to support the UKS/M programme. Peer-to-peer knowledge transfer is highly recommended due to its broad student coverage and the need for widespread teacher involvement. Frequent teacher rotations further highlight the need for ongoing knowledge sharing, which can be facilitated within schools or through teacher working groups at the sub-district or district level.
3. **Formally integrate PB into the school's annual academic calendar to ensure sustainability and broader reach.** To support school principals in creating necessary policies, official letters from the DEO and *Kemenag* at the district level are needed to legitimize PB implementation as part of the UKS/M programme and related activities.
4. **Strengthen healthy school food environments by applying the eight key success factors for a healthy canteen**. These should be maintained in the current PB schools and introduced in new ones as the programme expands in the district. The key actions include setting, socializing, and enforcing healthy canteen rules, prioritizing teachers or parents over third party to manage the canteen, and conducting regular monitoring by school staff and health officers. Gradual introduction on food changes, including promoting local foods, is also important as it helps ease the transition and gain students' acceptance. Adequate facilities like water dispensers are essential to support this effort.

4.2.2 Recommendations for programme learning and strengthening (UNICEF and Government of Indonesia)

1. **Align programme scheduling with the school calendar, ideally at the start of the semester.** This allows schools to seamlessly integrate PB activities into their academic agenda, ensuring smoother implementation and enabling the delivery of all 11 core nutrition education topics within one academic year.

2. **Ensure transfer of knowledge and skills of PB at *puskesmas* level.** Given the critical role of health centres in supporting PB and strengthening UKS/M, a structured knowledge transfer from trained staff to other relevant personnel is essential. Ideally, more than one staff member per health centre should attend the training to ensure complementary expertise—particularly since the UKS/M programme involves multiple units such as nutrition, health promotion, school health, and environmental health. This also addresses the reality that health centre staff often manage multiple responsibilities.

3. **Emphasize the implementation of overweight and obesity referral protocol** in PB training and monitoring. The Ministry of Health's *2024 Health Screening Guideline* should be referred to for clear procedures for necessary follow-up/intervention by the health centre.

4. **Facilitate the development of a strategy agreement for guiding street food vendors**. Considering that one of the main barriers to a healthy school food environment is the presence of street food vendors who often sell less healthy options—and that no specific authority has yet taken responsibility for regulating this—there is a need for cross-sectoral discussions among relevant government agencies to agree on the best approach to manage these vendors and promote healthier offerings.

5. **Facilitate a structured and regular coaching for *Kapten Bergizi* after they receive training.** Considering that *Kapten Bergizi* are Grade 5 students who still require substantial guidance, structured and regular coaching is essential. Based on school recommendations, the involvement of health centres as coaching resource persons, in addition to teachers, is essential to support *these students*.

6. **Promote meaningful parental involvement to influence children's eating habits and a healthy school food environment**. It is recommended that the PB creates regular activities that actively target and engage parents, by involving active roles of health centres. School committees can further strengthen parental involvement by mobilizing support and resources—for example, by providing breakfast with balanced nutrition for less-resourced students.

7. **Facilitate systematic learning exchange strategies to promote the adoption of PB implementation in schools and encourage behaviour change among students.** These exchanges also serve as recognition for high-performing schools and act as motivation for all schools and district stakeholders.

8. **Scale up the programme based on existing promising practices and outcomes.** A roadmap and strategies for expansion should be developed, drawing on the lessons learned from the PB schools. Integrating PB into broader national initiatives, such as the Healthy School Movement or *Sekolah Penggerak,* would strengthen its institutionalization and broaden its impact.

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Annexes

Annex 1. Ethical approval letter

KOMITE ETIK PENELITIAN KESEHATAN
RSUP NASIONAL DR. CIPTO MANGUNKUSUMO
FAKULTAS KEDOKTERAN UNIVERSITAS INDONESIA
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KEDOKTERAN

Nomor : KET-1717 /UN2.F1/ETIK/PPM.00.02/2024

KETERANGAN LOLOS KAJI ETIK
ETHICAL APPROVAL

Komite Etik Penelitian Kesehatan Fakultas Kedokteran Universitas Indonesia – RSUPN Dr. Cipto Mangunkusumo dalam upaya melindungi hak asasi dan kesejahteraan subjek penelitian kedokteran, telah mengkaji dengan teliti protokol penelitian yang berjudul:

The Ethics Committee of the Faculty of Medicine, University of Indonesia – Cipto Mangunkusumo Hospital with regards of the Protection of human rights and welfare in medical research, has carefully reviewed the research entitled:

"Survei Akhir (*Endline*) Pengukuran Status Gizi dan Faktor-faktor yang Berkaitan pada Anak Usia Sekolah Dasar di Provinsi Jawa Tengah."

Protocol Number	: **24-11-1733**
Peneliti Utama *Principal Investigator*	: **Dr. Luh Ade Ari Wiradnyani, M.Gizi**
Nama Institusi *Name of the Institution*	: **Gizi FK UI/SEAMEO RECFON**
Lokasi Penelitian *Site*	: **1. Kota Semarang** **2. Kota Surakarta** **3. Kabupaten Tegal** **4. Kabupaten Kudus**
Tanggal Persetujuan *Date of Approval*	: 25 NOV 2024 ***(valid for one year beginning from the date of approval)***
Dokumen Disetujui *Document Approved*	: **Proposal Penelitian, Version 1.0 tanggal 09 November 2024** **Lembar Penjelasan kepada Calon Subjek, Version 0.1 tanggal 09 November 2024**

dan telah menyetujui protokol berikut dokumen terlampir.
and approves the above mentioned protocol including the attached document.

Ditetapkan di : Jakarta
Specified in
Ketua
Chairman

Prof. Dr. dr. Ratna Dwi Restuti, SpTHTBKL, Subsp.Oto(K), MPH

** Peneliti berkewajiban
1. Menjaga kerahasiaan identitas subjek penelitian.
2. Memberitahukan status penelitian apabila:
   a. Setelah masa berlakunya keterangan lolos kaji etik, penelitian masih belum selesai, dalam hal ini *ethical approval* harus diperpanjang. Harap pengajuan perpanjangan etik dilakukan 30 hari sebelum masa aktif lolos kaji etik habis.
   b. Penelitian berhenti ditengah jalan.
3. Melaporkan kejadian serius yang tidak diinginkan (*serious adverse events*).
4. Peneliti tidak boleh melakukan tindakan apapun pada subjek sebelum protokol penelitian mendapat lolos kaji etik dan sebelum memperoleh *informed consent* dari subjek penelitian.
5. Menyampaikan laporan akhir, bila penelitian sudah selesai.
6. Cantumkan nomor protokol ID pada setiap komunikasi dengan KEPK FKUI-RSCM.
7. Semua prosedur persetujuan dilakukan sesuai dengan standar ICH-GCP.

Annex 2. Variable Indicator Matrix (VIM)

No	Variable	Indicators	Methods	Subject
1.	Child demographic characteristics	• Age (years) • Sex • Pocket money per week	Structured questionnaire	Grade 5 student who participated in the baseline study
2.	Socio-demographic characteristics of children's household	• Age (years) of parents • Educational background of parents • Occupation of parents • Number of household members	Structured questionnaire	Parents of Grade 5 student
		• Economic condition (DHS wealth index: ownership of selected assets, housing condition, and types of water access)	Structured questionnaire	Grade 5 student
3.	Food security status of the household	Food security status of household in the past one month	Structured questionnaire using Household Food Insecurity Access Scale (HFIAS)	Parents of Grade 5 student
4.	Nutritional status of school-age children	Nutritional status based on WHO 2006: • Severely thin: BMI for Age z-score <-3 S.D. • Thin: BMI for Age z-score -3 S.D. to <-2 S.D. • Normal: BMI for Age z-score -2 S.D. to +1 S.D. • Overweight: BMI for Age z-score >+1 S.D. to +2 S.D. • Obesity: BMI for Age z-score and >+2 S.D.	Anthropometric assessment (body weight and height)	Grade 5 students
5.	KAP related to balanced nutrition and overweight/ obesity prevention	**Knowledge** • General nutrition, consuming diverse diet • Limiting consumption of sugar-sweetened beverages (SSBs), foods high in salt/sugar/fat • Breakfast • Food safety • Drinking water • Food label • Physical activity • Healthy and hygienic practices (PHBS) • Body weight and height monitoring • Risks, causes and prevention of overweight/obesity	Structured questionnaire	Grade 5 students
		Attitudes • Diverse diet, including fruits and vegetables consumption • Limiting consumption of SSB, foods high in salt, sugar and fat • Breakfast • Drinking water • Food safety • Physical activity • Healthy and hygienic practices (PHBS) • Body weight and height monitoring • Seriousness of overweight and obesity among school children	Structured questionnaire using Likert scale of 1 to 3 (1 represents disagree and 3 represents agree)	Grade 5 students

No	Variable	Indicators	Methods	Subject
		Practices ● Dietary diversity ● Consumption of SSBs, and foods high in salts/sugar/ fat ● Breakfast habit ● Drinking water ● Food safety ● Reading food label ● Physical activity for 60 minutes per day in the previous 7 days ● Sedentary activity including screen time duration per day ● Healthy and hygienic practices (PHBS) ● Frequency of body weight and height monitoring	Single 24-hour dietary recall, FFQ for the previous week, structured questionnaire	Grade 5 students
6.	Child morbidity and health-seeking behaviour	● Child morbidity (diarrhea, cough, common cold, and fever) in the 2 weeks prior the survey ● Child health-seeking behaviour	Structured questionnaire	Grade 5 students
7.	School characteristics	● Changes in facilities, food sold, and management of school canteen ● Changes in availability and food sold by street food vendors ● Changes in facilities for physical activity and school gardening ● Changes in existing health/nutrition programmes at schools	Observation, Focus group discussion (FGD)	UKS/M teachers, canteen managers
8.	Referral system of malnourished cases (including overweight/ obesity)	● Changes in referral system for malnourished children to *puskesmas*	FGD, document review	UKS/M teachers
			In-depth interview (IDI), document review	*Puskesmas* staff
9.	KAP of UKS/M teachers related to children's balanced nutrition and overweight/obesity prevention	**KAP related to UNICEF's intervention package** ● Capacity building received from the programme ● New knowledge, insights, skills received from the programme ● Perceived changes to practices in facilitating nutrition education and counselling ● Perceived changes to balanced nutrition KAP of the students ● Perceived teachers', students' and parents' participation in the programme ● Coaching provided to peer support (including perceived 'performance' of the peer support) ● Perceived changes to communication and coordination with *puskesmas* (including follow-up of regular students' health screening) ● Perceived changes to UKS/M programme planning and implementation at school in general ● Perceived changes to food environment at school ● General opinion about the programme (key factor, main impact, suggestion) ● Perceived remaining challenges and support needed to sustain programme implementation	FGD, document review	UKS/M teachers of intervention school

No	Variable	Indicators	Methods	Subject
		Other points ● Capacity building received, other than UNICEF's intervention package ● Complementary roles of such capacity building with UNICEF's intervention package in enhancing teachers' KAP ● Other sources of nutrition-related information ● Capacity building on UKS/M programme received for the past year ● Perceived new knowledge, insights, skills, and practices for the past year ● Perceived changes in balanced nutrition KAP of the students for the past year ● Perceived changes in communication and coordination with *puskesmas* for the past year ● Perceived changes of UKS/M programme planning and implementation at school in general for the past year ● Perceived changes of food environment at school for the past year ● Awareness of UNICEF's intervention package programme	IDI	UKS/M teachers of control school
10.	KAP on balanced nutrition practices of peer support	**KAP related to UNICEF's intervention package** ● Capacity building and coaching received from the programme ● Perceived roles of peer support ● New knowledge and skills received from the programme and whether it supports peer support to perform their expected roles ● Perceived changes in balanced nutrition KAP of students at their school after the programme ● Perceived students participation in the programme ● Perceived changes of food environment at school ● Perceived challenges and support needed to perform their roles	IDI	Peer support of *Kapten Bergizi*
11.	KAP of canteen manager, food handlers, and street vendors around school related to healthy and safe foods	**KAP related to UNICEF's intervention package** ● Capacity building and coaching received from the programme (including 'new canteen regulation and monitoring' if relevant) ● New knowledge and skills received from the programme and whether it supports the provision of more healthy foods options for students ● General opinion about changes in food environment at school (changes in type of foods sold in canteen, food handlers' and students' acceptance of new regulation, if relevant) ● Perceived remaining challenges to enhance food environment and how to minimize the challenges ● Support needed to sustain programme implementation (if the food environment has been considered good)	FGD	Canteen manager of intervention school
		● General opinion about the food environment at school for the past one year (new regulation, coaching received from school and *puskesmas*, changes in	IDI	Food handlers and street vendors at intervention school

No	Variable	Indicators	Methods	Subject
		type of foods sold in canteen) ● Food handlers' and perceived students' acceptance of new regulation and food environment (if relevant) ● Perceived remaining challenges to enhance the food environment and support needed		
		● General opinion about changes in the food environment at school for the past year (capacity building for canteen manager/food handlers, changes in type of foods sold in canteen, food handlers' and students' acceptance to new regulation, if relevant)	IDI	Canteen manager at control school
12.	KAP of parents related to children's balanced nutrition and overweight/obesity prevention	● Exposure to UNICEF's intervention package (including participation in the activities) ● New knowledge, insights, skills received from the programme ● Perceived changes in children's dietary practices and physical activity ● Perceived changes in food environment at school and at home (family habit and regulation) ● Perceived remaining challenges to implementing balanced nutrition practices at home ● Perceived awareness and participation in the programme of parents outside the school ● General opinion about the programme (key factors, main impacts, suggestions) ● Perceived remaining challenges and support needed to sustain programme implementation	FGD	School committee members of intervention school
		● Parents' socio-demographic characteristics ● Household's food security ● KAP on balanced nutrition ● Source of nutrition and health information for the past year	Structured questionnaire	Parents of Grade 5 students
13.	KAP of PHC staff related to overweight and obesity prevention	***Puskesmas* in intervention area** ● Capacity building on school-based nutrition received for the past year (specific detail will be explored for training received from UNICEF's intervention programme) ● New knowledge, insights, skills received from the programme, and whether it supports their performance of their expected roles ● Perceived UKS/M programme implementation after the intervention (including specific changes to the school food environment, referral system, follow-up for health screening, and quality of nutrition education for the past year related and unrelated to UNICEF's intervention programme) ● Perceived changes in their communication and coaching of UKS/M teachers ● General opinion about UNICEF's intervention programme (key factors, main impacts, suggestions) and how it enhances UKS/M ● Perceived remaining challenges and support needed to sustain programme implementation	IDI, document review	*Puskesmas* staff

No	Variable	Indicators	Methods	Subject
		***Puskesmas* in control area** ● Capacity building on school-based nutrition received for the past year ● New knowledge, insights, skills received from the capacity building (or other source of information), and whether it supports their performance of their expected roles ● Perceived UKS/M programme implementation at school for the past year (including specific changes compared to the previous year on school food environment, referral system, follow-up for health screening, quality of nutrition education) ● Perceived communication and coaching of UKS/M teachers		
14.	KAP of local stakeholders on overweight and obesity prevention	● Awareness of UNICEF's intervention programme (including their specific roles in the programme) ● Perceived changes in the implementation of overweight/obesity prevention programme among school children in their respective area (including perceived changes to the school food environment) ● Perceived changes in multisector coordination for UKS/M programme (and school-based nutrition programme) for the past year (for planning, implementation, and monitoring stages) ● Opinion about UNICEF's intervention programme implementation and sustainability ● Remaining challenges for programme implementation and sustainability (including roles of each sector to minimize/cope with challenges)	FGD	District/city TP UKS/M, BAPPEDA, BPOM
15	UNICEF's implementing partner for the intervention programme	**Programme implementation** ● Perceived changes of UKS/M teachers KAP on balanced nutrition for school children ● Perceived changes in school food environment ● Specific capacity building and coaching for peer support, their perceived performance. The exploration will also consider differences between female and male students, where applicable ● Intervention activities carried out at schools. The exploration will also consider differences of intervention for female and male students, where applicable ● Specific intervention for parents, parents' participation and good practices ● Perceived changes in communication and coordination between schools and *puskesmas* ● Perceived changes in referral system for malnourished students, follow-up of health screening, and KAP of *puskesmas* staff for school-based nutrition promotion ● Perceived changes in multisector coordination (planning, implementation, monitoring, and evaluation) ● Key barriers and enabling factors for the intervention		
		Programme sustainability ● Key barriers and enabling factors for programme sustainability/roll-out ● Perceived room for improvement		

Annex 3. Student's questionnaire

QUESTIONNAIRE FOR STUDENTS
BASELINE SURVEY OF NUTRITIONAL STATUS AND ASSOCIATED FACTORS IN SCHOOL-AGE CHILDREN IN CENTRAL JAVA

Date of interview :____/_____/2025

Start time :
Finish time :
Duration : minutes

Interviewer code : [ ]

1. 11.
2. 12.
3. 13.
4. 14.
5. 15.
6. 16.
7. 17.
8. 18.
9. 19.
10. 20.

FOR FIELD SUPERVISOR

Checking date : ___/___/2025

Field supervisor code : [ ]

1. Hartanti Sandi Wijayanti
2. Evi Ermayani
3. Mursid Tri Susilo
4. Dewi Shinta

Field supervisor's signature:

_____

City/District Code : [ ]

1. Kota Semarang
2. Kota Surakarta
3. Kabupaten Kudus
4. Kabupaten Tegal

School/Madrasah Code : [ ]

1. SD Lamper Kidul 01
2. SD Pekunden
3. SD Tlogosari Wetan 01
4. SD Islam Al Azhar 29
5. MI Nashrul Fajar
6. SD N Bulu Lor
7. SD N Pleburan 03
8. SD Sendangmulyo 01
9. SD St. Antonius 02
10. MI Taufiqiyah
11. SDN Harjodipuran
12. SDN Sampangan
13. SDN Sabranglor No 78
14. SD Al Azhar Syifa Budi Solo
15. MIS Tamirul Islam
16. SDN Begalon I
17. SDN Danukusuman
18. SDN Kedunglumbu
19. SDIT Luqman Al Hakim
20. MIS TTQ Mitqum
21. SD 1 Wergu Wetan
22. SDN 1 Purwosari
23. SD 7 Gondosari
24. SD Muhammadiyah 1
25. MI Muhammadiyah Jati Kulon
26. SD 1 Jati Kulon
27. SD 3 Demaan
28. SD 4 Jekulo
29. SD NU Tanwirul Qulub
30. MI NU Raudlatus Shibyan 01
31. SDN Muncanglarang 01
32. SDN Kalisapu 01
33. SDN Kemantran 01
34. MI Islamiyah Brekat
35. MI Miftahul Ulum Bumijawa
36. SDN Bogares Kidul 02
37. SDN Karanganyar 01
38. SDN Kepandean 03
39. SD Muhammadiyah Karangdawa Margasari
40. MI Ikhsaniyah Kebandingan

Interviewer's signature

_____

A. STUDENT CHARACTERISTICS		
1. Student name		
2. Date of birth	(date) (month) (year)	
3. Age	_____ year	
4. Gender	1 Male 2 Female	[ ]
5. Amount of pocket money at school per day	: Rp _____	

B. SCREENING QUESTIONS		
1. VISION: Doyou wear glasses?	1. Yes 2. No	[ ]
2. VISION. Do you have difficulty seeing, even if wearing glasses? Would you say	1. No difficulty 2. Some difficulty 3. A lot of difficulty 4. Cannot do at all	[ ]
3. HEARING. Do you wear a hearing aid?	1. Yes 2. No	[ ]
4. HEARING. Do you have difficulty hearing, even if using a hearing aid? Would you say...	1. No difficulty 2. Some difficulty 3. A lot of difficulty 4. Cannot do at all	[ ]
5. MOBILITY. Do you have difficulty walking or climbing steps? Would you say...	1. No difficulty 2. Some difficulty 3. A lot of difficulty 4. Cannot do at all	[ ]
6. COGNITION (REMEMBERING). Do you have difficulty remembering or concentrating? Would you say...	1. No difficulty 2. Some difficulty 3. A lot of difficulty 4. Cannot do at all	[ ]
7. SELF-CARE. Do you have difficulty with self-care, such as washing all over or dressing? Would you say...	1. No difficulty 2. Some difficulty 3. A lot of difficulty 4. Cannot do at all	[ ]
8. COMMUNICATION. Do you have difficulty communicating, for example understanding or being understood? Would you say...	1. No difficulty 2. Some difficulty 3. A lot of difficulty 4. Cannot do at all	[ ]

C. ANTHROPOMETRY ASSESSMENT			
BW	Body weight (1)	,	Kg
	Body weight (2)	,	Kg
	Body weight (3), if the difference between the 1st and 2nd assessment is > 0.1 kg	,	Kg
BH	Body height (1)	,	Cm
	Body height (2)	,	Cm
	Body height (3), if the difference between the 1st and 2nd assessment is > 0.5 cm	,	Cm

D. FAMILY CHARACTERISTICS

1. Father's name	:	3. Father's age	:	Year
2. Mother's name	:	4. Mother's age	:	Year

Education background	**Type of work**	
1. No schooling 2. Graduated from elementary school 3. Graduated from junior high school 4. Graduated from senior high school 5. Diploma/bachelor's/master's/doctoral degree 88. Don't know 99. Not relevant	1. Housewife 2. Civil servant/police /military 3. Private sector employees 4. Self-employed 5. Farmer (owner) 6. Farmer (worker) 7. Retired	8. Unemployed 77. Others (specified) 88. Don't know 99. Not relevant

5. Father's highest education	: [ ]	7. Father's occupation	: [ ]	
		Other father's occupation		
6. Mother's highest education	: [ ]	8. Mother's occupation	: [ ]	
		Other mother's occupation		
9. Number of family members at home		: _____ people		
10. Number of siblings at home		: _____ people		

E. FAMILY SOCIO-ECONOMICS

1. What is the main flooring material in your home? *(choose one answer option)*	1.	Permanent (ceramic, marble, granite, tile, terrazzo, polished wood/parquet)	[ ]
	2.	Non-permanent (semi-plastered, unpolished wood/ board, natural earth/sand floor)	
	88.	Don't know	
2. What is the main material of the roof in your house? *(choose one answer option)*	1.	Permanent (tile, concrete, ceramic)	[ ]
	2.	Non-permanent (zinc, asbestos, bamboo, wood, natural thatch/straw roof)	
	88.	Don't know	
3. What is the main material of the walls in your home? *(choose one answer option)*	1.	Permanent (brick)	[ ]
	2.	Non-permanent (wood/triple board, bamboo, log, woven bamboo)	
	88.	Don't know	
4. What is the main fuel used for cooking in your home? *(choose one answer option)*	1.	Electricity	[ ]
	2.	LPG/Natural Gas (3kg)	
	3.	LPG/natural gas (5 kg or 12 kg)	
	4.	Biogas	
	5.	Kerosene	
	6.	Wood	
	7.	No cooking at home	
	77.	Other (please specify), continue to No. 5	
	88.	Don't know	
5. Other main fuel used for cooking in your home?			
6. What is the main source of drinking water in your home? *(choose one answer option)*	1.	Branded bottled water	[ ]
	2.	Refillable water	
	3.	PDAM	
	4.	Well	
	77.	Other (please specify), continue to No. 7	
	88.	Don't know	

7. Other main source of drinking water in your home?			
8. What type of toilet is most commonly used in your home? *(choose one answer option)*	1.	Private toilet in the house	[ ]
	2.	Shared toilet (shared with several other houses)	
	3.	Public toilet	
	77.	Other (please specify), continue to No. 9	
	88.	Don't know	
9. Other type of toilet is most commonly used in your home?			
10. Do you or anyone in your household **have any of** these **items**?			
a. Radio	1. Yes	2. No 88. Don't know	[ ]
b. Television	1. Yes	2. No 88. Don't know	[ ]
c. Refrigerator	1. Yes	2. No 88. Don't know	[ ]
d. Cell phone (cell phone, smart phone)	1. Yes	2. No 88. Don't know	[ ]
e. Landline phone	1. Yes	2. No 88. Don't know	[ ]
f. Computer/laptop	1. Yes	2. No 88. Don't know	[ ]
g. Bicycle	1. Yes	2. No 88. Don't know	[ ]
h. Motorcycle	1. Yes	2. No 88. Don't know	[ ]
i. Car/truck	1. Yes	2. No 88. Don't know	[ ]
j. Bank account	1. Yes	2. No 88. Don't know	[ ]

F. MORBIDITY

Now, I will ask you some questions about your sickness history in the last two (2) weeks and where do you usually seek treatment if you are sick.

No.	Question	Answer codes	Answer
	Have you had any of the following illnesses in the last 2 weeks (14 days)?	1=Yes 2=No (go to next disease type)	If yes, how many days have you been sick? Fill in 99 if not relevant
1	Diarrhea		[ ]
2	Cough		[ ]
3	Colds		[ ]
4	Fever		[ ]
5	When you are sick, where or to whom do you most often go for treatment?		
	1. Not going for treatment 2. Health centre 3. Hospital 4. Clinic 5. General practitioner/midwife practice 6. Not going to health facility, but buy medicine in pharmacy/convenient store/others 77. Others (specified), continue to No. 6 88. Don't know		[ ]
6	Other ways for health seeking behaviour	:	
7	**In the past 6 months**, have you taken deworming medication?	1=Yes 2=No	[ ]

G. STUDENTS' KNOWLEDGE OF BALANCED NUTRITION

Now, I'm going to ask you some questions about what we know about balanced nutrition. There will be 2 types of questions:

1	I will read out a statement, and then you can answer it with a **TRUE or FALSE answer**. If you don't know the answer, then you can answer **DON'T KNOW (88)**.
2	I will read out a question with answer choices, and then you can choose one of the **answer choices**. If you don't know the answer, then you can answer **DON'T KNOW (88)**.

INTERVIEWER: READ THE STATEMENTS AND QUESTIONS ONE BY ONE AS WRITTEN ON THE QUESTIONNAIRE.

No.	Statement	T/F/DK	Score (1: correct. 0: incorrect /don't know)
1	If you are not used to having breakfast, you can replace it with a larger lunch (F)	[ ]	[ ]
2	If we don't like vegetables, we can replace them with fruit because the nutritional content is the same (F)	[ ]	[ ]
3	Only drinking milk at breakfast is enough because milk contains all the nutrients our bodies need (F)	[ ]	[ ]
4	Consuming sugary foods and drinks too often can cause obesity (T)	[ ]	[ ]
5	We should drink at least 7 glasses of water per day (T)	[ ]	[ ]
6	We need to do physical activity only when we are overweight (F)	[ ]	[ ]
7	Cleaning the house and gardening are examples of physical activity (T)	[ ]	[ ]
8	We wash our hands only when they look dirty (F)	[ ]	[ ]
9	We can know our nutritional status based on our weight and height (T)	[ ]	[ ]

No.	Question	Answer	Score (1: correct. 0: incorrect /don't know)
10	At the very top of the Balanced Nutrition Guideline are foods that should be restricted in consumption, except **a. Fibre** b. Sugar c. Salt d. Fat/Oil 88. Don't know	[ ]	[ ]
11	In the My Plate guide, the portion of staple food consumption should be equal to the portion of **a. Vegetable** b. Fruit c. Side dish d. Water 88. Don't know	[ ]	[ ]
12	Here's an example of diverse eating at its best a. Noodles, egg, fried chicken, orange b. Rice, noodles, and sunny side up egg, sweet tea **c. Rice, fried fish, spinach vegetable, banana** d. Rice, carrot bean soup, papaya 88. Don't know	[ ]	[ ]
13	One of the characteristics of healthy food is **a. Safe** b. Satisfying c. Cheap d. It's delicious 88. Don't know	[ ]	[ ]

14	Being overweight can be caused by a. Consume too many vegetables b. Lack of protein intake **c. Frequent consumption of sugary drinks** d. Consume too much vitamin C 88. Don't know	[ ]	[ ]
15	Apart from rice, staple foods that contain a lot of carbohydrates are **a. Potatoes and cassava** b. Cauli flower and avocado c. Mushroom and pumpkin d. Tempe and tofu 88. Don't know	[ ]	[ ]
16	The following are the benefits of breakfast a. A source of energy in the morning b. Prevents obesity c. Improves concentration **d. All are correct** 88. Don't know	[ ]	[ ]
17	Examples of unhealthy snacking practice is a. Buying snacks sold in closed containers b. Choosing fresh fruits as snacks c. Buying snacks that do not contain a lot of salt **d. Choosing sugary soft drinks as snacks** 88. Don't know	[ ]	[ ]
18	Information in the Food Label of a packaged food/drink should include the following information, except: a. Amount of sugar content b. Food ingredients used **c. Food/drink prices** d. Amount of vitamin content 88. Don't know	[ ]	[ ]
19a	**<u>Risks of overweight and obesity</u>:** What are the health problems that can occur when a person is overweight or obese? [DO NOT READ THE OPTIONS] 1. Increased risk of chronic conditions (such as heart/cardiovascular disease, high blood pressure and diabetes, stroke, certain types of cancer, respiratory difficulties, chronic musculoskeletal problems, skin problems and infertility) 2. Reduced quality of life 3. Premature death 77. Other (specified), continue to No. 19b 88. Don't know		**Code:** **1.Yes 2.No** 1. [ ] 2. [ ] 3. [ ] 77. [ ] 88. [ ]
19b	Other health problems that can occur when a person is overweight or obese :		
19c	**Preliminary analysis** 1. Knows (at least has 1 correctly answer) 2. Does not know	[ ]	
19d	Number of correct responses	[ ]	
20a	**<u>Causes of overweight and obesity:</u>** Can you tell me the reasons why people are overweight or obese? [DO NOT READ THE OPTIONS] 1. Increased/excessive intake of energy-dense foods that are high in fat and/ or sugar 2. Lack of or decreased physical activity 77. Other (specified), continue to No. 20b 88. Don't know	**Code:** **1.Yes 2.No** 1. [ ] 2. [ ] 77. [ ] 88. [ ]	
20b	Other reasons why people are overweight or obese :		
20c	**Preliminary analysis** 1. Knows (at least has 1 correctly answer) 2. Does not know	[ ]	

20d	Number of correct responses	[ ]
21a	**Prevention of overweight and obesity:** How can people prevent overweight and obesity? [DO NOT READ THE OPTIONS] 1. Reduce energy intake (less high-energy foods and drinks)/reduce the intake of fatty and sugary foods 2. Eat vegetables and fruits more often 3. Eat legumes/whole-grain products more often 4. Increase physical activity level/engage in regular physical activity 77. Other (specified), continue to No. 21b 88. Don't know	**Code:** **1.Yes 2.No** 1. [ ] 2. [ ] 3. [ ] 4. [ ] 77. [ ] 88. [ ]
21b	Other ways to prevent overweight and obesity :	
21c	**Preliminary analysis** 1. Knows (at least has 1 correctly answer) 2. Does not know	[ ]
21d	Number of correct responses	[ ]

H. STUDENTS' ATTITUDES RELATED TO BALANCED NUTRITION

Now, I am going to ask you some questions about how you **feel** about balanced nutrition practices and healthy lifestyles. I will read out some **statements** about balanced nutrition and healthy lifestyle practices. You can answer either **disagree (1), neutral (2), or agree (3)** according to how you feel about the statements.

INTERVIEWER: READ THE STATEMENTS ONE BY ONE AS WRITTEN ON THE QUESTIONNAIRE.

No.	Statement	Answer	Score (1: correct. 0: incorrect /don't know)
1	Breakfast every day is hard for me to do **[1]**	[ ]	[ ]
2	Consuming a variety of foods (such as staple foods, animal protein side dishes, vegetable protein, vegetables, and fruit) at every meal is difficult for me to do **[1]**	[ ]	[ ]
3	I find it difficult to consume vegetables at every meal **[1]**	[ ]	[ ]
4	Almost all vegetables taste good **[3]**	[ ]	[ ]
5	I find it difficult to consume fruit at least twice a day **[1]**	[ ]	[ ]
6	I can drink at least 7 glasses of water every day **[3]**	[ ]	[ ]
7	I find it hard to choose water over other sugary drinks **[1]**	[ ]	[ ]
8	I can easily reduce my consumption of fried foods **[3]**	[ ]	[ ]
9	I find it difficult to reduce my consumption of salty foods/snacks **[1]**	[ ]	[ ]
10	I find it difficult to reduce my consumption of instant noodles **[1]**	[ ]	[ ]
11	The food available in the school canteen is just what I want **[3]**	[ ]	[ ]
12	The food sold in the school canteen is healthy and safe **[3]**	[ ]	[ ]
13	I find it difficult to do regular physical activity daily at least 30 minutes **[1]**	[ ]	[ ]
14	I prefer to play with my gadgets (cell phone, tablet, computer) during my free time rather than cycling or playing outside with friends **[1]**	[ ]	[ ]
15	Washing my hands with soap and running water before every meal is not difficult for me to do **[3]**	[ ]	[ ]
16	Maintaining normal body weight is important for our optimal health **[3]**	[ ]	[ ]
17	I have an ideal body weight **[3]**	[ ]	[ ]

18	Sleeping at least 8 hours every day is easy for me to do **[3]**	[ ]	[ ]
19	When we feel depressed and sad, we can tell our family and friends **[3]**	[ ]	[ ]
20	We should not label our friend by their physical appearance **[3]**	[ ]	[ ]
21a	**Perceived severity** How serious do you think it is to be overweight or obese? 1. Not really serious, continue to No. 21b 2. Neutral 3. Serious		[ ]
21b	*If not really serious:* Can you tell me the reason why it is not really serious?	:	

I. STUDENT PRACTICE RELATED TO BALANCED NUTRITION IN THE PAST 7 DAYS

Practice: Meal frequency		
1	How many times do you eat in a day? 1. <3 times 2. 3 times 3. >3 times	[ ]
2	If you eat <3x a day, what meal times do you usually skip? 1. Breakfast 2. Lunch 3. Dinner 99. Not relevant (eat ≥3x a day)	[ ]
Practice: Breakfast Habits		
1	What is your breakfast habit? 1. Every day 2. Occasionally (4-6 times a week) 3. Rarely (1-3 times a week) 4. Never	[ ]
2	What time do you usually have breakfast? 1. Before 9 o'clock 2. 9 o'clock and after 99. Not relevant (never had breakfast)	[ ]
3	Where do you usually have breakfast? 1. At home 2. At school by bringing meal from home 3. At school by buying food in the canteen/other places 99. Not relevant (never had breakfast)	[ ]
4	What do you **usually** eat for breakfast? 1. Rice, side dishes and vegetables 2. Rice and side dishes 3. Rice and vegetables 4. Bread/cakes and drinks 5. Drink tea/milk/water only 6. Instant noodles with/without rice 7. Instant noodles and eggs or other side dishes 8. Fried foods 77. Other (specified) 99. Not relevant (never had breakfast)	[ ]
5	Other type of breakfast menu :	

6	If you don't eat breakfast every day, why? 1. Not used to 2. No food prepared at home 3. No time 77. Others (please specify) 99. Not relevant (breakfast every day)	[ ]
7	Other reason for not having breakfast everyday :	
Practices: Snacks		
1	How many times have you usually bought **snacks** at school or home? 1. Every day 2. Occasionally (4-6x in a week) 3. Rarely (1-3x in a week) 4. Never	[ ]
2	What kind of food/drink snacks do you buy most often? [DO NOT READ THE OPTIONS]	**Code** **1=Yes 0=No**
	1. Sweet snacks (chocolate, wafer) Snacks (chips, chiki)	[ ]
	2. Biscuits	[ ]
	3. Bread, cake	[ ]
	4. Bottled drinks/instant drinks in sachets (tea, coffee, fruit-flavored drinks)	[ ]
	5. Milk/yoghurts	
	6. Soft drinks	[ ]
	7. Chips	
	8. Fried foods (fried banana, fritters)	[ ]
	9. Chicken Sempol, egg rolls, cilok	[ ]
	77. Others (specified)	[ ]
	99. Not relevant, because I never have snacks	[ ]
3	Other type of snacks :	
4	Where do you usually buy snacks? 1. In the school canteen 2. At the food vendors outside/around the school 3. At the food vendors near the house 4. Purchased by parents (not bought by themselves) 99. Not relevant, because I never have snacks	[ ]
Practice: Drink water		
1	What type of beverage do you drink most often in a day? 1. Water 2. Sweet tea 3. Milk 4. Other sweetened beverages (in sachets/ready-to-drink packets)	[ ]
2	What is the main reason for drinking that type of beverage most often? (e.g., taste, price, nothing else is available etc.) 1. Taste 2. Price 3. Most available beverage at home/school 4. Told by parents/teachers 77. Others (specify)	[ ]
3	Other main reasons for drinking that type of beverage most often :	

4	In an average day, how many glasses of **water** do you consume? 1. ≤ 3 glasses 2. 4-6 glasses 3. ≥ 7 glasses	[ ]
Practice: Reading food labels		
1	Do you **read food labels** when buying/consuming packaged food/drinks? 1. Always 2. Sometimes 3. Rare 4. Never	[ ]
2	When reading food labels, what information do you usually read? [DO NOT READ THE OPTIONS]	**Code** **1=Yes 0=No**
	1. Expiration date 2. Energy content 3. Vitamin content 4. Sugar content 5. Ingredient / food ingredient 77. Others (please specified), continue to No. 3 99. Not relevant (never read labels)	[ ] [ ] [ ] [ ] [ ] [ ] [ ]
3	Other information read in the food labels :	
4	Does the food label influence you to consume/buy or not to consume/buy a packaged food/drink? 1. Yes, most of the time 2. Yes, sometimes 3. No or not really 99. Not relevant (never read food label)	[ ]
5	For those who do not always read food labels, what is the main reason? 1. Do not understand it 2. Have no time 3. Others (specified), continue to No. 6 99. Not relevant (always read food label)	[ ]
6	Other main reasons for not reading food labels :	
Practice: Hygiene practice		
1	When do you usually wash your hands with clean running water and soap? [DO NOT READ THE OPTIONS]	**Code** **1=Yes 0=No**
	1. Before meals 2. After meals 3. After attending toilet (urination/defecation 4. After holding an animal 5. After taking out the trash 6. After playing 7. Can't be determined (no specific time)	[ ] [ ] [ ] [ ] [ ] [ ] [ ]
Practice: Physical Activities		
1	During class breaks, what do you do **<u>most</u>** often? 1. Sitting alone/with friends, chatting 2. Buying drinks/food at the school canteen 3. Play ball/basketball/chase with friends 4. Viewing cell phone 5. Doing schoolwork 77. Others (specified)	[ ]
	Other activities done during class breaks :	

2	Name the types of extracurricular activities you participate in at school! [You can choose more than 1]	**Code** **1=Yes 0=No**
	1. Scout 2. Flag Hoisting Troop 3. Sports (soccer, futsal, basketball, horse-riding, archery, etc.) 4. Arts (music, dance, theatre, etc.) 5. Language 6. Science club 77. Others (specified)	[ ] [ ] [ ] [ ] [ ] [ ] [ ]
	Other extracurricular activities participated in at school :	
3	Do you have a cell phone? 1. Yes, shared it with sibling 2. Yes, for my own use 3. No	[ ]
4	Number of social media accounts owned 1. Don't have 2. have 1 account 3. have more than 1 account	[ ]
	If you have any social media accounts, please specified :	
5	In the past one week, how often did you exercise? 1. <3 days 2. 3-6 days 3. Every day 99. Not relevant (did not exercise)	[ ]
6	What kind of exercise did you do most frequently this week? 1. Badminton 2. Basketball 3. Football 4. Running/jogging 5. Biking 6. Swimming 7. 'Senam' 8. Others (specified) 99. Not relevant (did not do any exercise)	[ ]
7	How long did you exercise each day over the past week? 1. <30 minutes 2. ≥30 minutes 99. Not relevant (no exercise)	[ ]
8	Has this exercise habit changed compared to the past year? 1. Yes 2. No	[ ]
9	If your exercise habit has changed, what has changed regarding the frequency? 1. Become more often 2. Become less often 99. Not relevant (no changes)	[ ]
10	If your exercise habit has changed, what has changed regarding the duration? 1. Longer in duration 2. Shorter in duration 99. Not relevant (no changes)	[ ]
11	Has your physical activity habit, aside from exercise, changed compared to the past year? 1. Yes 2. No	[ ]

12	If your physical activity habit has changed, what has changed regarding the frequency? 1. Become more often 2. Become less often 99. Not relevant (no changes)	[ ]
13	If your physical activity has changed, what has changed regarding the duration? 1. Longer in duration 2. Shorter in duration 99. Not relevant (no changes)	[ ]
14	For those who did not exercise last week, what was the main reason? 1. Not used to it 2. Too lazy to do it 3. No one told me to do so 4. No time 5. No friends/family to go with 6. No venues/tools to do exercise 99. Not relevant (did exercise in the past week)	[ ]
Practice: Sedentary Activities		
1	How long do you usually sleep a day? 1. <8 hours a day 2. 8-9 hours a day 3. 10 hours a day 4. >10 hours a day	[ ]
2	How much time (in minutes) do you usually spend on the following activities: 1. Using a cellphone/laptop/computer for playing games and entertainment 2. Watching tv 3. Study at school 4. Study at home 5. Sleep-in	: _____min : _____min : _____min : _____min : _____min
Practice: Monitoring Weight and Height Regularly		
1	In the past 6 months, did you measure/get your **weight** measured? 1. Yes 2. No	[ ]
2	If yes, where have you **weighed** in the last 6 months? 1. At school 2. At home 3. At school and at home 4. Others (please specify) 99. Not relevant (not measured)	[ ]
	Specified the other location:	
3	In the past 6 months, did you measure/get your **height** measured? 1. Yes 2. No	[ ]
4	If yes, where did you have your **height** measured in the last 6 months? 1. At school 2. At home 3. At school and at home 4. Others (please specify 99. Not relevant (not measured)	[ ]
	Specified the other location:	
5	Do you know the **results of** your weight and height **measurements**? 1. Yes 2. No 99. Not relevant (Did not measure weight and TB	[ ]

ACTUAL INTAKE PRACTICES: A 24-HR DIETARY RECALL FOR ASSESSING MINIMUM DIETARY DIVERSITY

Now, I'm going to ask you what foods/drinks you consumed all day **Yesterday** in the preceding day.

Interviewer: Ask for the name of the menu and a description of the food/drink consumed, without having to ask for more details about the number of servings consumed.

TIME	MENU	DESCRIPTION OF FOOD/ BEVERAGE
Breakfast		
Morning Snack		
Lunch		
Afternoon Snack		
Dinner		

Notes:
Be sure to ask about taking **vitamin/mineral supplements**, including appetite enhancing supplements!

MINIMUM DIETARY DIVERSITY

Based on the list of food and beverages consumed by respondents on the previous day that has been recorded in the table above, each type of food and beverage consumed by respondents is grouped according to the list of food groups that have been provided by giving codes:

- **Code 1** if the food group was consumed on the previous day
- **Code 0** if the food group was not consumed on the previous day

MAIN FOOD GROUPS		
DDS1	**Staple foods** (cereals (e.g. rice, porridge, noodles, corn, bread, etc.), tubers (e.g. potatoes, yams, etc.))	[ ]
DDS2	**Legumes** (red beans, black beans, chickpeas, green beans, peas, soybeans, tofu, tempeh, etc.)	[ ]
DDS3	**Nuts and seeds** (almonds, cashews, walnuts, hazelnuts, chia seeds, sunflower seeds, etc.)	[ ]
DDS4	**Milk and animal milk products** (liquid/powder milk, yogurt, cheese)	[ ]
DDS5	**Meat** (chicken (including feet), fish, red meat, seafood, offal, processed meat/fish, etc.)	[ ]
DDS6	**Eggs** (chicken eggs, quail eggs, duck eggs, etc.)	[ ]
DDS7	**Dark green leafy vegetables** (spinach, kale, katuk leaves, cassava leaves, moringa leaves, mustard greens, etc.)	[ ]
DDS8	**Other vitamin A-rich vegetables and fruits** (carrots, broccoli, yellow squash, red peppers, papaya, mango, tomatoes, etc.)	[ ]
DDS9	**Other vegetables** (cabbage, cauliflower, beans, string beans, eggplant, sprouts, cucumber, green peppers, mushrooms, etc.)	[ ]
DDS10	**Other fruits** (banana, orange, watermelon, apple, avocado, pear, durian, date, grape, melon, guava, pineapple, rambutan, etc.)	[ ]
IRON-RICH FOOD SOURCES		
Fe1	Offal (such as chicken liver)	[ ]
Fe2	Meats (chicken, beef)	[ ]
Fe3	Fish and seafood	[ ]
VITAMIN AND MINERAL SUPPLEMENTS		
Supp1	Vitamin supplements	[ ]
Supp2	Mineral supplements	[ ]
Supp3	Appetite-booster supplements	[ ]
LESS HEALTHY FOODS/DRINKS		
ActLH1	Sweet foods (cake, candy, chocolate)	[ ]
ActLH2	Sugary drinks (sweet tea, syrup, sweetened condensed, ready-to-drink or powdered sweetened drinks, fruit juices with added sugar)	[ ]
ActLH3	Deep-fried snacks	[ ]
ActLH4	Salty foods such as chips	[ ]
ActLH5	Instant noodle	[ ]

Weekly Intake Practices: 1-week Food Frequency Questionnaire (FFQ)

Now, I will ask you what foods/drinks you consumed for the **LAST 1 WEEK**.

Interviewer:

1. Ask whether the respondent consumed food/drink from each food group in the last 1 week (7 days).
2. If the respondent consumed these foods/drinks in the past week, ask how often (how many days in the past week) they were consumed.
3. Mark the answer option [v] according to the frequency of consumption.

No.	Food Group	Frequency of consumption in the past week			
		Never (0)	Rare (1-3 days/week) (1)	Often (4-6 days/week) (2)	Every day (3)
FFQ1	**Staple foods** (cereals (e.g. rice, porridge, noodles, corn, bread, etc.), tubers (e.g. potatoes, yams, etc.))				
FFQ2	**Legumes** (red beans, black beans, chickpeas, green beans, peas, soybeans, tofu, tempeh, etc.)				
FFQ3	**Nuts and seeds** (almonds, cashews, walnuts, hazelnuts, chia seeds, sunflower seeds, etc.)				
FFQ4	**Milk and animal milk products** (liquid milk, milk powder, yogurt, cheese)				
FFQ5	**Meat** (chicken (including feet), fish, red meat, seafood, offal, processed meat/fish, etc.)				
FFQ6	**Eggs** (chicken eggs, quail eggs, duck eggs, etc.)				
FFQ7	**Dark green leafy vegetables** (spinach, kale, katuk leaves, cassava leaves, moringa leaves, mustard greens, etc.)				
FFQ8	**Other vitamin A-rich vegetables and fruits** (carrots, broccoli, yellow squash, red peppers, as well as papaya, mango, tomatoes, passion fruit, etc.)				
FFQ9	**Other vegetables** (cabbage, cauliflower, beans, string beans, eggplant, cucumber, sprouts, green peppers, mushrooms, etc.)				
FFQ10	**Other fruits** (banana, orange, watermelon, apple, avocado, pear, durian, date, grape, melon, guava, pineapple, rambutan, etc.)				
Less healthy food/drink					
FFQLH1	Sweet foods (cake, candy, chocolate)				
FFQLH2	Sugary drinks (sweet tea, syrup, sweetened condensed, ready-to-drink or powdered sweetened drinks, fruit juices with other sugar added)				
FFQLH3	Deep-fried snacks				
FFQLH4	Salty foods such as chips				
FFQLH5	Instant noodles				

J. EXPERIENCES AND OPNION ON *PETUALANGAN BERGIZI* (only addressed to respondents at Intervention Schools)			
1	Have you ever heard of the *Petualangan Bergizi* Program? 1. Yes 2. No		[ ]
2	What types of activities included in *Petualangan Bergizi* Program? (do not mention the options)		
	a. Weekly nutrition education through classroom learning and educational games	1.Yes 2.No 66. Not relevant	[ ]
	b. Shared breakfast	1.Yes 2.No 66. Not relevant	[ ]
	c. Daily physical activity	1.Yes 2.No 66. Not relevant	[ ]
	d. Nutrition Captain	1.Yes 2.No 66. Not relevant	[ ]
	e. Others (specify .....)	1.Yes 2.No 66. Not relevant	[ ]
3	Which activity from the *Petualangan Bergizi* Program did you participate in? (do not mention the options)		
	a. Weekly nutrition education through classroom learning and educational games	1.Yes 2.No 66. Not relevant	[ ]
	b. Shared breakfast	1.Yes 2.No 66. Not relevant	[ ]
	c. Daily physical activity	1.Yes 2.No 66. Not relevant	[ ]
	d. Nutrition Captain	1.Yes 2.No 66. Not relevant	[ ]
	e. Others (specify .....)	1.Yes 2.No 66. Not relevant	[ ]
4	What nutrition messages from the *Petualangan Bergizi* Program do you remember most?		
	a. Have breakfast everyday	1.Yes 2.No 66. Not relevant 88. Do not know	[ ]
	b. Consume plenty of vegetables	1.Yes 2.No 66. Not relevant 88. Do not know	[ ]
	c. Consume plenty of fruits	1.Yes 2.No 66. Not relevant 88. Do not know	[ ]
	d. Isi Piringku	1.Yes 2.No 66. Not relevant 88. Do not know	[ ]
	e. Gizi Seimbang	1.Yes 2.No 66. Not relevant 88. Do not know	[ ]
	f. Reduce consumption of sweet drinks/foods	1.Yes 2.No 66. Not relevant 88. Do not know	
	g. Reduce consumption of salty chips/snack with MSG	1.Yes 2.No 66. Not relevant 88. Do not know	[ ]
	h. Consume safe foods (no striking colour sauce, no frequent use of cooking oil	1.Yes 2.No 66. Not relevant 88. Do not know	[ ]
	i. Do not buy foods from street food vendors	1.Yes 2.No 66. Not relevant 88. Do not know	[ ]
	j. Do regular physical activity	1.Yes 2.No 66. Not relevant 88. Do not know	[ ]
	k. Washing hands with soap and running water	1.Yes 2.No 66. Not relevant 88. Do not know	[ ]
	l. Drink a lot of water	1.Yes 2.No 66. Not relevant 88. Do not know	[ ]
	m. Other (specify, ...)	1.Yes 2.No 66. Not relevant 88. Do not know	[ ]

Annex 4. Parent's questionnaire

QUESTIONNAIRE FOR PARENTS OF STUDENTS
ENDLINE SURVEY OF NUTRITIONAL STATUS AND RELATED FACTORS ON SCHOOL-AGE CHILDREN IN CENTRAL JAVA

RESPONDENT INFORMATION	
Respondent's name	:
Respondent's relationship with students *(circle one answer option)*	1. Father 2. Mother 3. Siblings 4. Grandfather or grandmother 5. Uncle or aunt 6. Others, please specify _____
Respondent's cellphone number	:
STUDENT INFORMATION	
Student's name	:
Class	:
School name	:
School district/city of origin	:
PARENTS INFORMATION	
Age of father	: years old
Age of mother	: years old
Education of father of student	1. No schooling 2. Graduated from elementary school 3. Graduated from junior high school 4. Graduated from senior high school 5. Diploma/bachelor's/master's/doctoral degree
Education of mother of student	1. No schooling 2. Graduated from elementary school 3. Graduated from junior high school 4. Graduated from senior high school 5. Diploma/bachelor's/master's/doctoral degree

KNOWLEDGE
Instructions : Circle T if the statement is correct, and F if the statament is incorrect

1	A child whose parents are not overweight/ obese will have no risk of being overweight/obese	T / F
2	Reduced quality of life is one of the health problems that can occur when a person is overweight or obese	T / F
3	The key to prevent overweight/obesity is balancing energy intake and expenditure	T / F
4	Overweight/obesity can be caused by individual factors, and environmental factors	T / F
5	Packaged tea generally contains no/low energy	T / F

PRACTICE Instructions : Circle the answer choices that you think are most appropriate		
1	In general, where does the food come from in your household?	
	a. Cook at home b. Cook at home (main meal), buy (snacks/snacks) c. Purchase (main meals and snacks)	
2	How often did you buy ready-made food online during the last week?	
	a. Almost every day (5-7 days) b. Occasionally (1-4 days) c. Never	
3	How is availability of the following food in your house during the last week? **Option: (1)** Always (everyday); **(2)** Sometimes (4-6 days); **(3)** Rarely (1-3 days) **(4)** Never (0)	
	a. Vegetable	**(1)** Always; **(2)** Sometimes; **(3)** Rarely; **(4)** Never
	b. Fruit	**(1)** Always; **(2)** Sometimes; **(3)** Rarely; **(4)** Never
	c. Fried foods	**(1)** Always; **(2)** Sometimes; **(3)** Rarely; **(4)** Never
	d. Sugary drink (home-made tea/coffee, ready-to-drink sweet tea/ juice, sweet UHT milk, drink powder)	**(1)** Always; **(2)** Sometimes; **(3)** Rarely; **(4)** Never
	e. Sweet snacks (chocolate bar, candy, donuts, sweet cake/biscuit)	**(1)** Always; **(2)** Sometimes; **(3)** Rarely; **(4)** Never
	f. Salty snacks (such as chips)	**(1)** Always; **(2)** Sometimes; **(3)** Rarely; **(4)** Never
	g. Instant noodle	**(1)** Always; **(2)** Sometimes; **(3)** Rarely; **(4)** Never
3	What is the source of nutritional and health information that you **most often use?**	
	a. From health workers b. Internet (including social media) c. Family/friends	d. Television e. Others (specify)
4	Your child's nutritional practices/conditions are of concern to you **(please choose 2 options)**	
	a. Don't want/don't eat enough vegetables b. Don't want/eat less fruit c. Often skip breakfast d. Frequently consume sweet drinks/food e. Often eat salty foods (such as crisps/chips with flavorings f. Don't want to/rarely do physical activity, including sports g. Underweight h. Overweight i. Other	
ATTITUDE Instructions : Circle the answer choices that you think are most appropriate.		
1	It is not difficult for me to prepare breakfast for my child every day with a complete meal (rice, side dishes, vegetables)	**(1)** Disagree; **(2)** Neutral; **(3)** Agree
2	It is not difficult for me to ask my child to have breakfast every day with a complete meal (rice, side dishes, vegetables)	**(1)** Disagree; **(2)** Neutral; **(3)** Agree

3	It is not difficult for me to regulate my child's snack habits (frequency of snacks and types of food/drinks purchased)	**(1)** Disagree; **(2)** Neutral; **(3)** Agree
4	It's not difficult for me to get my child to eat vegetables at every meal	**(1)** Disagree; **(2)** Neutral; **(3)** Agree
5	It is not difficult for me to get my child to eat fruit twice every day	**(1)** Disagree; **(2)** Neutral; **(3)** Agree
6	It's not difficult for me to get my child to exercise at least 3-5 days a week	**(1)** Disagree; **(2)** Neutral; **(3)** Agree
7	Overweight/Obesity among elementary school children is a nutrition issue	**(1)** Disagree; **(2)** Neutral; **(3)** Agree
8	How likely do you think your child is to become overweight/obese	**(1)** Not likely; **(2)** Not sure; **(3)** Likely
9	How serious do you think impact of obesity to elementary school children	**(1)** Not really serious; **(2)** Neutral; **(3)** Serious
10	Overweight/Obesity is preventable	**(1)** Disagree; **(2)** Neutral; **(3)** Agree

EXPOSURE TO *KAPTEN BERGIZI* PROGRAM

Instructions :

1. Only intended for the parents of students attending the intervention school.
2. Circle the answer choices that you think are most appropriate.

KapGizi-1	Have you ever heard of the *Kapten Bergizi* program at your child's school?	☐ Yes ☐ No
KapGizi-2	How did you learn about the *Kapten Bergizi* program? *(Select all that apply)*	☐ School meetings ☐ Teacher announcements ☐ Letter from the school ☐ Other parents ☐ My child ☐ Other (please specify): _____ ☐ Never heard about *Kapten Bergizi*
KapGizi-3	What are activities of the *Kapten Bergizi* program that you are aware of? *(Select all that apply)*	☐ Shared breakfast at school ☐ Nutrition education ☐ Nutrition Captain (health cadre) ☐ School canteen strengthening ☐ Training on nutrition for teachers ☐ Never heard about *Kapten Bergizi*
KapGizi-4	In general, is there any change of your child dietary practices for the past one year?	☐ Yes ☐ No
KapGizi-5	If yes, what are the changes *(Select all that apply)*	☐ Consume more vegetables ☐ Consume more fruits ☐ Consume less sugary drinks/sweet snacks ☐ Have breakfast more regulalry ☐ Other (please specify): _____ ☐ No changes in my child's dietary practices
KapGizi-6	In general, is there any change of your family dietary practices for the past one year?	☐ Yes ☐ No
KapGizi-7	If yes, what are the changes *(Select all that apply)*	☐ Provide/buy more fruits ☐ Provide/buy more vegetables ☐ Provide/buy less sugary drinks/sweet snacks ☐ Prepare breakfast every day/more regulalry ☐ Other (please specify): _____ ☐ No changes in my family dietary practices

FOOD SECURITY (HFIAS) Instructions : Circle the answer choices that you think are most appropriate.		
HAFIAS1.	In the last four weeks, have you ever **worried** that your family is running out of food or not having enough food?	0 = no (go to question number 2) 1 = yes
HAFIAS 1a.	How often does this happen?	1 = rarely (1-2x in the last four weeks) 2 = sometimes (3-10x in the last four weeks) 3 = often (>10x in the last four weeks)
HAFIAS 2.	In the last four weeks, have you or any of your family members been **unable to eat ? desired food** due to lack of food sources?	0 = no (go to question number 3) 1 = yes
HAFIAS 2a.	How often does this happen?	1 = rarely (1-2x in the last four weeks) 2 = sometimes (3-10x in the last four weeks) 3 = often (>10x in the last four weeks)
HAFIAS3.	In the last four weeks, have you or any of your family members eaten **a variety of foods** due to lack of food sources?	0 = no (go to question number 4) 1 = yes
HAFIAS 3a.	How often does this happen?	1 = rarely (1-2x in the last four weeks) 2 = sometimes (3-10x in the last four weeks) 3 = often (>10x in the last four weeks)
HAFIAS4.	In the last four weeks, have you or any of your family members ever **eaten food you didn't want** because of a lack of food sources?	0 = no (go to question number 5) 1 = yes
HAFIAS 4a.	How often does this happen?	1 = rarely (1-2x in the last four weeks) 2 = sometimes (3-10x in the last four weeks) 3 = often (>10x in the last four weeks)
HAFIAS5.	In the last four weeks, have you or your family members eaten **smaller portions** due to lack of food sources?	0 = no (go to question number 6) 1 = yes
HAFIAS 5a.	How often does this happen?	1 = rarely (1-2x in the last four weeks) 2 = sometimes (3-10x in the last four weeks) 3 = often (>10x in the last four weeks)
HAFIAS6.	In the last four weeks, have you or your family members eaten **less frequently** a day ? due to lack of food sources?	0 = no (go to question number 7) 1 = yes
HAFIAS 6a.	How often does this happen?	1 = rarely (1-2x in the last four weeks) 2 = sometimes (3-10x in the last four weeks) 3 = often (>10x in the last four weeks)
HAFIAS7.	In the last four weeks, has there been **no food at all** at home due to a lack of food sources?	0 = no (go to question number 8) 1 = yes
HAFIAS 7a.	How often does this happen?	1 = rarely (1-2x in the last four weeks) 2 = sometimes (3-10x in the last four weeks) 3 = often (>10x in the last four weeks)
HAFIAS8.	In the last four weeks, have you or any of your family members ever gone to **bed hungry** because of a lack of food sources?	0 = no (go to question number 9) 1 = yes
HAFIAS 8a.	How often does this happen?	1 = rarely (1-2x in the last four weeks) 2 = sometimes (3-10x in the last four weeks) 3 = often (>10x in the last four weeks)
HAFIAS9.	In the last four weeks, have you or any of your family members ever gone **a whole day (all morning and evening) without eating at all** because of a lack of food sources?	0 = no (food insecurity questions completed) 1 = yes
HAFIAS 9a.	How often does this happen?	1 = rarely (1-2x in the last four weeks) 2 = sometimes (3-10x in the last four weeks) 3 = often (>10x in the last four weeks)

Please give the completed questionnaire sheet to your child to take to school for collection by their homeroom teacher.
Thank You

Annex 5. Guided questions for qualitative interviews

FOCUS GROUP DISCUSSION GUIDE PARTICIPANTS: UKS/M TEACHERS IN INTERVENTION SCHOOLS	
Notes for Discussion Facilitators	
1	Before starting, ask participants to fill in their personal data on the prepared form.
2	Open the discussion with introductions. Use these introductions to create a friendly atmosphere among participants.
3	Mention some guidelines during the discussion such as each participant is asked to respect each other's opinions, no opinion is wrong or right, and each participant is asked to participate actively.
4	Seek permission to record the discussion, for the purpose of data analysis.
No.	**Question Guide**
1	**Participation in the *Petualangan Bergizi* Program and Its Impact on their nutrition education facilitating skills/ confidence** ● Did you attend capacity-building activities organized by the program? (if so, ask the respondents to describe the activities including any follow-up action planned/taken) ● (Without leading, ask) How do you perceive your knowledge, skills, and confidence following the capacity-building activities? (explore the specific new knowledge/insights/skill they gain) ● How do you apply the new knowledge, insights, and skills into your role as a UKS/M teacher, especially when facilitating nutrition education sessions at school? Please share specific examples. ● Have the new knowledge, insights, and skills assisted you in addressing or overcoming challenges that you encountered for facilitating nutrition education? ● For the past one year, did you receive capacity-building support from sources other than *Petualangan Bergizi*? (Ask respondents to provide describe the activities)
2	**Nutrition Education Intervention at Schools** ● What nutrition education activities are implemented at your school as part of *Petualangan Bergizi*? Is there any activity specific for girls, boys and disabilities student? ● What activities do you think are working well? Why? ● What activities do you think are not working well? Why? What can be done to make it work better? ● In general how is teachers', students and parents' participation in the program
3	**Perceived Changes of Students' KAP on Balanced Nutrition and Role of Peer Support Team** ● Have there been any changes on balanced nutritional status, knowledge, attitude and practices of the students since the implementation of *Petualangan Bergizi* at your school ⌗ If yes, please share specific examples. What are the main drivers of the changes? ⌗ If yes - do you see any difference between girls, boys or children with disabilities? ⌗ If no, why? How to improve the condition? ● How do you perceive the role of peer support in nutrition education at your school? (please share specific examples) ⌗ Was there any training offered by the program to peer support? ⌗ What mentoring activities are provided to them following the training? ⌗ Are those support sufficient to equip them with necessary knowledge/skill/confidence for their roles ⌗ If the involvement is good, what factor contribute to it? ⌗ If the involvement is lacking, what are the barriers? How can this condition be improved?
4	**Perceived changes of food environment at school since the implementation of *Petualangan Bergizi*** ● Have there been any changes on school canteen management ⌗ If yes, please share specific examples (explore about foods/beverages sold particulalry foods/beverages high in sugar/salt/fat). What are the main drivers of the changes? (explore whether it is canteen regulation/rules, monitoring, training for the manager and vendors, else) ⌗ If no, what are the barriers? How can this condition be improved? ● Ask similar questions about any changes related to food vendors around the schools
5	**Coordination between Schools and *Puskesmas* and DEO/Religious Affair Office about UKS/M** ● Have there been any changes in communication and coordination between your school and *puskesmas* (including results and follow-up of students' health screening, coaching and supervision from *puskesmas*) ● What specific support has your school received from the District Education Office or Religious Affair Office about implementing nutrition education and UKS/M in general?
6	**Remaining Challenges and Input for the Program** ● Are there any ongoing challenges in implementing nutrition education activities at your school? If so, what are they? ● How can we sustain the successful aspects of the program and improve its implementation to enhance effectiveness? ● What are the main good practices and lessons learned from *Petualangan Bergizi*? (please give specific examples) ● Do you have any suggestions for the *Petualangan Bergizi* Program?

FOCUS GROUP DISCUSSION GUIDE
PARTICIPANTS: SCHOOL COMMITTEE MEMBERS IN INTERVENTION SCHOOLS

Notes for Discussion Facilitators

1	Before starting, ask participants to fill in their personal data on the prepared form.
2	Open the discussion with introductions. Use these introductions to create a relaxed atmosphere among participants.
3	Mention some guidelines during the discussion such as each participant is asked to respect each other's opinions, no opinion is wrong or right, each participant is asked to participate actively.
4	Seek permission to record the discussion, for the purpose of data analysis.

No.	Question Guide

1	**Exposure towards and opinion on *Petualangan Bergizi***
	• Have you ever heard about *Petualangan Bergizi?* (explore what they know about it, including the activity, objective, how do they know about it)
	• If yes, have you participated in the activity?
	  ⌗ If yes, please share specific examples
	  ⌗ What is specific new knowledge/insights gained from the program
	  ⌗ How do you use the new knowledge/insights to contribute for improving nutrition education at school
	  ⌗ If no, why?
	• What is specific role of school committee in the program? share specific examples
	• What activities do you think are working well (creating behaviour changes)? Why?
	• What activities do you think are not working well? Why? What can be done to make it work better?
	• In general how is teachers', students and parents' participation in the program
	  ⌗ If good, what are the drivers?
	  ⌗ If no, what are the barriers?

2	**Perceived changes since the implementation of *Petualangan Bergizi***
	• Have there been changes in children dietary practices and physical activity that you observed?
	  ⌗ If yes, please share specific examples, and what are the main drivers?
	  ⌗ If no, why? What should be done to create positive changes
	• Have there been changes on food environment at school (school canteen and food vendors around the school)
	  ⌗ If yes, please share specific examples, and what are the main drivers?
	  ⌗ If no, what are the barriers for positive changes
	• Have there been changes on food environment at home (family habit and regulation)
	  ⌗ If yes, please share specific examples, and what are the main drivers?
	  ⌗ If no, what are the barriers for positive changes

3	**Remaining challenges and support needed to sustain/improve program implementation** **a.** Is there any dietary practices of students that remain of your concern? **b.** How should schools and parents work together in this regard?

FOCUS GROUP DISCUSSION GUIDE
PARTICIPANTS: DISTRICT TP UKS/M

Notes for Discussion Facilitators

1	Before starting, ask participants to fill in their personal data on the prepared form.
2	Open the discussion with introductions. Use these introductions to create a relaxed atmosphere among participants.
3	Mention some guidelines during the discussion such as each participant is asked to respect each other's opinions, no opinion is wrong or right, each participant is asked to participate actively.
4	Seek permission to record the discussion, for the purpose of data analysis.

No.	Question Guide

1	**Roles of TP UKS/M in *Petualangan Bergizi***
	• What is specific role of TP UKS/M in the program? Please share specific examples (explore on district level regulation/ circular letter to school, monitoring program implementation, coordination for planning and budgeting)
	• Do you think the roles have been implemented effectively?
	  ⌗ If yes, please share specific examples (particularly regarding improvement in multi-sector coordination
	  ⌗ If no, why?

2	**Impact of *Petualangan Bergizi* on Nutrition Education and UKS/M program at school**
	• Based on the monitoring results, do you consider the program has successfully fostered behaviour changes among students?
	  ⌗ If yes, please share specific examples
	  ⌗ If no, why? What can be done to make it work better? (explore what TP UKS/M contribution to this)
	• From the monitoring results, have there been changes in school food environment (school canteen and food vendors around the school)
	  ⌗ If yes, please share specific examples
	  ⌗ If no, why? What can be done to improve the food environment (explore what TP UKS/M contribution to this)
	• In general, how is the role of the *Petualangan Bergizi* Program in strengthening UKS/M program at school? Please give specific examples

3	Program sustainability and improvement • How can we sustain the successful aspects of the program and improve its implementation to enhance effectiveness? • What are the main good practices and lessons learned from *Petualangan Bergizi?* (please give specific examples) • Do you have any suggestions for the *Petualangan Bergizi* Program?

FOCUS GROUP DISCUSSION GUIDE
PARTICIPANTS: CANTEEN MANAGER AT INTERVENTION SCHOOLS

Notes for Discussion Facilitators

1	Before starting, ask participants to fill in their personal data on the prepared form.
2	Open the discussion with introductions. Use these introductions to create a relaxed atmosphere among participants.
3	Mention some guidelines during the discussion such as each participant is asked to respect each other's opinions, no opinion is wrong or right, each participant is asked to participate actively.
4	Seek permission to record the discussion, for the purpose of data analysis.

No.	Question Guide
1	**Participation in the *Petualangan Bergizi* Program and Its Impact on their nutrition education facilitating skills/ confidence** ● Did you attend capacity-building activities organized by the program? (describe the activities) ● (Without leading, ask) How do you perceive your knowledge, skills, and confidence following the capacity-building activities? ⌗ Please share examples of the specific new knowledge/skill you gain ⌗ How do you apply the new knowledge and skills to manage school canteen better? Please share specific examples. ⌗ Have the new knowledge, insights, and skills assisted you in addressing/ overcoming challenges that you encountered for managing healthy school canteen at your school? If yes, please share specific examples; If no, why?
2	**Perceived changes about school environment following *Petualangan Bergizi*** ● If there have been positive changes, please provide specific examples (explore on regulation/rules, type of foods sold in canteen, monitoring, food handlers' and student's acceptance to new regulation (if relevant). What are the drivers? ● If no, why? What can be done to improve the condition
3	**Mentoring and Monitoring for the School Canteen** ● Have there been regular monitoring and support from *puskesmas*/DEO/Religious Affair District Office/*Petualangan Bergizi* team? (explore the frequency, method, results and feedback received) ● What type of monitoring and coaching do you provide to food vendors as the canteen manager (explore the frequency, method, results and feedback given) ● How should canteen managers, schools, and school committee cooperate in managing and monitoring the canteen
4	**Input for program improvement and sustainability for healthy school canteen** ● What are the remaining barriers to enhance food environment (for example offer healthier foods alternatives to packaged snacks and drinks? How to minimize the challenges? ● Support needed to sustain/improve the school canteen strengthening program ● What are the main good practices and lessons learned from *Petualangan Bergizi?* (please give specific examples) ● Do you have any suggestions for the *Petualangan Bergizi* Program?

IN-DEPTH INTERVIEW GUIDE
PARTICIPANTS: PRIMARY HEALTH CENTRE (NUTRITIONIST OR UKS/M STAFF)

Notes for Discussion Facilitators

1	Before starting, ask participants to fill in their personal data on the prepared form.
2	Open the discussion with introductions. Use these introductions to create a relaxed atmosphere among participants.
3	Mention some guidelines during the discussion such as each participant is asked to respect each other's opinions, no opinion is wrong or right, each participant is asked to participate actively.
4	Seek permission to record the discussion, for the purpose of data analysis.

No.	Question Guide
1	**Participation in the *Petualangan Bergizi* Program and Its Impact on their performance** ● Did you attend capacity-building activities organized by the program? (if so, ask the respondents to describe the activities including any follow-up action planned/taken) ● (Without leading, ask) How do you perceive your knowledge, skills, and confidence following the capacity-building activities? (explore the specific new knowledge/insights/skill they gain) ● How do you apply the new knowledge, insights, and skills into your role to mentor UKS/M especially nutrition education at school? Please share specific examples. ● Have the new knowledge, insights, and skills assisted you in addressing or overcoming challenges that you encountered for facilitating nutrition education? ● For the past one year, did you receive capacity-building support from sources other than *Petualangan Bergizi?* (Ask respondents to provide describe the activities)
2	**Nutrition Education Intervention at Schools** ● What nutrition education activities are implemented at schools in your area as part of *Petualangan Bergizi?* Is there any activity specific for girls, boys and disabilities student? Is there any activity targeted to parents? ● Based on your monitoring, ⌗ what activities do you think are working well? Why? ⌗ What activities do you think are not working well? Why? What can be done to make it work better?
3	**Perceived Changes of Students' KAP on Balanced Nutrition and Food Environment** ● Have there been any changes on balanced nutritional status, knowledge, attitude and practices of the students since the implementation of *Petualangan Bergizi* at your school ⌗ If yes, please share specific examples. What are the main drivers of the changes? ⌗ If yes - do you see any difference between girls, boys or children with disabilities? ⌗ If no, why? How to improve the condition? ● Have there been any changes on school canteen management ⌗ If yes, please share specific examples (explore about foods/beverages sold particulalry foods/beverages high in sugar/salt/fat). What are the main drivers of the changes? (explore whether it is canteen regulation/rules, monitoring, training for the manager and vendors, else) ⌗ If no, what are the barriers? How can this condition be improved? ● Ask similar questions about any changes related to food vendors around the schools
4	**Perceived changes in UKS/M Program management and implementation following *Petualangan Bergizi*** ● Have there been any changes in communication and coordination between your *puskesmas* and intervention school? Please give specific example ● Have there been any changes in mentoring the schools? Please give specific example ● Have there been any changes on UKS/M program implementation for the past 1 year (including referral system, follow-up for health screening, quality of nutrition education)
5	**Remaining Challenges and Input for the Program** ● Are there any ongoing challenges in coordinating and mentoring nutrition education activities as part of UKS/M in your area? If so, what are they? ● How can we sustain the successful aspects of the program and improve its implementation to enhance effectiveness? ● What are the main good practices and lessons learned from *Petualangan Bergizi?* (please give specific examples) ● Do you have any suggestions for the *Petualangan Bergizi* Program?

IN-DEPTH INTERVIEW GUIDE
PARTICIPANTS: PEER SUPPORT TEAM AT INTERVENTION SCHOOLS

Notes for Discussion Facilitators

1	Before starting, ask participants to fill in their personal data on the prepared form.
2	Open the discussion with introductions. Use these introductions to create a relaxed atmosphere among participants.
3	Mention some guidelines during the discussion such as each participant is asked to respect each other's opinions, no opinion is wrong or right, each participant is asked to participate actively.
4	Seek permission to record the discussion, for the purpose of data analysis.

No.	Question Guide
1	**Training as *Kapten Bergizi* Peer Support** ● Did you attend training on *Petualangan Bergizi?* (ask the respondents to describe the activities including any follow-up action planned/taken) ● Is there any specific new knowledge and skills that you obtain from the training? Please share specific example ● How do you understand your role as peer support team ● How the new knowledge/skills support you as a Peer Support team? Please share specific example ● Did you receive regular mentoring after the training? (explore the method, mentor)
2	**Nutrition Education Intervention at Schools** ● Please share your experiences in assisting nutrition education activities in *Petualangan Bergizi* program? (including in school canteen-related activities) ● Is there any activity specific for girls, boys and disabilities student? Is there any activity targeted to parents? ● Based on your observation, how is your friends responses to the activities? Is there activity favoured by you? By most students? Why
3	**Perceived changes in their peer's KAP and school food environment** ● Do you think there have been changes in your friend's nutrition practices after the *Petualangan Bergizi* program? ● Have there been any changes on foods sold in canteen at your school? Please give examples. ⁜ According to you, is your school canteen need improvement? Please give specific examples
4	**Others** ● How do your friends respond to your role as peer support ● Did you enjoy your role as peer support? Why ● Do you have input for *Petualangan Bergizi* program?

IN-DEPTH INTERVIEW GUIDE
PARTICIPANTS: UKS/M TEACHERS IN CONTROL SCHOOLS

Notes for Discussion Facilitators

1	Before starting, ask participants to fill in their personal data on the prepared form.
2	Open the interview with introductions. Use these introductions to create a friendly atmosphere with informant.
3	Mention some guidelines during the discussion such as no opinion is wrong or right as it aims to see the current practices.
4	Seek permission to record the discussion, for the purpose of data analysis.

No.	Topic	Question Guide
1	Capacity Building on UKS/M Program Received in the Past Year	Have you received any training or support related to the UKS/M program over the past year? • **Probing:** Could you describe the topics covered in the training? • **Probing:** Who organized the training, and how would you rate its quality?
2	Perceived new knowledge, insights, skill, and practices for the past one year	What new knowledge, insights, or skills have you gained related to the UKS/M program over the past year? • **Probing:** Has there been any change in how you carry out your UKS/M duties after gaining this new knowledge or skill? • **Probing:** Could you provide specific examples of how you've applied this new knowledge or skill?
3	Perceived changes in balanced nutrition knowledge, attitude and practices of the students for the past one year	In your opinion, have there been any changes in students' knowledge, attitude, or practices regarding balanced nutrition over the past year? • **Probing:** What improvements or declines have you observed in students' understanding of balanced nutrition? • **Probing:** Could you share examples of behavioural changes among students that indicate a positive attitude toward balanced nutrition?
4	Perceived changes in communication and coordination with *puskesmas* for the past one year	How would you assess the communication and coordination with the *puskesmas* (community health centre) over the past year? • **Probing:** Has there been an increase in the frequency or quality of communication with the *puskesmas*? • **Probing:** In your opinion, how has this communication impacted the effectiveness of the UKS/M program at school?
5	Perceived changes of UKS/M program planning and implementation at school in general for the past one year	How do you think the planning and implementation of the UKS/M program at school has changed over the past year? • **Probing:** Have there been specific adjustments to the UKS/M program to meet students' needs? • **Probing:** What support or challenges have you experienced in implementing these changes?
6	Perceived changes of food environment at school for the past one year	In your opinion, have there been any changes in the school food environment over the past year? • **Probing:** What are some of these changes, such as the types of food offered in the canteen or the availability of healthier options? • **Probing:** How do you think these changes have impacted students' eating behaviours at school?
7	Awareness of the UNICEF's Intervention package program	Are you aware of UNICEF's intervention package program related to UKS/M? • **Probing:** If so, to what extent do you understand the goals or components of this program? • **Probing:** In your opinion, how might this program impact the UKS/M program at your school? How so?

IN-DEPTH INTERVIEW GUIDE
PARTICIPANTS: CANTEEN MANAGERS IN CONTROL SCHOOLS

Notes for Discussion Facilitators

1	Before starting, ask participants to fill in their personal data on the prepared form.
2	Open the interview with introductions. Use these introductions to create a friendly atmosphere with informant.
3	Mention some guidelines during the discussion such as no opinion is wrong or right as it aims to see the current practices.
4	Seek permission to record the discussion, for the purpose of data analysis.

No.	Topic	Question Guide
1	General Opinion About Changes in the Food Environment at School Over the Past Year	How would you describe any changes in the school food environment over the past year? ● **Probing:** What have been the most noticeable changes? ● **Probing:** How do you feel these changes have impacted the canteen's daily operations?
2	Capacity Building for Canteen Managers/Food Handlers	Have you or any of the food handlers received training or guidance on food management and safety over the past year? ● **Probing:** What topics were covered in the training, if any? ● **Probing:** How helpful was the training for improving food safety and quality in the canteen?
3	Changes in the Type of Foods Sold in the Canteen	Have there been any changes in the types of food and beverages offered in the canteen over the past year? ● **Probing:** What were the reasons for these changes? ● **Probing:** Are there any new healthy options now available in the canteen?
4	Food Handlers' and Students' Acceptance of New Regulations (If Relevant)	Were there any new regulations related to food safety or nutrition introduced this year? If so, how were they received by the food handlers and students? ● **Probing:** How have the food handlers adapted to these regulations? ● **Probing:** How have the students reacted to the changes? Has it affected their food choices?

IN-DEPTH INTERVIEW GUIDE
PARTICIPANTS: FOOD HANDLERS AND STREET VENDORS AT INTERVENTION SCHOOL

Note to Interviewers

1	Before starting, ask participants to fill in their personal data on the prepared form.
2	Open the interview with introductions. Use this introductory session to create a relaxed atmosphere
3	Seek permission to record the discussion, for the purpose of data analysis.

No.	Topic	Question Guide
1	General Opinion About the Food Environment at School Over the Past Year	How would you describe the food environment at the school over the past year? ● **Probing:** What changes have you observed in the types of foods offered in the canteen or by street vendors? ● **Probing:** How has your experience been with any new regulations implemented in the past year? ● **Probing:** Have you received any coaching or guidance from the school or *puskesmas?* If so, could you share more about that?
2	Food Handlers' and Students' Acceptance of New Regulation and Food Environment	How have you and the other food handlers adapted to the new regulations and food environment changes introduced by the school? ● **Probing:** What has been the response of students to these changes? Have their food choices changed? ● **Probing:** Are there any specific challenges you or other food handlers faced in adjusting to these regulations?
3	Perceived Remaining Challenges to Enhance the Food Environment and Support Needed	What do you think are the remaining challenges in improving the food environment at school? ● **Probing:** What kind of support do you feel is necessary from the school, *puskesmas*, or other stakeholders to help overcome these challenges? ● **Probing:** Are there any specific tools, resources, or additional training you think would help enhance food quality and safety?
4	OBSERVATION	1. Food/drinks observed being sold by respondents 2. Note what is already good, and what needs to be improved (e.g. cleanliness, use of lids, good cooking oil (if relevant), presence of clean water, trash, animals such as flies, cats, others, personal hygiene of the seller). 3. Food/drink purchased by students

Annex 6. Anthropometry standardization results

The anthropometric measurement standardization test was conducted during the training to ensure that all enumerators followed a standardized procedure. This test aimed to assess two aspects of the measurements: precision, or how similar the values were for repeated measurements made by enumerators, and accuracy, or how close the measurements taken by enumerators were to the true value, established by the lead anthropometrist (field coordinator). Ten subjects were involved in the standardization test, with each enumerator independently measuring each subject twice. The first set of measurements was recorded and set aside until the second set was taken. The lead anthropometrist also conducted measurements as a reference. The same equipment used during the standardization test (a SECA digital scale for body weight and a Shorr board for height assessment) was utilized in the survey.

Following the test, all measurement records were compiled in an Excel file to calculate the Technical Error of Measurement (TEM), which quantifies the difference between the first and second measurements by the enumerator (precision), and bias, which measures the difference between the mean measurements of the enumerators and the lead anthropometrist (accuracy). This measure was also used to evaluate the quality of the measurements (i.e., good, fair, or poor) based on established guidelines (Zerfas, 1985)[2].

The results from team A and B are summarized as follows:

Variable	Indicator	Team A	Team B
Body WEIGHT			
Precision	TEM (kg)	0.04 (good)	0.01 (good)
Accuracy	Bias (kg)	0.06 (good)	-0.07 (good)
Body HEIGHT			
Precision	TEM (cm)	0.02 (good)	0.09 (good)
Accuracy	Bias (cm)	0.10 (good)	-0.38 (good)

For body weight measurement, both teams demonstrated high precision and accuracy. The average TEM) for body weight was 0.04 kg for Team A and 0.01 kg for Team B, with a bias of 0.06 kg and -0.07 kg, respectively.

For height measurement, both teams also exhibited strong precision and accuracy. The average TEM for height was 0.02 cm for Team A and 0.09 cm for Team B, with a bias of 0.10 cm and -0.38 cm, respectively.

Overall, the anthropometric standardization test was successfully conducted in accordance with standard procedures. Both teams achieved results within the allowable differences, ensuring precision and accuracy. Therefore, the anthropometric assessments conducted during the baseline survey can be considered valid and reliable.

[2] Difference thresholds for weight (kg): 0-0.19 (good), 0.20-0.29 (fair), 0.30-0.49 (poor). Difference thresholds for height (cm): 0-0.5 (good), 0.6-0.9 (fair), 1.0-1.9 (poor).

Annex 7. Detailed results

Details of practices

Meal frequency and breakfast habits

The analysis of students' meal frequency and breakfast habits shows no significant differences between the intervention and control groups across most variables. Most students in both groups consumed three meals per day (65.0 per cent intervention vs. 63.4 per cent control, p=0.897). A high proportion of students had breakfast daily (75.8 per cent intervention vs. 72.2 per cent control, p=0.606), with most eating before 9 am (94.8 per cent vs. 91.9 per cent, p=0.290). A significant difference was observed in the place of breakfast (p=0.038), with more students in the intervention group having breakfast at home (94.8 per cent), compared to 89.2 per cent in the control group. Regarding breakfast composition, the most common choices were rice with side dishes and vegetables (51.5 per cent intervention vs. 48.7 per cent control) and rice with side dishes (32.0 per cent vs. 36.6 per cent), with no significant variation between groups (p=0.506).

TABLE 1 Students' practice of meal frequency and breakfast habits at baseline and endline by treatment group

Variables	Intervention (n=383)	Control (n=389)	Total (n=772)	p-value
Frequency of meal in a day				
1. <3 times	68 (17.0)	67 (18.0)	135 (17.5)	0.897
2. 3 times	260 (65.0)	236 (63.4)	496 (64.2)	
3. >3 times	72 (18.0)	69 (18.5)	141 (18.3)	
Breakfast habit				
1. Every day	303 (75.8)	267 (72.2)	570 (74.0)	0.606
2. Occasionally (4 to 6 times a week)	51 (12.8)	50 (13.5)	101 (13.1)	
3. Rarely (1 to 3 times a week)	39 (9.8)	43 (11.6)	82 (10.6)	
4. Never	7 (1.8)	10 (2.7)	17 (2.2)	
Usual breakfast time				
1. Before 9 am	379 (94.8)	342 (91.9)	721 (93.4)	0.290
2. 9 am and after	14 (3.5)	20 (5.4)	34 (4.4)	
Usual place to have breakfast				
1. At home	379 (94.8)	332 (89.2)	711 (92.1)	0.038
2. At school by bringing meal from home	7 (1.8)	15 (4.0)	22 (2.8)	
3. At school by buying food in the canteen/other places	7 (1.8)	15 (4.0)	22 (2.8)	
Foods that students usually have for breakfast				
1. Rice, side dishes, and vegetables	206 (51.5)	181 (48.7)	387 (50.1)	0.506
2. Rice and side dishes	128 (32.0)	136 (36.6)	264 (34.2)	
3. Rice and vegetables	24 (6.0)	14 (3.8)	38 (4.9)	
4. Bread/cakes and drinks	9 (2.3)	12 (3.2)	21 (2.7)	
5. Drink tea/milk/water only	6 (1.5)	2 (.5)	8 (1.0)	
6. Instant noodles with/without rice	2 (.5)	1 (.3)	3 (.4)	
7. Instant noodles and eggs/other side dishes	2 (.5)	3 (.8)	5 (.6)	
8. Fried foods	0 (.0)	0 (.0)	0 (.0)	
9. Others	16 (4.0)	13 (3.5)	29 (3.8)	

P<0.05 indicates significant differences between intervention and control schools.

Snacking habits

The analysis of students' snacking habits reveals no significant differences between the intervention and control groups across most variables. The frequency of buying snacks was similar, with 44.0 per cent of intervention students and 46.2 per cent of control students purchasing snacks daily (p=0.751). The most bought snacks included sugary drinks (53.0 per cent intervention vs. 49.5 per cent control, p=0.326), chips snacks (46.5 per cent vs. 43.3 per cent, p=0.369), and sweet snacks (37.5 per cent vs. 37.9 per cent, p=0.908), with no significant differences between groups.

However, a significant difference (p=0.035) was observed in where students purchased snacks. A greater proportion of students in the intervention group bought snacks from the school canteen (52.3 per cent), compared to 49.5 per cent in the control group, while more control students purchased snacks from food vendors near their homes (38.2 per cent) compared to 30.3 per cent in the intervention group.

TABLE 2. Students' practice of snacking habits at baseline and endline by treatment group

Variables	Intervention (n=383)	Control (n=389)	Total (n=772)	p-value
Frequency of buying snacks at school/home				
1. Every day	176 (44.0)	172 (46.2)	348 (45.1)	0.751
2. Often (4 to 6 times in a week)	129 (32.3)	123 (33.1)	252 (32.6)	
3. Rarely (1 to 3 times in a week)	86 (21.5)	71 (19.1)	157 (20.3)	
4. Never	9 (2.3)	6 (1.6)	15 (1.9)	
Snacks most frequently bought by students				
1. Sweet snacks	150 (37.5)	141 (37.9)	291 (37.7)	0.908
2. Biscuits	23 (5.8)	30 (8.1)	53 (6.9)	0.204
3. Bread, cake	52 (13.0)	67 (18.0)	119 (15.4)	0.054
4. Sugary drinks	212 (53.0)	184 (49.5)	396 (51.3)	0.326
5. Milk, yogurt	40 (10.0)	35 (9.4)	75 (9.7)	0.782
6. Carbonated soft drinks	1 (.3)	3 (.8)	4 (.5)	0.282
7. Chips snacks	186 (46.5)	161 (43.3)	347 (44.9)	0.369
8. Fried snacks (fried banana, fritter)	107 (26.8)	114 (30.6)	221 (28.6)	0.232
9. Fried foods (chicken roll, egg roll)	92 (23.0)	95 (25.5)	187 (24.2)	0.411
10. Ready-made full meals (porridge, burgers, spaghetti, rice and dish, fried rice, yellow rice, instant noodles, chicken noodle, meatball, soto, batagor, siomay, kebab, seblak, pempek	139 (34.8)	114 (30.9)	253 (32.9)	0.595
Usual place where students buy snacks				
1. In the school canteen	209 (52.3)	184 (49.5)	393 (50.9)	0.035
2. At food vendors outside/around the school	49 (12.3)	38 (10.2)	87 (11.3)	
3. At food vendors near the house	121 (30.3)	142 (38.2)	263 (34.1)	
4. Purchased by parents	17 (4.3)	5 (1.3)	22 (2.8)	

P<0.05 indicates significant differences between intervention and control schools.

Drinking water

The analysis of students' drinking water habits shows that water was the most frequently consumed beverage in both the intervention (91.8 per cent) and control (88.4 per cent) groups (p=0.107), with no significant difference. Similarly, the main reason for beverage choice varied, with taste being the most common factor (33.1 per cent intervention, 37.1 per cent control), followed by availability at home/school (14.8 per cent vs. 11.0 per cent) and parental/ teacher influence (14.0 per cent vs. 16.4 per cent) (p=0.397).

However, a significant difference (p<0.001) was observed in daily water consumption. More students in the intervention group consumed ≥7 glasses of water daily (56.0 per cent), compared to 41.9 per cent in the control group. Conversely, more students in the control group drank ≤3 glasses per day (18.5 per cent) compared to 9.5 per cent in the intervention group.

TABLE 3. **Students' practice of drinking water at baseline and endline by treatment group**

Variables	Intervention (n=383)	Control (n=389)	Total (n=772)	p-value
Type of beverage most frequently consumed				
1. Water	367 (91.8)	329 (88.4)	696 (90.2)	0.107
2. Sweet tea	22 (5.5)	21 (5.6)	43 (5.6)	
3. Milk	7 (1.8)	9 (2.4)	16 (2.1)	
4. Other sweetened beverages (in sachets/ready-to-drink packets)	4 (1.0)	13 (3.5)	17 (2.2)	
The main reason for drinking that beverage				
1. Taste	132 (33.1)	138 (37.1)	270 (35.0)	0.397
2. Price	5 (1.3)	4 (1.1)	9 (1.2)	
3. Commonly available at home/school	59 (14.8)	41 (11.0)	100 (13)	
4. Told by parents/teachers	56 (14.0)	61 (16.4)	117 (15.2)	
5. Others	147 (36.8)	128 (34.4)	275 (35.7)	
Average amount of water usually consumed by students				
1. ≤ 3 glasses	38 (9.5)	69 (18.5)	107 (13.9)	<0.001
2. 4 to 6 glasses	138 (34.5)	147 (39.5)	285 (36.9)	
1. ≥ 7 glasses	224 (56.0)	156 (41.9)	380 (49.2)	

P<0.05 indicates significant differences between intervention and control schools.

Reading food labels

Most students read food labels only sometimes or rarely, with no significant difference between the intervention and control groups (p=0.122). In the intervention group, 13.0 per cent always read labels, 34.0 per cent sometimes, 29.3 per cent rarely, and 23.8 per cent never, compared to 14.0 per cent, 26.1 per cent, 33.1 per cent, and 26.9 per cent in the control group.

Among the types of information read on food labels, expiration dates (22.0 per cent intervention, 25.0 per cent control) and sugar content (45.8 per cent vs. 33.9 per cent) were the most checked. Notably, significantly more students in the intervention group checked sugar content (45.8 per cent) compared to the control group (33.9 per cent, p=0.002), suggesting an impact of the intervention on raising awareness of sugar intake.

Regarding whether food labels influenced purchasing decisions, there were no significant differences (p=0.799), with around 50 per cent of students in both groups reporting that labels influenced their choices at least sometimes.

TABLE 4. Students' practice of reading food at baseline and endline by treatment group

Variables	Intervention (n=383)	Control (n=389)	Total (n=772)	p-value
Frequency of reading food labels when buying/ consuming packaged food/drinks, *n(%)*				
1. Always	52 (13.0)	52 (14.0)	104 (13.5)	0.122
2. Sometimes	136 (34.0)	97 (26.1)	233 (30.2)	
3. Rarely	117 (29.3)	123 (33.1)	240 (31.1)	
4. Never	95 (23.8)	100 (26.9)	195 (25.3)	
Information usually read on food labels by students, *n(%)*				
1. Expiration date	88 (22.0)	93 (25.0)	181 (23.4)	0.306
2. Energy content	32 (8.0)	34 (9.1)	66 (8.5)	0.553
3. Vitamin content	40 (10.0)	47 (12.6)	87 (11.3)	0.288
4. Sugar content	183 (45.8)	126 (33.9)	309 (40.0)	0.002
5. Ingredient/food ingredient	81 (20.3)	72 (19.4)	153 (19.8)	0.664
Whether the food label influences students to consume/buy or not consume/buy a packaged food/ drink, *n(%)*				
1. Yes, most of the time	66 (16.5)	66 (17.7)	132 (17.1)	0.799
2. Yes, sometimes	138 (34.5)	125 (33.6)	263 (34.1)	
3. No or not really	101 (25.3)	85 (22.8)	186 (24.1)	

P<0.05 indicates significant differences between intervention and control schools.

Personal hygiene

The analysis of students' handwashing practices shows that most students wash their hands before meals (89.0 per cent), with similar proportions in the intervention (90.0 per cent) and control (87.9 per cent) groups (p=0.352). Washing hands after meals (52.2 per cent) and after handling trash (5.3 per cent) were also common but did not differ significantly between groups.

A significant difference (p=0.030) was observed in handwashing after using the toilet, with 7.0 per cent of intervention students and only 3.5 per cent of control students reporting this practice, suggesting that the intervention may have positively influenced toilet hygiene habits. However, the frequency of handwashing after holding an animal (59.5 per cent) and after playing (4.3 per cent) remained low, with no significant differences between groups.

TABLE 5. Students' practice of personal hygiene at baseline and endline by treatment group

Variables	Intervention (n=383)	Control (n=389)	Total (n=772)	p-value
The time when students usually wash their hands with clean running water and soap				
1. Before meals	360 (90.0)	327 (87.9)	687 (89.0)	0.352
2. After meals	216 (54.0)	187 (50.3)	403 (52.2)	0.3
3. After taking out the trash	23 (5.8)	18 (4.8)	41 (5.3)	0.573
4. After attending toilet (urination/defecation)	28 (7.0)	13 (3.5)	41 (5.3)	0.030*
5. After holding an animal	233 (58.3)	226 (60.8)	459 (59.5)	0.479
6. After playing	18 (4.5)	15 (4.0)	33 (4.3)	0.748
7. Can't be determined (no specific time)	28 (7.0)	31 (8.4)	59 (7.7)	0.479

P<0.05 indicates significant differences between intervention and control schools.

Physical activity

Table 6 presents endline comparisons of students' physical activity between intervention (n=383) and control (n=389) groups. Most students in both groups exercised less than three days per week (intervention: 45.8 per cent; control: 49.9 per cent), with only a small proportion exercising daily. Similarly, the majority reported exercising for ≥30 minutes, slightly higher in the intervention group (73.9 per cent) than in the control (67.9 per cent), though not statistically significant (p=0.183). The main reasons for not exercising—such as lack of time or motivation—were reported at similarly low rates across groups.

During school breaks, students commonly played ball or chatted with friends, with minimal differences between groups. Participation in extracurricular activities was also comparable, with scouting and sports being the most common types. For example, scout participation was reported by 48.0 per cent of the intervention group and 49.4 per cent of the control group, while sports involvement was slightly higher in the intervention group (30.0 per cent vs. 24.4 per cent), though not statistically significant. Cell phone ownership was high in both groups (intervention: 81.2 per cent; control: 79.2 per cent). Across all variables, no statistically significant differences (p>0.05) were observed, suggesting that the intervention had limited measurable impact on students' physical activity behaviours by endline.

TABLE 6. Students' practice of physical activity at baseline and endline by treatment group

Variables	Intervention (n=383)	Control (n=389)	Total (n=772)	p-value
Frequency of exercise in a week				
1. Never	8 (2.1)	14 (3.6)	22 (2.9)	0.211
2. <3 days a week	175 (45.8)	194 (49.9)	369 (47.9)	
3. 3 to 6 days a week	151 (39.5)	149 (38.3)	300 (38.9)	
4. Every day	47 (12.3)	31 (8.0)	78 (10.1)	
Average time for each exercise				
1. <30 minutes	92 (24.0)	111 (28.6)	203 (26.3)	0.183
2. ≥30 minutes	283 (73.9)	264 (67.9)	547 (70.9)	
Main reason for not exercising				
1. Not used to it	1 (0.3)	2 (0.5)	3 (.4)	
2. Too lazy to do it	3 (0.8)	8 (2.1)	11 (1.4)	
3. No one told me to do so	0 (0.0)	0 (0.0)	0 (.0)	
4. No time	5 (1.3)	1 (0.3)	6 (.8)	
5. No friends/family to go with	2 (0.5)	1 (0.3)	3 (.4)	
6. No venues/tools to do exercise	1 (0.3)	1 (0.3)	2 (.3)	
Main activity during class breaks at school				
1. Buying drinks/food at the school canteen	117 (30.5)	108 (27.8)	225 (29.1)	0.323
2. Play ball/basketball/chase with friends	140 (36.6)	126 (32.4)	266 (34.5)	
3. Sitting alone/with friends, chatting	121 (31.6)	149 (38.3)	270 (35.0)	
4. Doing schoolwork	0 (.0)	2 (.5)	2 (.3)	
5. Viewing cell phone	0 (.0)	0 (.0)	0 (.0)	
Type of participation in extracurricular at school				
1. Scout	184 (48.0)	192 (49.4)	376 (48.7)	0.589
2. Sports	115 (30.0)	95 (24.4)	210 (27.2)	0.211
3. Arts	99 (25.8)	125 (32.1)	224 (29.0)	0.184
4. Science club	15 (3.9)	7 (1.8)	22 (2.8)	0.170
5. Language	5 (1.3)	3 (0.8)	8 (1.0)	0.631
6. Flag hoisting troop (paskibraka)	24 (6.3)	18 (4.6)	42 (5.4)	0.492
Ownership of cell phone				
1. Yes	310 (81.2)	308 (79.2)	618 (80.2)	0.279

* Number of respondents based on those who answer 'yes' to the previous related question.
p<0.05 indicates significant differences between intervention and control schools.

Sedentary activity

Table 7 summarizes students' sedentary activity patterns and sleep duration at baseline and endline, comparing intervention (n=383) and control (n=389) groups. Most students in both groups reported sleeping 8 to 9 hours daily (intervention: 61.5 per cent; control: 65.9 per cent), with only a small proportion sleeping less than 8 hours or more than 10 hours. The distribution of sleep duration did not differ significantly between groups (p=0.284), indicating similar rest patterns regardless of intervention status.

In terms of sedentary activities, the median time spent studying at school was 300 hours in both groups, with a wide range of variation (275–345 hours for intervention and 270–340 hours for control; p=0.859). Time spent using digital devices for entertainment was slightly higher in the intervention group (median: 80 hours vs. 60 hours), although the difference was not statistically significant (p=0.127). Watching television and studying at home followed similar patterns between groups, with no meaningful differences observed.

Overall, the total sedentary time reported was slightly higher in the intervention group (median: 1 050 hours) compared to the control group (1 035 hours), yet this difference was not statistically significant (p=0.304). These findings suggest that the intervention did not produce measurable changes in students' sedentary behaviours or sleep patterns, highlighting the challenge of influencing screen time and inactivity through school-based programs alone.

TABLE 7. Students' practice of sedentary activity at baseline and endline by treatment group

Variables	Intervention (n=383)	Control (n=389)	Total (n=772)	p-value
Duration of sleep a day				
1. <8 hours a day	104 (26.0)	85 (22.8)	189 (24.5)	0.284
2. 8 to 9 hours a day	246 (61.5)	245 (65.9)	491 (63.6)	
3. 10 hours a day	36 (9.0)	24 (6.5)	60 (7.8)	
4. >10 hours a day	14 (3.5)	18 (4.8)	32 (4.1)	
Time spent on sedentary activities				
1. Study at school (hours, rounded up)	300 (270-345)	300 (270-340)	300 (270-345)	0.859
2. Using a cell phone/laptop/ computer for playing games and entertainment	80 (60-120)	60 (60-120)	60 (60-120)	0.127
3. Watching TV	60 (15-90)	60 (10-75)	60 (15-90)	0.533
4. Study at home	60 (60-120)	60 (30-120)	60 (60-160)	0.163
Total time spent on sedentary activities (hours)	1050 (960-1130)	1035 (942-1132)	1040 (950-1130)	0.304

P<0.05 indicates significant differences between intervention and control schools.

Routine body weight and height measurements

Nearly 70 per cent of the students had their body weight measured in the past six months, with no significant difference between the intervention (67.5 per cent) and control (66.9 per cent) groups (p=0.867). Similarly, 52.7 per cent had their height measured, with nearly identical proportions in both groups (p=0.986).

Regarding measurement locations, 29.4 per cent were weighed at school, 15.9 per cent at home, and 2.3 per cent in both locations, with no significant variation between groups (p=0.301). Similarly, for height measurement, 29.8 per cent occurred at school, 8.2 per cent at home, and 1.6 per cent in both locations, again showing no significant differences (p=0.287).

Awareness of measurement results was relatively low (43.1 per cent), with slightly more students in the control group (44.6 per cent) than in the intervention group (41.8 per cent) knowing their weight and height, though the difference was not significant (p=0.166).

TABLE 8. Students' practice of routine body weight and height measurement at baseline and endline by treatment group

Variables	Intervention (n=383)	Control (n=389)	Total (n=772)	p-value
Student's body weight was measured in the past 6 months	270 (67.5) 130 (32.5)	249 (66.9) 123 (33.1)	519 (67.2) 253 (32.8)	0.867
Location of body weight measurement in the last 6 months				
1. At school	116 (29.0)	111 (29.8)	227 (29.4)	0.301
2. At home	69 (17.3)	54 (14.5)	123 (15.9)	
3. At school and at home	13 (3.3)	5 (1.3)	18 (2.3)	
4. Other (please specify)	73 (18.3)	79 (21.2)	152 (19.7)	
Student's height was measured in the past 6 months	211 (52.8)	196 (52.7)	407 (52.7)	0.986
Location of height measurement in the last 6 months				0.287
1. At school	120 (30.0)	110 (29.6)	230 (29.8)	
2. At home	32 (8.0)	31 (8.3)	63 (8.2)	
3. At school and at home	10 (2.5)	2 (.5)	12 (1.6)	
4. Other	53 (13.3)	53 (14.2)	106 (13.7)	
Students knew results of their body weight and height measurement	167 (41.8)	166 (44.6)	333 (43.1)	0.166

P<0.05 indicates significant differences between intervention and control schools.

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