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Nutrition of School-Aged Children: Effects of COVID-19 and Opportunities for Enhancing the Nutrition Focus under UKS/M in Indonesia

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KEMENTERIAN KOORDINATOR BIDANG PEMBANGUNAN MANUSIA DAN KEBUDAYAAN REPUBLIK INDONESIA

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December 2022

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Abbreviations

Bapanas	*Badan Pangan Nasional* (National Food Agency)
BAPPENAS	*Badan Perencanaan Pembangunan Nasional* (Ministry of National Development Planning)
BKKBN	*Badan Kependudukan dan Keluarga Berencana Nasional* (Indonesian National Population and Family Planning Board)
BPOM	*Badan Pengawas Obat dan Makanan* (National Food and Drug Agency)
BRIN	*Badan Riset dan Inovasi Nasional* (National Research and Innovation Agency)
Co-PI	Co-Principal Investigator
Dapodik	*Data Pokok Pendidikan* (Basic Data on Education)
DEO	District Education Office
DHO	District Health Office
EMIS	Education Management Information System
EPPBGM	*Elektronik- Pencatatan dan Pelaporan Gizi Berbasis Masyarakat* (Community Based Electronic Nutritional Status Recording and Reporting)
FGD	focus group discussion
FSVA	Food Security and Vulnerability Atlas
GERMAS	*Gerakan Masyarakat Hidup Sehat* (Healthy Living Community Movement)
IDI	in-depth interview
IEC	information, education and communication
JDIHN	*Jaringan Dokumentasi dan Informasi Hukum Nasional* (National Legal Documentation and Information Network)
K3S	*Kelompok Kerja Kepala Sekolah* (School Principal Working Group)
Kemendikbud	*Kementerian Pendidikan dan Kebudayaan* (Ministry of Education and Culture)
Kemendikbudristek	*Kementerian Pendidikan, Kebudayaan, Riset dan Teknologi* (Ministry of Education, Culture, Research and Technology)
Kemenkes	*Kementerian Kesehatan* (Ministry of Health)
Kemenko PMK	*Kementerian Koordinator Bidang Pembangunan Manusia dan Kebudayaan* (Coordinating Ministry for Human Development and Cultural Affairs)
KIA	*Kesehatan Ibu dan Anak* (Maternal and Child Health)
KSB	*Kampung Siaga Bencana* (Disaster Alert Village)
MCO	movement control order
MIN	*Madrasah Ibtidaiyah Negeri* (public Islamic school)
MIS	*Madrasah Ibtidaiyah Swasta* (private Islamic school)
MoA	Ministry of Agriculture

MoEC	Ministry of Education and Culture
MoECRT	Ministry of Education, Culture, Research and Technology
MoH	Ministry of Health
MoHA	Ministry of Home Affairs
MoRA	Ministry of Religious Affairs
MoSA	Ministry of Social Affairs
MSG	monosodium glutamate
NFDA	National Food and Drug Agency
NSPK	*Norma, Standar, Prosedur dan Kriteria* (norms, standards, procedures and criteria)
P2L	*Pekarangan Pangan Lestari* (Sustainable Food Garden Utilization Programme)
PB	*Peraturan Bersama* (Joint Regulation)
PERBUP	*Peraturan Bupati* (District Regulation)
PERGUB	*Peraturan Gubernur* (Province Regulation)
Permendikbud	*Peraturan Menteri Pendidikan dan Kebudayaan (*Ministry of Education and Culture's Regulation)
PHBS	*Perilaku Hidup Bersih dan Sehat* (Clean and Healthy Lifestyle)
PHC	primary health care centre
PKH	*Program Keluarga Harapan* (Family Hope Programme)
PKK	*Pemberdayaan Kesejahteraan Keluarga* (Family Welfare Empowerment)
PMT	*Pemberian Makanan Tambahan* (supplementary feeding)
Poskestren	*Pos Kesehatan Pesantren* (Health Post for Islamic Boarding School)
PTA	Parent-Teacher Association
RAD	*Rencana Aksi Daerah* (Sub-National Action Plan)
RAN AUSREM	*Rencana Aksi Nasional Anak Usia Sekolah dan Remaja* (National Action Plan for School-Aged Children and Adolescents)
RAN PG	*Rencana Aksi Nasional Pangan dan Gizi* (National Action Plan for Food and Nutrition)
RAN PIJAR	*Rencana Aksi Nasional Peningkatan Kesejahteraan Anak Usia Sekolah dan Remaja* (National Action Plan for Strengthening School-Aged Children and Adolescent Wellbeing)
RISKESDAS	*Riset Kesehatan Dasar* (Basic Health Survey)
RPJMN	*Rencana Pembangunan Jangka Menengah Nasional* (National Medium-Term Development Plan)
SDN	*Sekolah Dasar Negeri* (public elementary school)

SEAMEO RECFON	Southeast Asian Ministers of Education Organization Regional Centre for Food and Nutrition
SEKDA	*Sekretaris Daerah* (District Secretary)
SKB	*Surat Keputusan Bersama* (Joint Decree)
SPM	*Standar Pelayanan Minimal* (Minimum Service Standard)
SPSS	Statistical Package for the Social Sciences
TAGANA	*Taruna Siaga Bencana* (Disaster Preparedness Youth)
TP UKS/M	*Tim Pembina UKS/M* (UKS/M team)
TTD	*Tablet Tambah Darah* (Iron Folic Acid Supplementation)
UKS/M	*Usaha Kesehatan Sekolah/Madrasah* (School Health Programme)
UN	United Nations
UNICEF	United Nations Children's Fund
WASH	water, sanitation and hygiene
WFP	World Food Programme

Executive Summary

Preceding the COVID-19 pandemic, Indonesian children ages 5 to 11 already faced a triple burden of malnutrition. Previous studies suggested an increased risk of malnutrition among school children during the pandemic due to the reduced ability for families to meet nutrient needs, as well as an increased risk of weight gain due to higher consumption of calorie-dense comfort foods and increased "screen time." As schools progressively started to reopen by September 2021, the role of school health programmes (Usaha Kesehatan Sekolah/Madrasah, or UKS/M) was seen as increasingly important for building and maintaining healthy lifestyle habits necessary for quality education and learning outcomes. Therefore, with support from Cargill, the World Food Programme (WFP) contracted the Southeast Asian Ministers of Education Organization Regional Centre for Food and Nutrition (SEAMEO RECFON) to conduct a study on the effects of COVID-19 on the nutrition of school-aged children and the opportunity for enhancing the nutrition focus under UKS/M in Indonesia. The main objective of the study is to identify factors that have had a positive and/or negative impact on the consumption of healthy diets by girls and boys ages 6–12 enrolled in school during the COVID-19 period of school closures and hybrid learning. Specifically, the study aims to: 1) assess the effects of school closures on food consumption patterns, knowledge and practices of school-aged children in Indonesia; 2) identify existing policies and programmes that ensure good dietary practices of school-aged children, as schools started to reopen for face-to face learning; 3) explore the relevance and effectiveness of existing nutrition education interventions for protecting and promoting healthy diets among primary school-aged children in the context of the COVID-19 pandemic; and 4) recommend strategic options and pathways of change that will be catalytic to improved, adaptive UKS/M nutrition education modalities within the context of COVID-19 and other disasters. The study led to recommendations to strengthen the mainstreaming of nutrition education into the UKS/M programme.

Methodology

This study used a mixed-methods approach that included a survey, in-depth interviews (IDIs), focus group discussions (FGDs), field observation and a desk review. Data collection was conducted in three districts (North Lampung, Pasuruan and Kupang) in March 2022. It involved a survey of 660 primary school children in grades 4–6 to track children's understanding of nutrition, their current food consumption and changes to consumption patterns from before the pandemic. The IDIs and FGDs elaborated information on knowledge and attitude towards children's nutrition practices; changes in children's food consumption; supporting factors and barriers for good nutrition practices; implementation of the UKS/M programme; exposure to necessary policies, programmes and guidelines; experiences and reported effective nutrition education activities; and proposed strategies to improve UKS/M, including adoption of nutrition education. The field observation focused on existing facilities and the food environment in and around schools. The desk review focused on relevant government policies, regulations, strategic plans, program guidance and reports that support balanced nutrition practices in school-aged children in Indonesia.

Findings

Objective 1: The effects of school closures on food consumption patterns, knowledge and practices of school-aged children in Indonesia found that more than half of the children surveyed had their food consumption changed during the COVID-19 pandemic. They ate less fruit, red meat/poultry and milk/dairy products. On the other hand, they ate carbohydrates and vegetables more frequently. Factors underlying the change in dietary practices were increased attention to health and nutrition during pandemic, reduced household income, implementation of movement control order and different learning schemes. Consumption of sugary drinks increased during the pandemic; during a one-week recall, almost 40 percent of children surveyed had consumed sugary drinks. Sugary drinks were widely available around schools. In terms of knowledge, the children had insufficient knowledge about specific good dietary practices particularly related to breakfast, food variety and food safety. Children, teachers and parents were not familiar with the concepts of Balanced Nutrition *(Gizi Seimbang)* nor My Plate *(Isi Piringku)*. Teachers and parents had limited knowledge and access to nutrition information, which reduced their ability to support children in good dietary practices.

Objective 2: The existing national policies and programmes that support good dietary practices of school-aged children were available, yet insufficiently addressed food quality, approach and sensitization. Food environment policies focus instead on food safety, sanitation and hygiene. Awareness of the policies, strategies and programmes is low and coordination limited, especially at the sub-national level. A family-based approach to reach school-aged children was still limited. The National Action Plan for Strengthening School-Aged Children and Adolescents Wellbeing (RAN PIJAR) 2022–2024 was found promising, but, as it is still in its infancy, no concrete results were observed. As for UKS/M, it focused on hand-washing during the pandemic with much less about nutrition. Other challenges for UKS/M programme implementation were less supportive food environments at school; inadequate data on dietary practices among school children; lack of access and use of health screening results; and an overall lack of resources, coaching and coordination.

Objective 3: Nutrition education is crucial for protecting and promoting healthy diets among primary school-aged children in the context of the COVID-19 pandemic. This study observed that nutrition education activities were not implemented in a structural manner, but those that were implemented were relevant to the observed gaps in nutrition behaviour of school-age children. Nonetheless, the issue of less healthy food environments in and around schools was not addressed.

Objective 4: The strategic options and pathways of change to adapt nutrition education to current education modalities within the context of COVID-19 and other disasters, as proposed by UKS/M key stakeholders, should prioritize: (a) health screenings and official engagement through heads of districts; (b) raising awareness, sharing lessons learned and coordination; (c) capacity building of all stakeholders; and (d) strengthening monitoring as a way to strengthen the UKS/M programme, including nutrition education. Challenges listed included limited resources and materials, staff turnover, non-mandatory nutrition education, minimal parent engagement and lack of interest of children.

Conclusions and Recommendations

The COVID-19 pandemic triggered changes in children's food consumption. Although there was increased attention to health and nutrition during COVID-19 and more time to eat at home due to different learning schedules, this did not always translate into healthier food consumption. Some of the reasons for this include reduced family income and unfavourable food environments. Moreover, the children, as well as parents and teachers, displayed limited knowledge of good dietary practices.

Although regulations and programmes to improve children's nutritional status exist, in practice they do not actually produce positive effects because they are insufficiently implemented, monitored and evaluated. Schools and parents were aware of what factors were needed for nutrition education activities to be effective, and while some activities have been implemented, they were very limited and less structured than intended. Some strategies were proposed by the UKS/M stakeholders to improve nutrition education, including prioritization for school-aged children, capacity building, awareness raising and strengthening program monitoring. The results indicated the need to strengthen existing policies and programmes to support school-aged children in implementing good dietary practices.

The recommendations from this study are:

1. **Ensure that the food environment in and around schools is healthy,** by enhancing knowledge and skills of food vendors and strengthening the assessment and monitoring of food sold by vendors by including indicators for both nutritional value and food safety of the items they sell to children.
2. **Increase access to affordable nutritious foods for school-aged children,** especially among the most vulnerable families through the existing social safety net programmes, including increasing programme beneficiaries' awareness of nutritious foods.
3. **Support existing national policy frameworks** by issuance of sub-national policies and regulations to gain better commitment, including financial and human resource allocation.
4. **Establish a UKS/M information system,** to enable sharing of information and good practices related to policies, programme guidelines and learning materials for all UKS/M stakeholders at the sub-national level.
5. **Strengthen UKS/M programme monitoring and evaluation** by conducting individual level assessments (nutritional status and dietary practices of school-aged children) and institutional-level assessments (UKS/M stratification).
6. **Integrate dietary practices of school-aged children into the existing health screening tools** as part of nutrition surveillance and analyse these to inform national and sub-national nutritional programme planning development.
7. **Improve awareness, capacity building, mentoring and access to nutrition information** for district stakeholders, schools and parents, to improve their nutrition knowledge and skills in facilitating nutrition education for school-aged children.
8. **Strengthen the role of Parent-Teacher Associations (PTAs) in nutrition education activities in schools** to promote healthy diet among primary school-aged children.

I. Background

The COVID-19 pandemic has affected global health and economic and livelihood conditions, and is estimated to increase the risk of all forms of malnutrition (Headey et al., 2020). Food insecurity, poor-quality diets, reduced income, limited financial resources, limited care-restricted health services, interrupted education and unhealthy household environments have been risk factors for undernutrition (Akseer et al., 2020). Particularly in low- and middle-income countries, the increased risk of malnutrition for school-aged children further aggravates the impact of the pandemic on their education and social development.

Preceding COVID-19, Indonesian children ages 5 to 11 already faced a triple burden of malnutrition,[1] and Indonesia has not been spared from the effects of the pandemic. Schools in Indonesia closed in March 2020 and partial reopening started only in the third quarter of 2021. Reopening strategies varied per geographical location, based on the local incidence of COVID-19 and schools' abilities to ensure safety and tracing measures.

A recent UNICEF study in Indonesia found that nearly 75 percent of parents were concerned about learning loss resulting from prolonged school closures (UNICEF, 2022). Furthermore, nearly 90 percent of respondents reported a decline in income, affecting their family's ability to meet nutrient needs (Wahana Visi Indonesia, 2020). Increasing out-of-school time due to the school closures was associated with higher risk of weight gain due to higher consumption of calorie-dense comfort foods (Rundle et al., 2020). In addition, many parents reported that their children had replaced physical activity with more "screen time."

As schools progressively started to reopen by September 2021, technical guidelines and safety protocols are being reconsidered. All learning materials and teaching methodologies, including those for nutrition, are being adapted to the "new normal." For example, the Ministry of Education, Culture, Research and Technology (MoECRT)[2] along with other ministries and development partners developed a set of guidelines for school reopening, which included guidance on balanced nutrition and healthy school canteens. The guidelines highlight the need for school children to eat a healthy breakfast every day, have adequate physical activity and practice *Pola Hidup Bersih dan Sehat* (a clean and healthy lifestyle), including hand-washing with soap.

In Indonesia, health-related school programmes are part of the *Usaha Kesehatan Sekolah/Madrasah* (UKS/M), which aims to develop healthy lifestyle habits among school communities to improve the quality of education and learning outcomes. UKS/M's role is seen as increasingly important when schools reopen. Therefore, with funding support from CARGILL, the World Food Programme (WFP) contracted the Southeast Asian Ministers of Education Organization Regional Centre for Food and Nutrition (SEAMEO RECFON) to conduct a study on the effects of COVID-19 on the nutrition of school-aged children and the opportunity for enhancing the nutrition focus under UKS/M in Indonesia. The study will help formulate recommendations to strengthen the mainstreaming of nutrition education into UKS/M.

1 Based on RISKESDAS 2018, the triple burden of malnutrition comprises undernutrition (23.6 percent stunting and 9.2 percent wasting), overnutrition (10.8 percent overweight and 9.2 percent obesity) and micronutrient deficiencies (26.8 percent anaemia).

2 The Ministry of Education, Culture, Research and Technology (MoECRT) was established in April 2021, as a merger between the Ministry of Education and Culture (MoEC) and the Ministry of Research and Technology (MoRT).

II. Objectives

This study aims to identify factors that have had a positive and/or negative impact on the consumption of healthy diets by girls and boys (6–12 years) enrolled in school during the COVID-19 period of school closures and hybrid learning.

The specific objectives of this study were to:

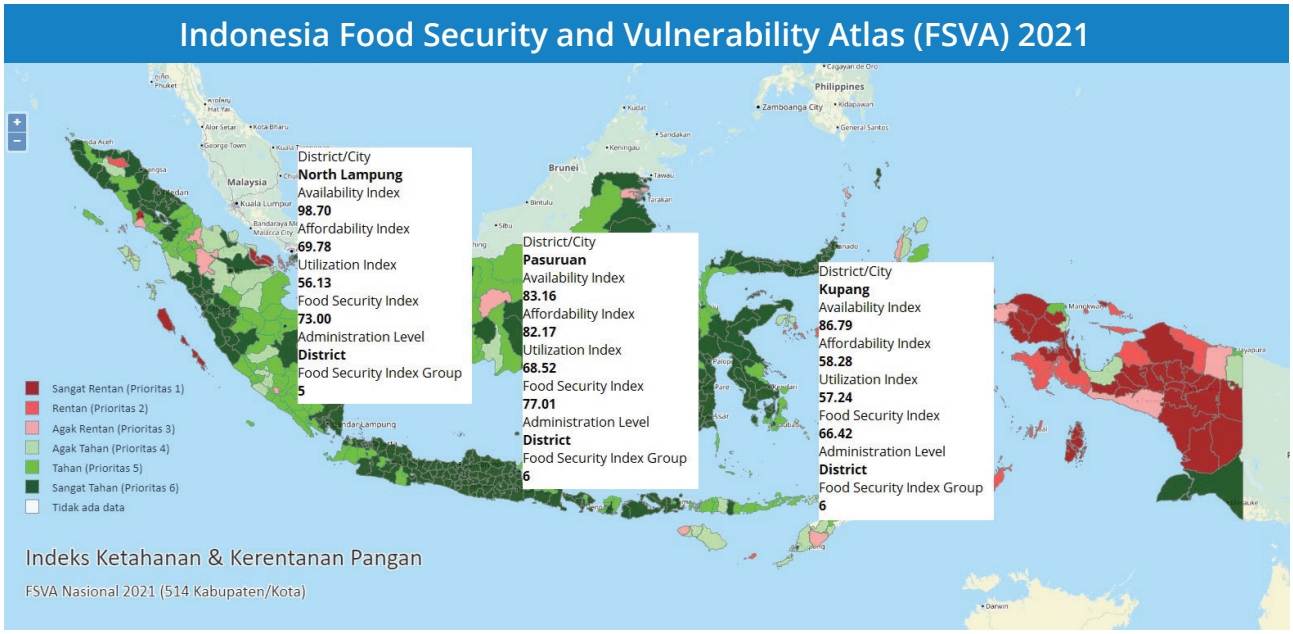
1. Assess the effects of school closures on food consumption patterns, knowledge and practices of school-aged children in Indonesia;
2. Identify existing policies and programmes that ensure good dietary practices of school-aged children, as schools started to reopen for face-to face learning;
3. Explore the relevance and effectiveness of existing nutrition education interventions for protecting and promoting healthy diets among primary school-aged children in the context of the COVID-19 pandemic; and
4. Recommend strategic options and pathways of change that will be catalytic to improved, adaptive UKS/M nutrition education modalities within the context of COVID-19 and other disasters.

III. Methods

This study used a mixed qualitative and quantitative approach. The qualitative approach included key in-depth interviews (IDIs), focus group discussions (FGDs), field observations and desk reviews. Quantitative data collection was done through a survey among primary school children. Results and recommendations were validated through a consultation meeting with relevant ministries and government agencies.

Study Area

Data collection was conducted from 23–30 March 2022 in North Lampung (Lampung), Pasuruan (East Java) and Kupang District (East Nusa Tenggara), and the desk reviews and IDIs with national stakeholders were done from April–July 2022. During data collection, the majority of schools applied face-to-face learning, taking measures as per the 2021 Joint Decree of the MoECRT, the Ministry of Health (MoH), the Ministry of Religious Affairs (MoRA), and the Ministry of Home Affairs (MoHA) on Face-to-Face Learning. Geographical selection was based on pre-pandemic nutrition indicators (stunting, obesity and anaemia of primary school-aged children) and the food security status of the districts. In addition, the three districts represented western, central and eastern parts of Indonesia.



Source: Badan Ketahanan Pangan (2021)

Figure 1. Food Security Index 2021 of the study sites

As presented in Figure 1, the Indonesia Food Security and Vulnerability Atlas (FSVA) shows that Pasuruan had the highest food security index score (77.01) among the three selected districts (Badan Ketahanan Pangan, 2021). A higher score indicates better food security conditions. Pasuruan also had a higher affordability index score (82.17) compared to North Lampung (69.78) and Kupang (58.28), suggesting more community members were able to afford food resulting from a lower proportion of the population living below the poverty line, a lower percentage of households with food expenditure above 65 percent of total household income and a higher percentage of households with access to electricity.

Respondents

The respondents were students (girls and boys) in grades 4–6, school principals, homeroom teachers (that is, a teacher who is assigned to manage a class of students in terms of their learning process and character building), UKS/M teachers, parents (mothers and fathers), PTA members, local education officers, health officers, religious officers, district secretary officers and district food security officers. In addition, national-level staff from the School/Madrasah Health Programme Team (TP UKS/M) and relevant ministries or government agencies also participated in the study. The study pursued gender balance among respondents and enumerators.

Sample Size and Sampling Procedures

Sample Size

For the quantitative survey among primary school children, the sample size was calculated based on the formula from Lemeshow et al. (1997) as follows:

$$n = \frac{z_1^2 - \alpha/2\, P(1-P)}{d^2}$$

Where:
z is the z score 95%
d is the margin of error 5%
P is the population proportion 50%

Population proportion was assumed as 50 percent, as it yields the highest sample size. A 95 percent confidence interval, precision of 5 percent, design effect of 1.5 and 10 percent non-response rate were used and resulted in a total number of subjects needed of 635 (211–212 subjects per district). However, for practicality reasons, the study included a total of 660 subjects (220 subjects per district) to allow recruitment of 22 subjects with a balanced number of boys and girls in each participating school.

Sampling Procedure

The number of *Sekolah Dasar Negeri* (SDN, public elementary schools) and *Madrasah Ibtidaiyah Negeri/ Swasta* (MIN/MIS, public/private Islamic schools) included in this study was proportional, referring to numbers of total SDNs and MIN/MIS in urban and rural areas in the respective districts (Annex 1). The selection of schools and students is outlined in Figure 2.

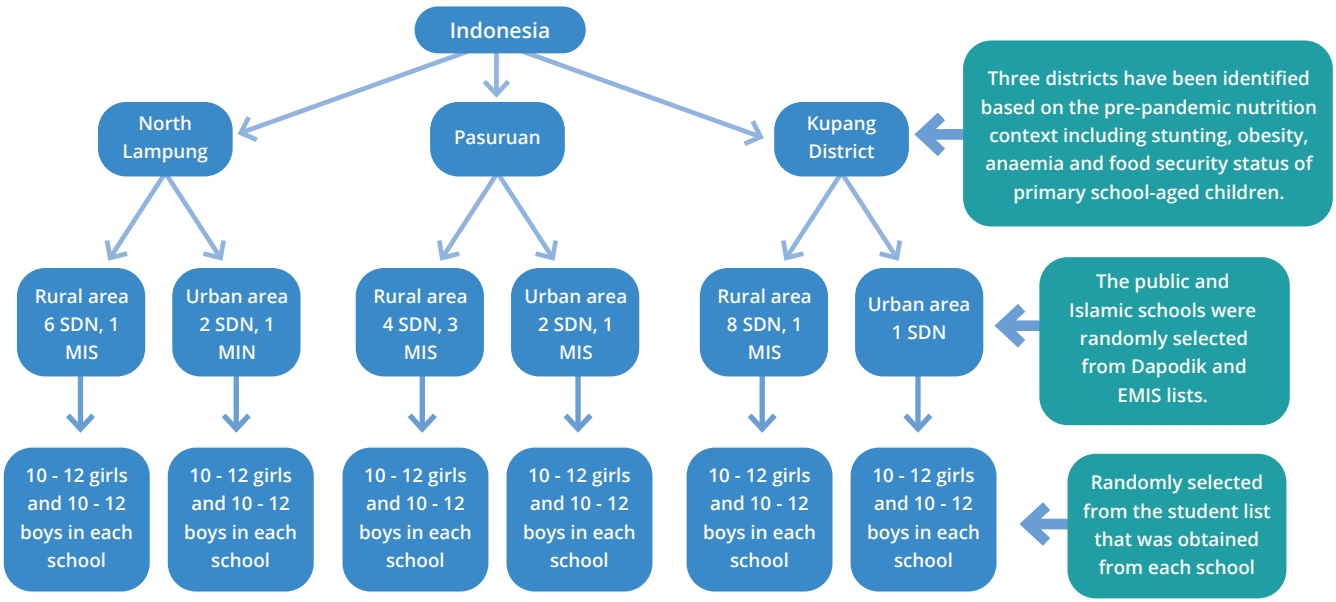


Figure 2. Sampling procedure

In each district, the SDNs and MIN/MIS were randomly selected from the *Data Pokok Pendidikan/ Dapodik* (Basic Data on Education) managed by MoECRT and Education Management Information System (EMIS) managed by MoRA, respectively (accessed in March 2022). In total, there were 30 SDNs and MIN/MIS (10 schools per district) included in this study.

Qualitative Approaches

In each district, the schools with similar characteristics were represented by one or two schools. Therefore, except for FGDs among UKS/M teachers, not all schools from the quantitative assessment were included in the qualitative assessment.

Informants and FGD participants were selected in coordination with the respective schools, taking into consideration several characteristics such as residence type (urban and rural), school type (SDN and MI), gender (boy/girl, man/woman), grade (4/5/6, when relevant) and mother's employment status (working/not working). During data collection, the District Secretary (SEKDA) of Pasuruan District refused to join the study since there had not been anyone in charge of UKS/M for a year.

At the national level, IDIs were conducted with representatives of the national-level TP UKS/M. In addition, representatives from other relevant ministries and government agencies were included, such as the Ministry of National Development Planning (Bappenas), the Indonesian National Population and Family Planning Board (BKKBN), the Ministry of Social Affairs (Kemensos), Coordinating Ministry for Human Development and Cultural Affairs (Kemenko PMK), National Food Agency (Bapanas) and the National Food and Drug Agency (BPOM). Table 1 summarizes the total number of subjects/ informants included in the study by data collection method.

Table 1. Total number of subjects/informants, by data collection method

Data Collection Methods and Respondents/Informants	Number
Quantitative: survey among children grades 4–6	660 students (30 SDN and MIN/MIS)
Qualitative: In-depth interview (IDI)	
• TP UKS/M at the district level: District Education Office (DEO), District Health Office (DHO), District MoRA (SEKDA) and Food Security Office (3–4 informants per district)	13
• Primary health care centre (PHC)tstaff for UKS/Mt programme (1 urban and 1 rural PHC per district)	6
• School/madrasah principals (4 informants per district)	12
• Parents (4 mothers and 4 fathers per district)	24
• Students*	2
• National-level TP UKS/M and relevant ministries	12
Qualitative: Focus Group Discussions (FGDs)	
• Students grades 4–6 (4–5 FGDs per district)	13 FGDs
• Homeroom teachers of grades 4–6 (2 FGDs per district)	6 FGDs
• UKS/M teachers (1 FGD per district)	3 FGDs
• Parent-Teacher Association (PTA) (2 FGDs per district)	6 FGDs
Qualitative: School/madrasah environments observed, with regards to nutrition and health practice facilities	30 schools

* The schools were quite far from the FGD venue, so students were therefore interviewed in-depth.

Data Collected in the Study

Table 2. Summary of the data collected

Respondent	Data collected
Students grades 4–6	• Knowledge of and attitude on balanced nutrition • Food consumption practices for the past week • Reported changes of balanced nutrition practices during the pandemic • Reported supporting factors and barriers
Parents, PTA, homeroom teachers, UKS/M teachers	• Knowledge of balanced nutrition and source of information • Reported changes of balanced nutrition practices for children during COVID-19 pandemic, supporting factors and barriers • Attitude (reported needs to improve children's balanced nutrition practices, reported roles and readiness to contribute) • Experiences and reported effective nutrition education activities • Relevant facilities, exposure to necessary policies/programmes/guidelines (PTA and teachers only) • Coping strategy during the COVID-19 pandemic (parents only)
District TP UKS/M, food security staff	• Exposure to necessary policies/programmes supporting balanced nutrition practices for school children • Opinion about UKS/M programme implementation, reported challenges and opportunities (TP UKS/M only) • Reported relevance and effectiveness of the existing nutrition education activities • Attitude (perceived needs to improve children's balanced nutrition practices, perceived roles and readiness to contribute) • Innovations made during the pandemic
Four ministries directly in-charge for UKS/M programme (MoECRT, MoH, MoRA and MoHA)	• UKS/M policies and awareness of those policies • Opinion about UKS/M performance during the COVID-19 pandemic, barriers and opportunities • Perceived readiness of TP UKS/M at district level • Specific support for district TP UKS/M to promote balanced nutrition practices among school-aged children
Other relevant ministries/ government agencies	• Policies/programmes led by respective ministries/agencies and how those policies/programmes support balanced nutrition practices among elementary school children, barriers and opportunities • Ideas for policies/programmes in the near future given the COVID-19 pandemic situation

Before data collection in early March 2022, a consultation meeting was held with MoH, MoECRT, MoRA, Ministry of Agriculture (MoA) and MoHA, to gain input about the study tools, including the questionnaire, FGD and IDI guides and list of observations. See Annex 2.

Data Collection Procedures

Face-to-face data collection was carried out in accordance with the COVID-19 health protocols issued by national and local governments. Before data collection, the area coordinator in each district visited the selected schools to obtain approval from the schools to join this study, do sampling to select the children (main and additional subjects) and explain "informed consent" to parents of the selected subjects. This mechanism was used to give the school sufficient time to inform the students as well as their parents. Additional subjects were selected in case the main subjects refused or were not allowed to participate.

Before data collection, the survey questionnaire was field trialled, involving 10 children grades 4–6 in each district. The objectives were to (1) check the understanding of the questions (and revise the questionnaire accordingly), and (2) check the reliability of the knowledge and attitude set of questions (and revise them accordingly to obtain acceptable reliability). In addition, a field trial of the qualitative approach was done with parents and UKS/M teachers in an online interview. The data collection procedures are summarized in Table 3.

Table 3. Data collection procedures

	Method and Tools	Notes
Quantitative survey	Face-to-face interview by trained enumerator using a pre-tested questionnaire	Conducted at school with agreed-upon schedule, 30 minutes each
Qualitative approach	• IDIs and FGDs (face-to-face in the three districts and online via zoom meeting for national-level informants) • Guided by a trained moderator/IDI interviewer using a pre-tested guide question, assisted by a note-taker	• Conducted at school/office/home or online with agreed schedule, 60–90 minutes each • Each FGD was attended by 8–10 participants. • Written consent from respondents was obtained before starting the FGD/IDI.
Desk reviews	The review focused on relevant government policies/regulations/guidance as well as reports from relevant government agencies that support balanced nutrition practices in school-aged children in Indonesia.	Main sources of information were *Jaringan Dokumentasi dan Informasi Hukum Nasional* (JDIHN, or the National Legal Documentation and Information Network) database,[3] references shared by the IDI participants and published documents on the websites of UN Agencies and nongovernmental organizations.
Field observation	• Direct observation using an observation list (Annex 2) • Observations focused on food vendors/ sellers around the schools; information, education and communication (IEC) materials on nutrition; and facilities for WASH and physical activity.	• The data are about availability and condition of the vendors/facilities. • Observations about school canteens were not feasible in the majority of schools because canteens were closed following the face-to-face learning regulation.

3 Khazanah Dokumen Hukum Indonesia 2022. Accessed April-May 2022. Available from: https://jdihn.go.id/

Data Analysis

Survey

Data entry, cleaning and statistical analysis were done using Statistical Package for the Social Sciences (SPSS) for Windows Version 27.0. Double-checking on missing data, extreme values and consistency were performed to ensure data entry was accurate and valid. Tests for normality distribution were conducted using Kolmogorov-Smirnov, with $p>0.05$ indicating normally distributed data.

Descriptive data were analysed using a univariate test. Continued data were presented using mean and median depending on the normality of data, and categorical data was presented in the form of frequency and percentage. Bivariate analysis was conducted using a t-test or Kruskal-Wallis test (for continuous data) or chi-square test (for categorical data) to determine the association between gender/type of residence/district/grade and students' knowledge, attitude and practice on food consumption, physical activity and personal hygiene (Dahlan, 2015).

FGDs and IDIs

The analysis was done in two stages: in-the-field analysis and at-the-desk analysis.

- In-the-field analysis. A summary of responses from each informant was put into a matrix (one matrix for each type of respondent/informant). The goal was to check data completeness (including sufficient exploration) and to have preliminary findings of the most important issues (including preliminary patterns in terms of similarities and differences).
- At-the-desk analysis. The focus was to verify information in the summary matrix and have a more detailed explanation on the findings and preliminary pattern. Verification was done and more detailed information was obtained by reading the transcripts of the FGDs and IDIs.

Consultation Meeting on Preliminary Findings

The consultation meeting was held on 7 July 2022, via a video conference platform. The meeting was hosted by SEAMEO RECFON and WFP, and attended by representatives from MoECRT, Bappenas, MoH, MoHA and MoRA. The participants acknowledged the preliminary findings and provided their reactions to the findings and recommendations, which were largely positive.

Ethical Approval and Local Authorities Permit

Ethical clearance for this study was obtained from the Ethical Committee Faculty of Medicine Universitas Indonesia on 21 March 2022, Number KET.278/UN2.F1/ETIK/PPM.00.02/2022 (Annex 3). Before asking for respondents' written consent to participate in the study, they received information about the study (objective, procedures and their rights). The identity of the informant was kept confidential and was only used for the purpose of this study. For the students, consent was given by one of their parents or caregivers. A student's approval (assent) was obtained before the start of an interview (small-scale survey) or FGD. In addition, approval from the district government offices and schools was obtained before the data collection was carried out.

IV. Findings

Characteristics of the Respondents

The quantitative survey included 660 school children with a median age of 11 years, mainly from rural areas, considering the higher proportion of schools in rural than urban areas in the three study sites. The study aimed at gender balance among respondents, so 49 percent were boys and 51 percent girls. Approximately 85 percent of the primary caregivers were mothers (85.6 percent), with a median age of 39 years (Table 4). The majority of parents in North Lampung were Javanese and Lampung, in Pasuruan Javanese, and in Kupang Timorese.

Table 4. Socio-demographic characteristics of the respondents

Characteristics (N= 660)	n (%)/ Median (25th, 75th)				p-value[1]
	All districts	Lampung Utara	Pasuruan	Kupang	
Sex					0.801
Boy	324 (49.1)	113 (50.9)	108 (48.0)	103 (48.4)	
Girl	336 (50.9)	109 (49.1)	117 (52.0)	110 (51.6)	
School Area Rural	505 (76.5)	156 (70.3)	158 (70.2)	191 (89.7)	<0.001*
Grade					0.032*
Grade 4	197 (29.8)	73 (32.9)	67 (29.8)	57 (26.8)	
Grade 5	232 (35.2)	60 (27.0)	89 (39.6)	83 (39.0)	
Grade 6	231 (35.0)	89 (40.1)	69 (30.7)	73 (34.3)	
Children Age[2]	11.16 (10.5, 11.9)	11.16 (10.3, 11.9)	11.16 (10.6, 11.9)	11.25 (10.5, 12.0)	0.996
Main Caregiver					0.256
Mother	565 (85.6)	187 (84.6)	201 (89.3)	177 (83.1)	
Grandmother	47 (7.1)	17 (7.7)	11 (4.9)	19 (8.9)	
Others (Father, Grandfather, Aunt, Sibling)	44 (6.3)	17 (7.7)	13 (5.8)	17 (8.0)	
Number of siblings[2]	2 (1,3)	2 (1,2)	1 (1,2)	3 (2,4)	<0.001*

[1]Chi Square Test. [2]Kruskal-Wallis H test. *Significantly different

At the time of data collection, most children were physically in school, following COVID-19 protocols. At a sub-national level, there were several levels of movement control orders (MCO) for the COVID- 19 pandemic. The national regulation on the learning schemes and implementation of those schemes in the participating schools are illustrated in Table 5 (details in Annex 4).

Table 5. Learning scheme implementation during the COVID-19 pandemic in the study sites

	2020	2021	2022
Regulation	• Distance learning, no national exam • Child health and safety prioritized	Intermittent face-to-face learning allowed following strict procedures	Joint Decision of the 4 Ministers 2021: • Face-to-face learning allowed and adapted considering the MCO level and vaccination status • Students were encouraged to have breakfast before school, bring food and water from home, and consume a balanced diet.
Implementation	• Online: WhatsApp group (WAG), Zoom • Offline: Teachers' weekly home visits, in-person assignment submission, small group face-to-face learning • Hybrid: online via WAG/ Zoom and offline	Hybrid: online via WAG/ Zoom and offline learning by assignments submission at school, 50 percent face-to-face learning for some weeks, and occasional home visits by teachers	Offline: • 50 percent face-to-face learning in batches with/without assignments via WAG • 100 percent face-to-face learning (grades 4–6 have longer learning hours)

In this study, all informants preferred face-to-face over distance learning. The children preferred face-to-face learning because they could meet friends at school, receive pocket money and better understand the subjects. School staff and parents found that distance learning did not allow achieving learning objectives and lowered children's learning performance. The teachers and school principal found that conveying nutrition messages and building children's character and habits required a personal approach, which could only be reached through face-to-face sessions.

> *"We must meet directly [face-to-face] with the children. We talk about something else first, then we can ask about their breakfast habit, for example. Then we give motivation to take it [breakfast], give explanation that breakfast is important. We cannot do this online. This is similar to asking about other habits. It should be in a relaxing situation. And as direct chat."* —School Principal, North Lampung (urban)

The section below presents the study findings according to the study objectives. Within each study objective, two to three key findings were identified and displayed in a separate box for easier identification.

Objective 1

To assess effects of school closures on food consumption patterns, knowledge and practices of school-aged children in Indonesia

Key Finding 1: The COVID-19 pandemic triggered increased frequency of children's carbohydrate and vegetable consumption, and decreased frequency of animal-source foods and fruit consumption.

- The frequency of most children's consumption of vegetables, beans/legumes, fruit, red meat/poultry, eggs and milk/dairy products was well below recommendations for a healthy diet. Carbohydrates, on the other hand, were eaten on a daily basis by almost all.
- More than half of the children reported that their food consumption had changed during COVID-19. They less frequently consumed fruit and animal-source food, often because of income decrease. On the other hand, they more frequently consumed carbohydrates and vegetables. Overall, the diet of the children was less diverse, potentially causing a higher risk of micronutrient deficiency.
- Factors underlying the change in dietary practices were increased attention to health and nutrition during the pandemic, reduced household income, implementation of movement control orders and different learning schemes.

Perceived Changes in Children's Food Consumption during the Pandemic

Survey participants were asked about their food consumption during the past week, and 50–70 percent of children consumed fruit, animal-source protein and beans/legumes 1–3 days per week. Nearly all children (95.5 percent) consumed a source of carbohydrate 4–7 days per week. Similarly, 51.1 percent of children consumed vegetables 4–7 days per week. Approximately, one-fourth of the children never consumed fruit (23 percent), red meat/poultry (22.6 percent) and milk/dairy product (27.7 percent) (Annex 5).

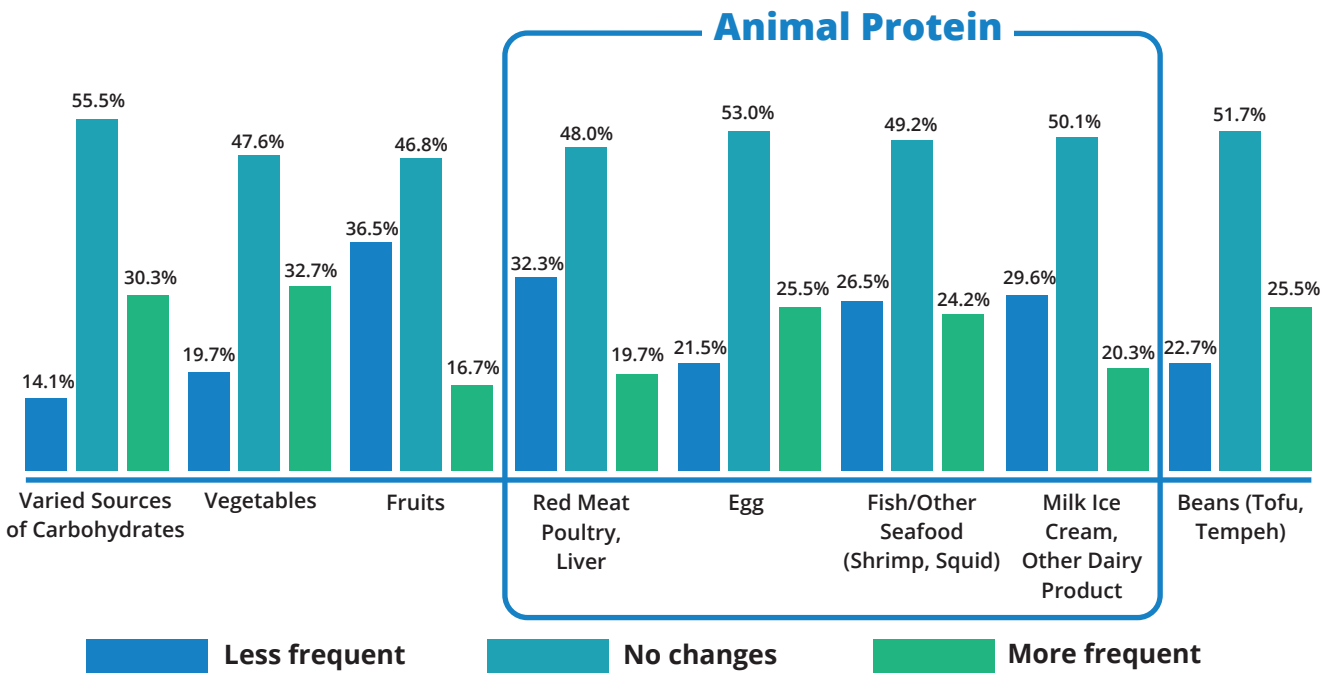


Figure 3. Changes in food consumption during the pandemic, as reported by children

More than half of the children reported that their food consumption had changed during the pandemic, but not always with a clear direction. For some food groups, higher and lower consumption were reported almost equally: eggs (25.5 percent vs 21.5 percent), fish/seafood (24.5 percent vs 26.5 percent) and beans/legumes (25.5 percent vs 22.7 percent). Vegetables were consumed more often (32.7 percent of children consumed more, 19.7 percent less) as well as carbohydrate sources (30.3 percent vs 14.1 percent). Fruit was reportedly eaten less frequently (36.5 percent less, 16.7 percent more). Figure 3 provides the full details. In addition, nearly 30 percent of children perceived that they had consumed breakfast more frequently, and 42.7 percent drank water more frequently during the pandemic.

Children in urban areas reported more significant changes in food consumption than those in rural areas, with 62 percent of urban children reporting that their vegetable consumption had changed during the pandemic, against 49.5 percent in rural areas. Similarly, 58.8 percent urban and 49.9 percent rural children reported changes in their red meat/poultry consumption, and 58.7 percent urban and 47.2 percent rural children reported changes in their milk/dairy product consumption (Annex 6).

Urban children's experience of bigger changes may have been caused by higher exposure to information about the corona virus, stricter protocols and fear of going outside. When it comes to vegetables, the difference could be related to the practices of rural populations to use or consume whatever is available around them. Vegetables, for instance, are planted by many families in rural areas in their garden:

> *"Vegetables such as sweet potato leaves, we just take them from the field. We mix them with papaya leaves, banana blossoms, and papaya flowers. In its season, we plant 'sawi [pakcoy]'. [And we] consume it. Now, it is moringa, moringa leaves. [We] always consume vegetables. Whenever I give it to her [my daughter], she eats it."* —Mother, Kupang (rural)

Urban parents however also experienced positive changes in vegetable consumption, since they were able to do home gardening more frequently during the pandemic. In addition, all parents believed vegetables are good for health, which was often prioritised during the pandemic.

> *"She [my daughter] consumed vegetables more frequently now. And more varied. Green vegetables, especially. Moringa leaves, spinach, water spinach. I give moringa leaves more during the pandemic. It is good for health."* —Mother, Pasuruan (urban)

Parents in rural areas shared that consumption of certain food types had been low even before the pandemic due to lack of purchasing power, which worsened during the pandemic, but less severely than in urban areas.

> *"Those foods [eggs, meats and fish] are rarely given. Not only during the pandemic. Sometimes, we buy one egg and give that when she [my daughter] cries asking for it. [Daily] just vegetables and rice."* —Mother, Kupang (rural)

Difficult access to the market and reduced household income prevented most parents from providing a variety of animal protein for the family during the pandemic.

> *"There are changes which came with the pandemic. We rarely consume them [animal-source protein foods] because we are afraid to go to the market to buy them."* —Mother, Kupang (urban)

Triggering Factors for Changes in Food Consumption

Information from the FGDs and IDIs indicates that there were four main factors that triggered changes of food consumption among children during the pandemic.

1. **Increased attention to nutrition and health:** The pandemic created momentum towards healthier eating practices. Parents indicated that they found being healthy important during the pandemic. This included compliance with health protocols, getting COVID-19 vaccinations and improving the immune system by eating well. Parents elaborated that they paid more attention to the quantity and diversity of food consumed by their children. They ensured that their children consumed vegetables more often in terms of amount and variety and ate breakfast.

   > *"Since corona, [my child] must take breakfast. Sometimes she has porridge in the morning and rice or corn in the afternoon. Sometimes she has it [breakfast] with tea, sweet potato, and banana. Before [the pandemic], sometimes she did not have breakfast. Now, she must."* —Mother, Kupang (rural)

2. **Reduced household income.** Some parents reported that the decrease in income made some food items less affordable, leading to a lower variety available for consumption. The survey showed a decrease in consumption of animal-source foods (specifically red meat/poultry and milk/dairy products) among 26–32 percent of children. The consumption shifted to more affordable animal protein (egg) or plant protein (tofu and tempeh). Moreover, some families could not afford to have any protein-source foods at all and thus relied on rice and vegetables or instant noodles.

   > *"One of the parents works as a construction labourer. During the pandemic, he has much fewer jobs. They even have to rely on instant noodles for the whole family. Nothing else. Some of them [students' families] are like that."* —PTA member, North Lampung (rural)

   Parents specifically related the more frequent consumption or larger portions of carbohydrate-source foods during the pandemic to income reduction.

   > *"We buy fewer foods. We have a garden, right. So, if we don't have money, we consume corn. We have cassava too. I usually cook rice and corn. If she [my daughter] wants to have more, then she can have corn."* —Mother, Kupang (rural)

3. **Implementation of a movement control order (MCO).** Physical access to food was disrupted due to the national MCO, especially during the early pandemic and when COVID-19 cases peaked. Parents could not go to the market and rarely had fresh fruit at home. They had to rely on affordable and practical foods with a long shelf life, such as instant noodles.

4. **Different learning schemes and face-to-face learning regulations.** Nearly 30 percent of the children reported that they had breakfast more frequently during the pandemic. The two different learning schemes (that is, distance learning and face-to-face learning) affected students' breakfast patterns. During distance learning, children had more time to get ready in the morning, often allowing for breakfast. During face-to-face learning, parents have to make more efforts to comply with the government regulation that recommended the children to have breakfast before school. Moreover, the children felt that they needed to be more focused when they study at school compared to at home.

> *"Before the pandemic, breakfast had to be at 6 am. Otherwise, we would be late. [I] often skipped breakfast. During the pandemic, [I have breakfast] at seven because we won't be late."* —Female student, Pasuruan (urban)

Nonetheless, despite more time being available, some parents shared that distance learning made some of the children less disciplined due to the 'loose schedule,' leading to skipping breakfast.

> *"When they study at school, they wake up early and have breakfast. During distance learning, they wake up late, at 9:00 or 10:00, because they don't go anywhere. They then skip breakfast. It [breakfast] becomes less regular. They eat when they feel hungry only."* —Father, Pasuruan (urban)

Coping Strategies to Maintain Quality of Children's Food Consumption

To ensure their families stayed healthy during the pandemic, parents made strategies to provide nutritious foods despite income loss, including prioritising children's food consumption in the household expenditure.

> *"We make efforts to provide vegetables and simple dishes. The expenses other than foods are reduced. Foods for the children are prioritised to stay healthy."* —Father, North Lampung (urban)

Urban parents also took the initiative to plant vegetables at home, especially green leafy vegetables, which provided a higher variety of vegetables for family consumption.

Reasons for not Changing Food Consumption during the Pandemic

Around 50 percent of the children reported that they still followed a similar food consumption pattern. The main reason for this was that practices had been part of the children's habit, which was related to children's preferences, compliance with the parents' rules as well as food availability (Table 6).

Table 6. Food consumption habits that remained the same during the pandemic and reasons why

Food Groups	Proportion of Children Who Kept the Same Consumption Pattern*	Consumption Pattern during Pandemic as Compared to Before Pandemic	Perceived Reasons for Maintaining Consumption Pattern
Fruit	46.8%	Remained rare	Rarely available at home (rarely bought, children's favourite fruit was seasonal such as mango, rambutan, longan)
		Remained frequent	Had papaya and banana fruit trees in the garden

Food Groups	Proportion of Children Who Kept the Same Consumption Pattern*	Consumption Pattern during Pandemic as Compared to Before Pandemic	Perceived Reasons for Maintaining Consumption Pattern
Vegetable	47.6%	Remained rare	Children did not like the taste
		Remained irregular	Depended on availability at home
		Remained frequent	Told by parents, always available at every mealtime
Protein-sourced food	48.0-53.0%	Remained frequent (every meal) with often similar menu (mostly egg, tempeh, tofu; sometimes fish, chicken)	Always available at every mealtime
Main Meal		**No Changes**	**Reasons**
Meal frequency in a day and portion size		Remained 2-3x in a day	Got used to it, told by parents
		Remained irregular (for portion size)	Depended on menu (the children ate more if they liked the meal)
Main Meal		**No Changes**	**Reasons**
Breakfast	53.2%	Remained rare	Was not used to consuming regular breakfast, had stomach-ache after it, rush to go to school, not hungry in the morning
		Remained regular (every day)	Got used to regular breakfast, told by parents

*The percentages refer to results from the quantitative survey.

Supporting Factors and Barriers to Good Dietary Practices

Children who reported following the recommended practices—including, for example, daily breakfast, consumption of fruit and vegetables, water intake—stated that the supporting factors were a) availability of the meal/foods at home, b) guidance from parents and/or teachers and c) their own preferences. Children who did not follow the recommended practices did so because they did not get used to it, or the type of food was not available (Table 7).

Table 7. Supporting factors and barriers for good dietary practices

Healthy Diet Practices	Supporting Factors	Barriers
Daily breakfast	Availability (meal is provided at home or brought to school), told by parents and/or teacher, good experience having meal together at school	Did not get used to (did not feel hungry, lack of time, did not like eating in the morning)
Consume fruit every day	Availability, told by parents	Unavailability
Consume vegetables every mealtime	Availability, told by parents	Unavailability, children's food preference (did not like taste)
Drink at least 7–8 glasses of water per day	Perceived needs, children's preference (feel fresh), availability/ easy access	No perceived need to drink that much (did not feel thirsty that often)

Key Finding 2: During the pandemic, there was (relatively) high consumption of less healthy food items and beverages among school-aged children.

- Compared to before COVID-19, consumption of sugary drinks by children reportedly went up but consumption of salty snacks and noodles decreased. Still, consumption of all unhealthy snacks was high: in a one-week recall, almost 40 percent of children consumed sugary drinks and around 25 percent consumed salty snacks 4–7 days per week.
- Children who bought more snacks did so because they felt bored or were influenced by their peers. They were able to buy these snacks because such food is widely available around schools and parents had given them money, although typically the money was meant to buy breakfast.

Perceived Changes in the Consumption of Less Healthy Foods

One message for balanced nutrition is to limit consumption of sweet/salty/fatty food items. Instant noodles are seen as unhealthy, because of their high sodium content. Survey results show:

- Nearly 40 percent of children consumed sugary drinks 4–7 days per week, and only 9.4 percent reported that they "never consumed" sugary drinks over the past one week.
- Around 25 percent of children consumed salty chips 4–7 days per week.
- Nearly 20 percent of children consumed instant noodles 4–7 days per week, and 65.3 percent consumed instant noodles 1-3 days per week

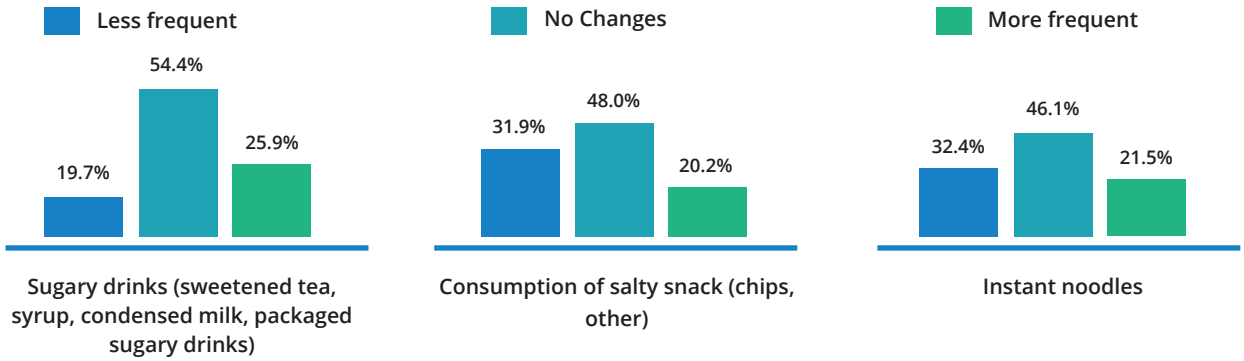


Figure 4. Changes in the consumption of unhealthy foods during the pandemic

Children explained that they consumed snacks to make them feel full (for example, fried noodles, fish cakes, meatballs and biscuits) or based on flavour (for example, ice cream, sugary drinks, savoury chips and chocolate bars). One-fourth of children reported more frequent sugary drink consumption during the pandemic. One-third of children reported less frequent salty snack and instant noodle consumption (Figure 4). The reported changes were significantly higher for sugary drink consumption among urban children than among rural children.

Triggering Factors for the Changes in the Consumption of Unhealthy Food Items

Staying at home more and peer influences. During the pandemic, children stayed at home much more often. Feeling bored at home and seeing friends snacking were the reasons for the children's frequent snacking. Parents also believed that their children bought snacks more frequently during the pandemic because of boredom and more spare time with much fewer activities. Some mothers managed to make the snacks at home and monitor their children's snacking habit, but they could not prevent children's snacking when they were not at home.

> *"When he [my son] is at school, he only buys snacks during the break. And I limit the amount of his pocket money. When he studies at home, he requests to buy snacks again and again. When his friend buys snacks, he asks for more money."*
> —Father, Pasuruan (rural)

Parents' rules to stay healthy. As part of their increased attention to health and nutrition during the pandemic, parents demanded their children not consume salty packaged chips and instant noodles. They believed that these foods contain unhealthy chemical substances such as preservatives and monosodium glutamate (MSG). Parents said that their children usually complied, especially when at home. They did not discourage consumption of sugary drinks though.

> *"Chi**l [a brand of salty snacks] is not allowed. I tell him that it contains chemical substances. My sister, who works as a midwife, tells me the same thing. A lot of preservatives, a lot of MSG. During the pandemic, we should avoid this [salty packaged snack]. He [my son] usually complies."* —Father, North Lampung (urban)

Barriers in Limiting the Consumption of Less-Healthy Foods

Limiting the consumption of unhealthy foods was a challenge because children like this kind of food, especially sweet drinks. Children described sugary drinks as "tasty" and "fresh" (because the drinks were generally served cold). Moreover, sugary drinks were reportedly sold everywhere.

> *"After school, he [my son] goes to his grandmother's house. After I come home from work, I pick him up. At grandma's house, there are always various kinds of drinks because she [grandma] has a small shop."* —Mother, Pasuruan (urban)

Most children received pocket money from their parents, often to buy a meal for breakfast. According to teachers though, children usually spent the money on food they like, with sugary drinks being the favourite, instead of buying a meal for breakfast. Children said that they would stop buying sugary drinks only when they would no longer receive pocket money.

Photo 1: Children buying sugary drinks and other snacks around the school

During the data collection, school canteens in most schools were closed, following the regulation on face-to-face learning. Still, in some schools, there were many mobile food vendors as well as food stalls outside the school premises (Photo 1). The vendors sold several types of snacks such as biscuits, salty chips, fried frozen foods, and sugary drinks. Sugary drinks were bought by most of the students; most were homemade sweet drinks with fruity flavour served with ice, homemade sweet tea with ice and packaged powdered sugary drink blended with water and ice and with cheese or chocolate chips on top (Photo 2).

Photo 2: Typical sugary drinks, including sweet tea with ice in plastic and nicely packaged sugary drink with cheese and chocolate chips

No Changes in the Consumption of Less-Healthy Food during the Pandemic

As explained in Table 8, accessibility promoted children's snacking habits. Those who still received pocket money during the pandemic shared that their habit of consuming sugary drinks as well as salty chips remained frequent during the pandemic. Such snacks were available in nearby food stalls. On the other hand, following their parents' rules was one of the reasons shared by children who rarely bought or consumed sugary drinks, salty chips and instant noodles. These parents shared that they had limited their children's snacking consumption even before the pandemic.

> *"No changes. Because I told her not to consume sugary drinks such as xx [brand of packaged sugary drinks] too often. Because I think consumption of those drinks will increase children's body weight. They will get fat."* —Mother, Pasuruan (urban)

Table 8. Summary of reasons for consumption of less-healthy food remaining the same

Food type	Consumption frequency compared to before pandemic	Reasons
Sugary drinks (54.4%), salty chips (48%)	Remained frequent	Received pocket money, like snacking, sold everywhere, see friends snacking
	Remained irregular/incidental	Depending on the situation (when parents bought it, when children requested it)
	Remained rare	Most snacks are less healthy (contain preservatives), no pocket money, do not like snacking
Instant noodles (46.1%)	Remained frequent	Children like it
	Remained rare	Parents limit consumption

Key Finding 3: Children had insufficient knowledge about specific good dietary practices particularly related to breakfast and food variety.

- Children's knowledge of nutrition varied by topic. It was good on carbohydrate sources and drinking sufficient water, but very poor on skipping breakfast and low vegetable and fruit consumption.
- Children were not familiar with the concepts of *Gizi Seimbang* or *Isi Piringku.*

Children's Knowledge of Good Dietary Practices

The nutrition knowledge score differed significantly by district (62.5 for North Lampung, 50.0 for Pasuruan and 62.5 for Kupang) as shown in Annex 7. The low score among children in Pasuruan was not in line with the finding that they had better food consumption practices than children in Kupang and North Lampung. The scores were not significantly different by gender.

Figure 5 shows the percentage of children who correctly answered the questions on good dietary practices. Their knowledge of a variety of carbohydrate sources and the importance of sufficient water intake was considered good, with 86.1 percent and 87.1 percent correct, respectively. However, their knowledge on the need to consume both fruits and vegetables and to not skip breakfast was very limited at 19.2 percent and 29.5 percent, respectively.

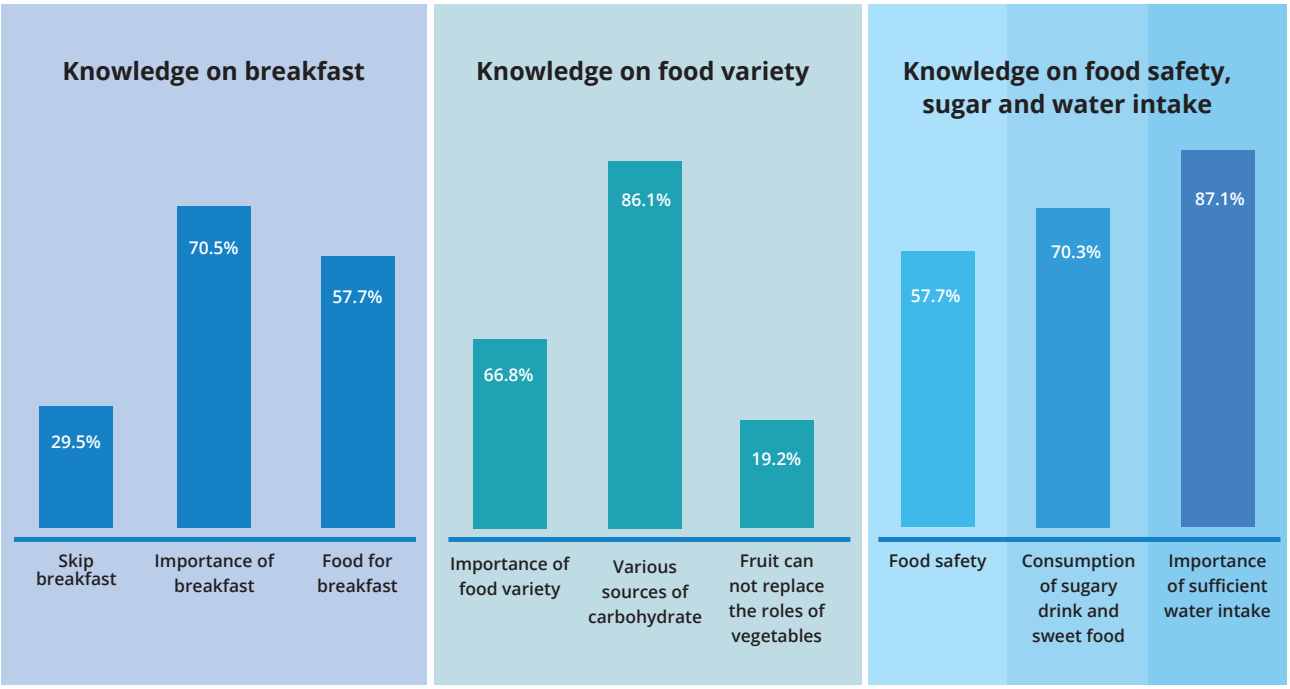


Figure 5. Percentage of children who correctly answered survey questions related to dietary practices

Pedoman Gizi Sembang (Balanced Nutrition Guide)

In Indonesia, the Balanced Nutrition Guide was introduced in 1995 by the Ministry of Health (MoH). It elaborates recommendations on foods that should be consumed daily because they contain the right type of nutrients in the right quantity to meet the nutrient requirement needed to stay healthy. The guide highlights variety of foods, adequate physical activity, clean hygiene behaviour and regular monitoring of body weight and height to maintain normal nutritional status and prevent malnutrition.

Visually, the *Gizi Seimbang* is promoted in two ways: (1) *Tumpeng Gizi Seimbang* (Food Pyramid) highlights recommended type and portion of foods for daily consumption, and (2) *Isi Piringku* (My Plate) highlights recommended type and portion of foods per meal.

Children appeared not to be familiar with *Gizi Seimbang* and *Isi Piringku*. They demonstrated some understanding of balanced nutrition principles though, without knowing the specific concepts. They were able to identify a healthy child as an active child who exercises regularly; consumes vegetables, vitamins and water; and washes hands frequently. This description was in line with some components of the Balanced Nutrition principle, which is not only about food but also includes personal hygiene and physical activity.

> *"Healthy children are children who are enthusiastic and not weak. A strong child diligently goes to school. Sick [children] will rarely go to school."* —Female student, Pasuruan (urban)

Objective 2

To identify existing policies and programmes that ensure good dietary practices of school-aged children, as schools started to reopen for face-to face learning

Key Finding 4: Various national policies and programmes have content related to nutrition for school-aged children, but it insufficiently addresses the importance of food quality and an engaged family-based approach. It is also poorly sensitized and not well understood by stakeholders at the sub-national level. Nonetheless, the newly launched National Action Plan for Strengthening School-aged Children and Adolescent Wellbeing (RAN PIJAR) is promising.

- A number of policies include content about health and nutrition for school-aged children, including the umbrella programme, UKS/M.
- RPJMN 2020–2024 and the Law 36 of 2009 on Health have some gaps on nutrition for school-aged children. Government regulations, policies and strategies for school-aged children related to food environment have focused on food safety, hygiene and sanitation with limited content on food quality.
- Awareness of the policies, strategies and programmes is low and coordination limited, however, especially at the sub-national level.
- There is also future potential to improve the health and nutrition of school children, such as the RAN PIJAR and the Healthy School Campaign, both emphasising coordination. Family-based social protection programmes could provide an additional impetus.

Existing Policies and Programmes

Policies on health and nutrition for school-aged children at the national level. The national government has issued several policies on health and nutrition for school-aged children, which are described in Table 9.

Table 9. National policies on health and nutrition for school-Aged children

Policy	Level	Main Points related to School-Aged Children
Law Number 36 of 2009 on Health	Law	Every school-aged child and adolescent has the right to information and education through school and out-of-school settings, to improve their life skills for quality human resources. Improving the nutrition condition should be based on a lifecycle approach. The priority target groups are infants and children under five, adolescent girls, pregnant women and lactating mothers. The government is responsible to provide nutrition information and education for communities.
Presidential Instruction Number 1 of 2017 on Healthy Living Community Movement	Presidential instruction	Relevant instructions are: 1. Strengthen the UKS/M programme according to the guidelines (led by MoECRT); 2. Strengthen and expand surveillance and intervention on food safety at school (led by the NFDA); and 3. Strengthen functions of Islamic Boarding School Health Posts and UKS/M according to the guidelines (led by MoRA). The MoECRT and MoRA were also in charge of encouraging schools/madrasahs to be child-friendly. The component includes establishment of a healthy environment at school, including a healthy school canteen to support good nutrition practices of the school children.

Policy	Level	Main Points related to School-Aged Children
Presidential Regulation Number 18 of 2020 on National Medium-Term Development Plan 2020–2024)	Presidential regulation	The main indicators of Community Nutrition Development do not include nutrition indicators for school-aged children. The number of schools with *Pangan Jajanan Anak Sekolah Aman* (safe snacks for school children) has been included as an additional indicator in the RPJMN.
Joint Regulation between MoEC, MoH, MoRA, and MoHA Number 6/X/PB/2014, Number 73 of 2014, Number 41 of 2014, Number 81 of 2014 on School Health Programme (UKS/M)	Ministerial regulation	Nutrition components in the UKS/M programme are nutrition education, *Perilaku Hidup Bersih dan Sehat* (PHBS, or clean and healthy lifestyle programme), physical activity and school canteen. This regulation is used as a reference for the UKS/M programme management and implementation at the national and sub-national levels.
MoEC's Strategic Planning for Primary School Directorate 2021–2024	Ministerial regulation	One of the policy directions is to use the UKS/M programme as a channel to create a conducive environment for students' personality/character formation.
Regulation of the MoH Number 21 of 2020 on Strategic Planning for MoH 2020–2024	Ministerial regulation	One of the main targets of MoH is to have the draft government regulation (RPP) on UKS/M by 2023.
Regulation of the MoH Number 4 of 2019 on Minimum Service Standards on Health	Ministerial regulation	The Minimum Service Standards on Health for children at primary education level are (1) health screening using "My Health Report Book" for school-going children; (2) health screening using *Buku Pemantauan Kesehatan* for out-of-school children; and (3) following-up on the health screening results.
Regulation of the MoHA Number 90 of 2019 on Classification, Codification and Nomenclature of Regional Development Planning and Finance	Ministerial regulation	This regulation is used as a reference for sub-national governments in programme planning and budgeting. It includes nomenclature about UKS/M rooms, school canteens and others school facilities and supplies.
Regulation of the Coordinating Ministry for Human Development and Cultural Affairs Number 1 of 2022 on The National Action Plan for Strengthening School-Aged Children and Adolescent Wellbeing 2022–2024	Ministerial regulation	One of the key interventions aims to improve the nutritional status and eating patterns of school-aged children by strengthening the healthy school canteen programme and physical activity programme, and by building facilities to ensure balanced nutrition practices. The action plan demands strong coordination and involvement of 19 ministries and government agencies.
Regulation of the MoRA Number 18 of 2020 on Strategic Planning of MoRA 2020–2024	Ministerial regulation	One of the programme priorities is to increase governance on budget planning and effectiveness for education by increasing the sub-national commitment and capacity in implementing nutrition education for school-aged children.
Agency Regulation of the NFDA Number KH.02.02.1.2.12.21.467 of 2020 on Strategic Planning of National Food and Drug Agency 2020–2024	Government agency regulation	One of the programme outcomes/outputs is the number of schools implementing food safety in NFDA working areas at the sub-national level.

Policy	Level	Main Points related to School-Aged Children
Regulation of the MoA Number 484/KPTS/RC.020/M/8/2021 on Amendment to Regulation of the MoA Number 259/KPTS/RC.020/M/05/2020 on Strategic Planning of MoA 2020–2024	Ministerial regulation	One of the main targets of MoA is to increase the provision of nutritious food at the household level through the use of home gardening.

Most policies highlight the UKS/M programme as being the umbrella of promoting health and nutrition for school-aged children in schools. UKS/M consists of three pillars, with nutrition-related activities as follows:

1. Health education: Breakfast as part of a balanced diet, integration of nutrition issues into school subjects, practicing physical activity, washing hands with soap, and peer support
2. Health services: Regular nutritional status assessment and follow-up
3. Developing a healthy environment: Creation of an environment to support the learning process at school, including availability of hygiene facilities and a healthy school canteen

Both the Joint Regulation of Four Ministries on UKS/M (2014) and the *Standar Pelayanan Minimal* (SPM, or Minimum Service Standards) highlight the UKS/M programme. The Joint Regulation provides information on the guidance and development of UKS/M. It also includes mandatory half-yearly multi-sectoral coordination in the national and sub-national teams as part of monitoring and evaluation activities of the UKS/M programme. The scope of responsibilities of each ministry is clearly defined. MoECRT and MoRA have similar roles, such as creating policies to integrate UKS/M into the school agenda, encouraging the sub-national government to conduct training for UKS/M teachers and peer support and encouraging implementation of Healthy Schools/Madrasah. The role of MoH includes conducting health screening, providing learning materials and mentoring the UKS/M school teams in programme implementation.

Policies related to healthy diets among school-aged children at the sub-national level. Policies supporting healthy diets among school-aged children at the sub-national level are implemented through the UKS/M programme. The desk review showed that some districts and provinces had regulations related to UKS/M—PERGUB (province regulation) and PERBUP (district regulation)—indicating the sub-national government commitment to supporting the UKS/M implementation including practices of healthy diets for school-aged children. In total, 8.8 percent of provinces and 3.3 percent of districts have PERGUB and PERBUP on UKS/M programme. Specifically, the PERGUB and PERBUP, included UKS/M management incentives, UKS/M guidance and development, implementation of UKS/M, formation of UKS organization and work procedures, UKS/M revitalization and UKS/M stratification (Annex 8). However, the three districts where this study was implemented did not have this regulation yet.

During the pandemic, district UKS/M programmes strongly encouraged schools to provide sufficient hand-washing facilities and to monitor health protocol during face-to-face learning. The compliance of the schools was intensively monitored by the local authorities.

> *"We conducted frequent dissemination of health protocol to them [the children] and monitored the practices. We also provided extra masks and hand sanitizer at school."* —UKS teacher, Pasuruan (rural)

Informants perceived that nothing specific was initiated in terms of innovations in the UKS/M programme. The main focus of the schools was catching up on the learning curriculum, which was considered "behind" due to the limited achievements via distance learning.

In March 2021, a Joint Minister's Decree on face-to-face learning was published, which also highlighted the importance of good balanced nutrition practices. Complying with this face-to-face learning regulation, including ensuring the children's compliance with the COVID-19 health protocol and provision of hygiene and sanitation school facilities was another focus of schools.

> *"The implementation of face-to-face learning refers to the Joint Decree (SKB) of the Four Ministries. There is a checklist that schools should fulfill; if I'm not mistaken, there are 12 components, including toilets, ventilation, and hand-washing facilities. So, the 12 components are the reference and focus. About nutrition and food, if it's not in the SKB, we have not focused on it yet."* —District TP UKS/M, North Lampung

The district TP UKS/M and school principals shared their hesitance to initiate a new activity due to the need to comply with the health protocol and the fear of exposing the children to unnecessary risks during the pandemic. Moreover, the UKS/M during the pandemic preferred to focus on washing hands with soap, which they considered a national programme.

> *"Nothing specific because the UKS/M is idle now; the focus is PHBS and health protocol. Also, it seems there are no significant changes in nutritional status of school children in this area."* —District TP UKS/M, Kupang

Tools for performance evaluation and guidelines. Various tools and guidelines are in place; further details can be found in Annex 9. The SPM is a reference for performance evaluation for the sub-national government. SPM prescribes three mandatory health screening services targeted to primary education, namely

1. Health screening for school-going children, based on "My Health Report Book"
2. Health screening for out-of-school children, using the "Health Monitoring Book" and
3. Follow up on the health-screening results.

The first part of *Buku Rapor Kesehatan Ku* ("My Health Report Book") contains guidelines on health and nutrition to achieve adequate growth and development of school-aged children. The second part contains assessments and results of health screenings. In the screenings, risky behaviour (which includes skipping breakfast and snacking) and the nutritional status (which includes body weight and height assessment and clinical symptoms of anaemia) are assessed. Malnourished children are referred to primary health care centres (PHCs) for treatment.

Data on nutritional status and dietary practices of school children from regular health screenings are meant to serve as nutrition surveillance data for programme evaluation and planning at national and sub-national levels. The results are to be used to inform evidence-based nutrition-programme-planning for promoting healthy dietary practices for school-aged children.

The MoECRT, MoRA, MoH and MoHA have jointly issued technical guidelines, including integration of the three pillars of UKS/M into the routine school agenda, which assesses the performance along four strata: *minimal, standar* (standard), *optimal* and *paripurna* (excellent).

During the pandemic, MoH released *Guidelines for Health Services for School-Aged Children and Adolescents during the COVID-19 Pandemic*, where assessments were elaborated and included washing hands with soap and running water, eating nutritious foods and engaging in physical activity.

Existing guidelines for strengthening school canteens emphasize hygiene, sanitation and food safety (Kemenkes, 2021); food safety and balanced nutrition (BPOM, 2013); and hygiene, sanitation and quality of foods sold at the school canteen (Kemendikbudristek RI, 2021). In addition, the regulation of mobile food vendors was included in the MoH guidelines with a focus on hygiene, sanitation and food safety issues. Several stakeholders are in charge of strengthening the mobile food vendors, such as PHC (for monitoring and evaluation) as well as district government. School canteen monitoring is conducted once a year by PHC staff (sanitarian unit). Only six out of the 96 points that can be obtained are for the quality of foods sold in the canteen. Four points are for food safety aspects of packaged foods/drinks, and two points for non-packaged foods. The other 90 points of evaluation are for the availability and cleanliness of facilities and infrastructure.

Policy and programme awareness. During the pandemic, the central government disseminated guidelines on UKS/M-related programmes and provided other relevant information online, via webinars and social media.[4] The face-to-face learning regulation was one of the regulations issued. The district levels received information on the regulation from the national level, which they disseminated to the schools (via online school principal group chat and circular letter) and then shared with parents (via online group chat communication). Informants at the district and school level as well as parents displayed very good knowledge of this face-to-face learning regulation. Parents had intensive exposure to information and knew about health protocols and the need for the child to have breakfast and bring food and water from home during face-to-face learning.

> *"The dissemination was conducted through a Zoom meeting from the Ministry on the Implementation of Learning during the pandemic. Then the Education Office made a circular letter which the Regent directly signed, then forwarded to K3S [Kelompok Kerja Kepala Sekolah, or the principal's working group for elementary schools] via a WhatsApp group. The headmaster forwarded the circular letter to each school's WhatsApp group and then forward it again to the students' WhatsApp group. We disseminate to schools the main points of the circular letter, and limited face-to-face learning will be conducted on a specified date. Students are asked to wear masks, comply with health protocols, eat breakfast, bring lunch and not bring pocket money because the school canteen must remain closed."* —District TP UKS/M, North Lampung

Information on the face-to-face learning regulation was available from the internet and shared via social media, disseminated orally during PHC visits and sub-district or village meetings. Implementation during the pandemic was minimal, despite district TP UKS/M, PHC and school's exposure to guidelines about UKS/M implementation. Therefore, they mostly referred to the face-to-face learning regulation.

4 Examples are the Webinar on Future UKS Concept, Awareness on Health Services for School Age Children and Adolescents during Pandemic, Webinar on TP UKS/M Functions in Preparation for Face-to-face Learning Scheme, Webinar on UKS/M Standard Improvement and Empowerment, Website for School-Aged Children and Adolescents Reference Materials and Instagram posts focused on nutrition education.

> *"Nothing [no exposures on UKS/M guidance during pandemic]. We refer to the Joint Decree [SKB] of the four ministries regarding the implementation of face-to-face learning. [The SKB is] not specific about UKS, but all [all issues in implementing face-to-face learning], including health [issues] already exists [in the SKB]. [the health issues are about] Implementation of health protocols during face-to-face learning."* —District TP UKS/M, Pasuruan

The TP UKS/M from the District Health Office mentioned the Annual Evaluation Meeting hosted by the Provincial Health Office as an additional source of information. Specific to UKS/M implementation during the pandemic, emphasis was given to adjustment in implementing health monitoring and services (including health screenings) based on "new" school hours; highlighting the implementation of health protocols during face-to-face learning; and using Google forms for health screenings, in which students (assisted by parents and teachers) do self-assessment and self-report several indicators.

Exposure to the *Technical Guidelines of Healthy School/Madrasah,* including UKS/M stratification, had been very limited, reportedly because the current nutrition programme was mainly targeted to children under five. Moreover, PHC staff believed that awareness of the guidelines was limited to selected schools, participating in the Healthy School Competition.

> *"In general, the school does not know it [the guidelines]. [Dissemination of the guidelines] only to a few schools selected for the Healthy School Competition. Only the selected schools will receive the coaching [on UKS/M implementation]."* —PHC staff, North Lampung (urban)

Gaps in existing policies. There are two main gaps in the existing policies. The first is in the Law on Health Number 36 (2009), which states that improving health and nutrition must refer to the lifecycle approach. Nevertheless, school-aged children are only mentioned as a priority group for the right to have information and education to improve their life skills. They are not specifically mentioned as one of the priority target groups for nutrition interventions. The second gap is in the RPJMN, which limits the regulation for snacks available at schools/madrasahs to food safety, with less consideration for the nutritional value of the snacks.

In the RPJMN, there are two indicators related to the UKS/M programme, namely "the number of madrasahs with good UKS/M and sanitation quality" (under the Islamic Education Programme led by the MoRA) and "the number of UKS/M teams at the sub-national level that guide and monitor the UKS/M implementation in their respective area" (under the Sub-National Development Programme led by the MoHA). These two indicators are not under the Community Nutrition Development Programme, potentially hampering multi-sectoral coordination.

Limited coordination at national and sub-national levels. IDIs indicated that coordination at the national level, though not fully meeting expectations, was better than at the sub-national level.

> *"One of the challenges is the lack of support and commitment from the concerned ministries to establish strong internal coordination."* —Informant in one ministry

Some of the challenges at the sub-national level were job rotation of the district TP UKS/M (and no staff was assigned for replacement), changes in nomenclature or bureaucracy in the district, insufficient information sharing within and across the institutions and the mindset that UKS/M should be coordinated by the health sector. In addition, the COVID-19 pandemic made coordination more

difficult. Strategies have been developed by the national TP UKS/M to raise awareness on the UKS/M programme and activities to the sub-national TP UKS/M to make it more effective, for example by organising coordination and awareness meetings for smaller groups.

> *"Alhamdulillah, we have regular coordination meetings. The agreed programme or activities are always shared. But coordination mostly occurs at the national level. At provincial, district and school levels, we need to strengthen the coordination and awareness. Moreover, for the past two years, COVID-19 has worsened the situation. Our coordination did not reach the sub-national level."*—National TP UKS/M programme staff

Nevertheless, at the national level, coordination and commitment to implementing UKS/M were not as expected either.

> *"One of the challenges is the lack of support and commitment from the concerned ministries to establish strong internal coordination."* —Informant in one ministry

Potential Policy and Programmes to Improve Nutrition of School-Aged Children

National Action Plan for Strengthening School-Aged Children and Adolescents Wellbeing (RAN PIJAR) 2022–2024. In April 2022, the RAN PIJAR was launched by the Coordinating Ministry for Human Development and Cultural Affairs (Kemenko PMK). Several indicators on nutrition for school-aged children were defined for the plan, such as prevalence of wasting, overweight and obesity; prevalence of children with adequate physical activity; and number of schools with safe snacks for school-aged children. One of the goals of the RAN PIJAR is to improve nutritional status and dietary habits by, among others, strengthening school canteens and promoting physical activity to achieve balanced nutrition practices of school-aged children and adolescents.

Given the scope of the RAN PIJAR, a total of 19 ministries and government agencies are engaged with very clear and specific responsibilities according to their respective roles and functions. The RAN PIJAR strategies integrate various key aspects including strengthening multi-sectoral commitment and coordination at the national and sub-national levels. Bappenas must encourage the RAN PIJAR to become a national priority with an activity and budget plan. In addition, MoHA takes charge of encouraging provincial and district government to have specific policy and budget allocations for implementation of the action plan. The RAN PIJAR is to be translated into the Sub-National Action Plan (*Rencana Aksi Daerah*, or RAD).

Data and information are another key aspect under coordination of several ministries and government agencies, including the Ministry of Communication and Informatics (to disseminate information on school-aged children and adolescents wellbeing), the Central Statistics Bureau (to prepare data and encourage the use of it for policies) and the National Research and Innovation Agency (BRIN) as well as universities (to conduct research, reviews, and advocacy). Nevertheless, because the RAN PIJAR was only launched in early 2022, the technical guidelines and report or publication on its progress were not available by the time this study report was published.

Healthy School Campaign. Triggered by issues related to the health and nutrition status and practices of school-aged children, MoECRT launched the Healthy School Campaign on 23 August 2022. The campaign aims to revitalize the UKS/M programme by improving health promotion efforts at schools.

It emphasizes the importance of collaboration among government, schools and other stakeholders. The campaign has three aspects: *Sehat Fisik* (physical health), *Sehat Bergizi* (nutritional health) and *Sehat Imunisasi* (immunization health). The first two aspects were already part of the existing UKS/M programme. *Sehat Fisik* includes weekly exercises, stretching during breaks, promotion of traditional games during breaks, intra- and extra-curricular exercise and regular walking. *Sehat Bergizi* and *Isi Piringku* include an understanding of balanced nutrition behaviour; limiting consumption of fast food, food with sweetener and preservative, low fibre, high sugar, high salt and high fat; and strengthening healthy school canteens.

In 2022, MoECRT held a webinar series as part of the launching activities and awareness in all elementary schools and for relevant stakeholders. A series of training sessions on UKS/M is planned for schools at provincial and district levels led by MoECRT and MoRA, and the finalization of a *Peraturan Pemerintah* (government regulation) on UKS/M led by MoH. MoHA will be the coordinator for a regulation on budget nomenclature of UKS/M for sub-national governments; norms, standards, procedures and criteria (NSPK) on UKS/M; and UKS/M programme evaluation.

Family-based approach to improve family resources. There were two programmes which provided cash and food for families categorized as poor or living in food-insecure areas. MoSA coordinates the *Program Keluarga Harapan* (PKH, or Family Hope Programme), an Indonesian conditional cash transfer programme targeting poor families (Kemensos, 2018). Poor families with school-aged children are among the main beneficiaries. In 2021, families received a cash transfer of IDR 900,000 per year per school-aged child. PKH beneficiaries were expected to have better access to basic social services such as health, education, food and nutrition. For primary school children, the output indicator target was an enrollment rate of 100 percent and an attendance rate of 85 percent in a formal education institution.

At the village level, beneficiaries are invited to attend regular meetings, where various topics such as family economy, health, nutrition, parenting and education are discussed. The sessions are expected to increase the beneficiaries' knowledge to create demand for better health, education, food and nutrition as well as increase their skill in fulfilling their own basic needs. It is considered acceptable under PKH for beneficiaries to use the cash as they require, for example for school transportation costs for children and not necessarily only for buying nutritious foods.

Another programme is the Sustainable Food Garden Utilization Programme (*Pekarangan Pangan Lestari*, or P2L) under the coordination of the MoA and the Food Security Office at the sub-national level. In its strategic plan 2020–2024, the programme was named Development of Variety and Safe Foods Consumption *(Pengembangan Penganekaragaman Konsumsi dan Keamanan Pangan)*. The P2L programme targeted food-insecure areas and 34 stunting-reduction priority districts/municipalities. Its objectives were to increase availability, accessibility and use of foods by families to fulfill the requirement towards a variety of foods, balanced nutrition and safe foods. In addition, the programme aims to increase family incomes through foods for sale. The implementation of the programme referred to the *Technical Guideline of Government Assistance on the P2L* published in 2021 (Kementerian Pertanian, 2021). In its technical guideline, there is no specific information about inclusion of nutrition education for the groups participating in P2L.

The National Population and Family Planning Board (BKKBN) has produced a parenting module for families with school-aged children called *Be a Great Parent* (*Menjadi Orangtua Hebat)*. The module consists of various topics including healthy living, particularly building good dietary habits by

consuming nutritious and healthy food. There is no specific programme mentioned yet to deliver the nutrition messages to parents.

Key Finding 5: The implementation of UKS/M faces many barriers and has insufficient focus on nutrition.

- During the pandemic, the building of hand-washing facilities at schools and promotion of washing hands with soap were massively encouraged and monitored.
- Nutrition education was conducted in some schools, but it was neither well-structured nor well-organised.
- The food environment in and around schools (canteens and food vendors) is not sufficiently conducive to improved nutrition in general nor to implementation of UKS/M in particular.
- Nutrition screening data are not accessible by stakeholders beyond the district health office (DHO) or PHC, and results are not used. Data on dietary practices are not available, since these are not assessed during the health screening.

Barriers to UKS/M Implementation in Supporting Children's Healthy Diets

The informants at the national and sub-national level found that UKS/M was not well-implemented, even before the pandemic, and that the pandemic added to the existing challenges.

UKS/M programme implementation had not been focused on nutrition. Although nutrition is part of the UKS/M triad, it has not been a priority. Students, PTA members, parents, UKS/M teachers and PHC staff said that at school, UKS/M implementation was about first aid, health screenings, immunization, deworming and, during the pandemic, hand washing. PHC staff shared that their current nutrition programme focuses on stunting reduction, targeting children under five years old, their caregivers and pregnant and lactating women. Parents and the district education officer confirmed that nutrition education was mainly done at integrated health posts (Posyandu), focusing on nutrition for children under five.

> *"Never heard of UKS. Maybe it is the same as in a hospital but in a school. If someone is ill, they can be cured at UKS."* —Female student, Pasuruan (urban)

Informants said that nutrition education was provided in some schools, but it was not well-structured or well-organised. Promotion materials in schools are about COVID-19, and there are none about nutrition. Health information received from school, church and radio were mostly about COVID-19, and about the health protocol.

Less-supportive food environment at school. Homeroom teachers, UKS/M teachers and PHC staff highlighted that the school environment was not supportive of good nutrition behaviour. Unhealthy foods such as sugary drinks, salty snacks/chips and instant noodles are sometimes sold in school canteens and often by mobile food vendors outside the school premises. School principals and parents shared their concerns on foods sold by those food vendors, as they considered the food unhealthy in terms of food safety (colouring agents, preservatives and flavour enhancers), cleanliness and freshness. But they did not feel they were "the authority" for managing this issue.

> *"Actually, the school does not agree with the food being sold by the street food vendors because it is not necessarily healthy nor is it clean—for example, meatballs*

and rice cake [siomay] with striking coloured sauce. We already discussed it with the vendors, but it did not work. The vendors only moved their stalls not far away from the school, so students could still go there and buy the snacks. It makes us more anxious because of the busy streets, and the large number of students. We also have a social sense/sympathy for the street food vendors. Parents actually do not agree but are afraid. The school is also afraid because it would be a problem. The government is also having trouble controlling street vendors, right? Not to mention schools." —School principal, North Lampung (urban)

School canteens are the main supplier of food and nutrition education media at school, hence their role is crucial. Still, school, PHC and district TP UKS/M staff found that the infrastructure of the canteens and regulation on type of foods for sale are not conducive to good nutrition.

"In addition to no UKS room, the challenges of a nutrition programme for school children are no materials for education, and an inadequate canteen. Only small tents to sell food and drinks. It has been emphasized that selling packaged foods and drinks is prohibited, but they are still being sold because the children like them." — PHC staff, Kupang (rural)

Unavailability of data on dietary practices among school children. The PHC staff mentioned that no data had been collected on balanced nutrition practices among school children. The health screening form does not collect such data either.

"There are no nutritional problems in elementary school children in this area. From the health screening, students' nutritional status is generally normal. But indeed, a survey about the habit of eating snacks, breakfast, eating vegetables and fruit has never been done." —PHC staff, North Lampung (rural)

Lack of access and use of health-screening results. Health screening was one of the main focuses of UKS/M activities prioritized by the PHC before and during the pandemic. Health screening is part of the Minimum Service Standards on Health. Nonetheless, the health screening results were not always disseminated to relevant stakeholders, as not all district TP UKS/M had the data. In addition, within the PHC, the data were not always shared by the nutritionist with the UKS/M staff. As a result, they had no information about the nutritional status of children in their area.

"We do not really understand about elementary school children's nutrition status. We indeed conducted body weight and height measurements for new students. But the ones who know the data are the person-in-charge [nutritionist] because there is a specific way to calculate it. I do not have the data." —UKS/M staff at PHC, North Lampung (rural)

Lack of resources, coaching, clarity of responsibilities and coordination. One of the challenges is insufficient human resources and facilities. There is no UKS/M room, lack of anthropometric assessment tools in some schools and insufficient IEC materials. The PHC staff highlighted their concern about the majority of schools perceiving that UKS/M belonged to PHC, and that therefore the UKS/M implementation was under PHC's responsibilities.

"UKS activities such as counselling and health examinations are still very dependent on the PHC. On the other hand, we also have limited funds and human resources. The school assumes that UKS belongs to the PHC." —PHC staff, North Lampung (rural)

The lack of guidance on examples of nutrition education methods/activities and materials made the PHC staff feel unprepared to facilitate nutrition education at school.

> *"No, not ready [to provide nutrition education at school] because we should coordinate the visit schedule with other programmes to make it efficient. Also, we still need to find the right method and materials to make the session interesting for school children. Educational media should also be prepared, which doesn't exist yet." —PHC staff, North Lampung (rural)*

In addition, the schools and PHC staff found that intensive coaching on UKS/M was limited to schools participating in the Healthy School Competition. Moreover, coordination within the district UKS/M team, and between PHC and schools is not working well. The schools said they needed more comprehensive coaching from the PHC, and current coaching was considered very brief. PHC staff, on the other hand, expected better support from schools, for example by designating a UKS/M teacher with whom the PHC staff coordinate UKS/M activities.

> *"Currently, there is still no full support from the school. There are no UKS staff in some schools. When we are directed to the homeroom teacher, the homeroom teacher often does not give a good response because they consider that the UKS programme is not included in the learning curriculum." —PHC staff, Kupang (rural)*

Good Practices in UKS/M Implementation at Sub-National Level during the Pandemic

Despite the above challenges, some good practices have been noted at the district and school levels regarding UKS/M implementation. For example, some PHCs and schools were able to conduct health screening, despite the fact that the assessment required more than one day per school to complete due to the need to comply with the COVID-19 health protocol. Another good practice is the use of Google Forms for self-assessment and self-reporting health-screenings in one of the districts. In addition, as shared by one of the district UKS/M staff and PHC staff, the coordination across sectors and between schools and PHCs was good. In one district, the district TP UKS/M had regular meetings and created a schedule for monitoring UKS/M implementation by visiting the schools. Nevertheless, time constraints and the pandemic limited the number of schools that could be visited by the district TP UKS/M.

> *"The UKS team comprises of us and three other offices: health office, religious affairs office, and Kesra [Community Welfare Division under District Office] as the coordinator. Activities include visits to schools and viewing or monitoring through the school principal, the K3S [school principal working group], or the UKS/M committee. Usually, the school takes a picture or photo and shares it in the [WhatsApp] group. We [the District TP UKS/M] visit 12 to 20 schools yearly. The following year, besides having a visit to 12 to 20 new schools, the team also visits the schools visited in the previous year to see the results of the coaching that has been performed—for example, evaluating the hand-washing facilities, canteen, and the UKS room. Due to time constraints, this visit cannot be done to many schools, and there are activity restrictions during the pandemic. Schools are not requested to make an official UKS report. However, the results of the school visits and progress updates from schools fostered in the previous year were reported to the TP UKS at Kesra as the coordinator."* —District TP UKS/M, North Lampung

Objective 3

To explore relevance and effectiveness of existing nutrition education interventions for protecting and promoting healthy diets among primary school-aged children in the context of the COVID-19 pandemic

Key Finding 6: Nutrition education activities were not implemented in a systematic manner, but those that were implemented were relevant. Nonetheless, the issue of unhealthy food items available through vendors could not be addressed.

- Most schools did not follow the UKS/M technical guidelines related to nutrition and hence implementation was not systematic, but, nonetheless, where nutrition education was implemented (including under the COVID-19 protocol), it was relevant to addressing the observed gaps in nutrition behaviour of school-aged children.
- Easy access for children to unhealthy food around school remains a barrier to improving nutrition behaviour that parents and schools are unable to address.

Relevance of Nutrition Education at School

The latest Basic Health Survey (RISKESDAS) 2018 shows that 23.6 percent of children aged 5–12 years were stunted, 9.2 percent wasted, 10.8 percent overweight and 9.2 percent obese. Their nutrition practices were also inadequate. Nearly 97 percent of school-aged children did not consume vegetables and fruit as recommended. Moreover, 15–17 percent of children aged 5–14 years old did not consume vegetables at all for the past one week. More than 50 percent of children aged 5–14 years old consumed sweet foods and sweet drinks more than once a day, while frequent consumption of salty foods was reported by more than 30 percent of children. In addition, 64 percent of children aged 10–14 years old had insufficient physical activity.

Given the above, the types of nutrition education interventions suggested in the UKS/M triad are very relevant. These interventions are re-emphasized in more detail in the *Technical Guidance of Healthy School/Madrasah* (Kemenkes, 2021). Good examples relate to before-class sessions/practices (washing hands with soap, having breakfast together at school, and weekly nutrition education), between-class breaks (eating healthy snacks together, brushing teeth together once a week), between subjects (stretching every day) and extracurricular (peer support meeting, healthy lifestyle skills education and sports sessions).

In the study sites, there were no data about school children's balanced nutrition practices. Results of the weight and height of the children as part of the regular health screening were not followed-up and referred by the district TP/UKS and respective PHC for planning. Moreover, the nutrition education activities that were carried out at some schools were not planned and organized in coordination between the school and the district TP/UKS or PHC.

The district TP/UKS, PHC and schools in the study sites had not been adequately exposed to information on Healthy School/Madrasah Programme. Therefore, the implementation of the above recommended activities was not as expected. Initiatives in schools were mainly triggered by the face-to-face regulation (ensuring children had breakfast, brought foods from home and enjoyed them together at school, washed hands with soap frequently and consumed healthy foods). Although

activities were not implemented according to plan, some nutrition education activities were relevant, given the observed nutrition practices of school-aged children, which are confirmed in this study. Access to nutritious food was not covered, however, under nutrition education activities.

Perceived Effective Nutrition Education at School

The kinds of nutrition education activities implemented at schools and perceived effectiveness in promoting behaviour changes in children are listed in the following table.

Table 10. Effectiveness of nutrition education activities at school according to schools and parents

No	Activities	Perceived as effective?
1	Give continuous encouragement and reminder for students (and/or parents) to eat breakfast every day, bring food and water from home, and wash hands, followed by monitoring. (The encouragement/reminder was addressed directly at school and/or via class online chat app.)	**Yes, in general.** More students do it, parents put effort into preparing foods, most students (although not all) start building their breakfast habits, reduce snacking, are more focused in class, and there is more communication between students and parents. **Less in some cases** because parents have no time to prepare food and children are given pocket money.
2	Give suggestions to follow nutrition practices at home (physical activity, wash hands with soap, consume healthy foods), and inform parents of the consistency of messages.	**Not sure** because no specific monitoring was conducted
3	Place posters at school.	**Yes.** Serve as repeated encouragement/reminder
4	Integrate balanced nutrition practices into school subjects, complemented by school assignments.	**Yes, in general,** as children become aware and more willing to practice it **Not sure/less in some schools.** It depends on the teachers.
5	Insert messages on healthy foods and washing hands in regular events at school, and complement those messages with eating together (foods prepared by parents.)	**Yes,** because it is obligatory for students and done regularly.
6	Allocate one specific day in a week to have a session where children have health/nutrition-related activities (for example, exercise together, clean and healthy lifestyle (PHBS) awareness, eat breakfast together).	**Yes,** because it is a regular session and joined by all children, children experience direct practices, emphasized in messages
7	Create nutrition literacy and disseminate info on nutrition.	**Yes,** because it creates the necessary awareness, though actual behaviour change is not certain
8	Suggest limiting snacking and buying healthy snacks.	**No.** Many vendors are outside the school premises, and children have pocket money.

Reasons for ineffective or less effective nutrition education. Some factors decreased the effectiveness of nutrition education at school. These include lack of a supportive food environment (as mentioned, mobile food vendors outside the schools), limited learning hours during face-to-face learning, challenges in emphasizing nutrition messages via distance learning, reduced family income, children's food preferences, children's lack of awareness and family food habits.

"The time is very short. Communication with students is limited to the important things [to the point]. Cannot build personal communication as an introduction to messages. Closeness to students is insufficient, while closeness is important to deliver the messages." —School Principal, North Lampung (urban)

Key Factors for Effective Nutrition Education

Intensive exposures to information. Positive factors supporting nutrition messages were high exposure to information, complemented with continuous encouragement and reminders for children and parents, followed by monitoring at school and home.

"At the beginning of the pandemic, children often washed their hands because they thought that during a pandemic there are viruses. The children were afraid of carrying the virus, so they were more complying with cleanliness. But now, because the pandemic issue is no longer booming, the news has reduced, and children started to think that COVID-19 no longer exists. So, children started washing their hands less often. They need to be reminded more often."
—Mother, Kupang (urban)

Continuous encouragement and reminders. Continuous encouragement and reminders are needed to strengthen the information provision and maintain the practice. In the study areas, this was done via online class and parents' group communication via an online app, a direct reminder to the students at school and/or placing a poster at school. The teachers and PTA highlighted the improved habits of the children in washing hands due to the pandemic because of intense exposure to messaging and receiving repeated reminders.

"The activities to build a habit such as personal hygiene by washing hands can change their [students] behaviour because it is continuously encouraged and conveyed to them." —UKS/M teacher, Pasuruan (rural)

Complementary roles of parents and schools. To avoid confusion due to conflicting messages, teachers and school principals suggested that parents repeat the messages received in school consistently and show the appropriate practice to their children. Similarly, parents expected schools continuously convey the messages to the children at school.

"The role of the school is very important because they can convey information about the importance of washing hands and having breakfast so that children feel the importance of the message because they get the message not only from parents but also teachers." —Mother, North Lampung (rural)

Effectiveness of mandatory and regular activities. Some of the activities in school were mandatory for all students, for example, student assignments to make a poster on how to prevent a COVID-19 infection. This was seen to make the children understand and more likely to follow it. Regularity of implementation of the activity was also found to be effective in creating changes and habit on the children's behaviour.

"Welcoming Ramadan this year, students bring food and eat together at school. Now, [we do it] every Saturday before the break. Because every Saturday the class agenda is more flexible, the rest of the time after the break can be used for sports or eating together. It is effective." —PTA member, North Lampung (urban)

The use of an experiential approach. Arranging nutrition education as experiential learning rather than information dissemination only was found beneficial in giving exposure and experiences to the children as they are learning by doing. In addition, activities that children do together with friends at schools were seen as more successful.

> *"It is effective. So, students know what balanced nutrition practices are like and see all their friends eating too. Therefore, it is convincing the students that healthy food is important."* —PTA member, North Lampung (urban)

Key Finding 7: School staff and parents acknowledge their role in supporting children's good dietary practices, but they claim to have insufficient nutrition knowledge.

- Parents use various online and offline sources for obtaining nutrition information. Parents are aware of barriers to healthy consumption for children and acknowledge their role and responsibility. Still their nutrition knowledge remains compromised due to insufficient intensity and quality of nutrition messaging. Also, fathers feel less inclined than mothers to look for information.
- Teachers acknowledge their role in nutrition education, and some have started to deliver it, but they need more guidance for a comprehensive approach.
- The role of the PTA in nutrition education is virtually absent, even though the guidelines provide them space to engage; they, as well, feel their knowledge is too limited.

Parents and teachers' knowledge as well as their attitude might determine their motivation and confidence in creating or facilitating nutrition education for the school children.

Sources of Knowledge on Nutrition of Parents and Teachers

Similar to the children, very few respondents/informants have heard the terms *Gizi Seimbang* and *Isi Piringku*. Those who have heard them related both terms to healthy foods (*4 Sehat 5 Sempurna)*[5] and highlighted the importance of staple foods, carbohydrates, vegetables, fruit and side dishes.

> *"Gizi Seimbang is the physical condition of the child, not being too fat nor thin. Never heard of it [Isi Piringku]. Food with good nutrition is according to '4 Sehat 5 Sempurna' with fruit and vegetables." —Mother, Pasuruan (urban)*

Despite their lack of familiarity with *Gizi Seimbang,* parents and teachers know the importance of the three pillars, namely consuming a variety of foods, being physically active and practicing good personal hygiene. The fourth pillar—maintaining normal body weight—was not mentioned.

> *"What a child needs in terms of food is adequate nutrition so that the child is healthy and has a sharp brain, the fulfillment of '4 Sehat 5 Sempurna', adequate side dishes, vegetables, carbohydrate, protein, fruit and milk. Doing sport like cycling in the yard or with friends. Also, always maintain hygiene by handwashing." —Mother, North Lampung (rural)*

Parents used "more traditional" channels to look for nutrition information, such as television, printed materials (posters and flipcharts) in PHCs and discussing with people with health education background or friends. Still, the use of technology-based channels such as YouTube, Instagram and Google were also common. Compared to mothers, fathers mentioned less sources of information.

5 *"4 Sehat 5 Sempurna"* is a former tagline of healthy eating promoted by the Indonesian Government since 1955. The literal translation of *"4 sehat 5 sempurna"* is "4 healthy 5 perfect," which highlights four food groups to make us healthy (i.e., staple foods, protein-source foods, vegetables and fruits), and drinking milk to make the meal perfect.

In addition to the above sources, mothers also received information at meetings of Family Welfare Empowerment,[6] child learning materials at school, college students who participated in community service, the church and mothers in the neighbourhood. Parents' most-sought information was how to prevent illness, healthy foods for children, simple recipes for a child, how to increase a child's appetite, food safety, home remedy, treatment for certain diseases, how to prevent the COVID-19 pandemic and how to wash hands properly.

Parents have different preferences on which information sources to use. Some preferred YouTube or Google (easy access), posters and flipcharts (main messages are reflected and easy to understand), the *Kesehatan Ibu dan Anak* (KIA, or Maternal and Child Health) book (for its complete information), direct consultation with health staff (direct feedback), Instagram (easy access, varied information and interesting issues), PHCs (trusted sources, frequent visits to PHC), college students (intensive activities for five weeks) and television (available at home, easy to understand messages). Some parents, particularly fathers, did not feel like looking for nutrition information. Reasons included busy working, no access to technology, no familiarity with information technology, no idea how to access nutrition information, the child looking healthy, never having received nutrition information from PHCs and expecting the information to be given to the child by the schools.

Teachers preferred social media and Internet (YouTube, Google) because these are relatively accessible and user-friendly. Homeroom teachers also get information from subjects which are related with health such as physical exercise and science. UKS teachers received information from technical meeting organized by the DEO as well as from former UKS/M teachers.

Attitude of Parents and Schools

Perceived needs to improve the children's dietary practices. Parents, PTA members and school staff acknowledged that they knew about problems with children's dietary practices. There were four main concerns on these practices. The first concern was reduced quality of foods consumed by families, including children, due to the reduced household income, which they found impacting the children's nutritional status and, later, their health.

> *"I feel sad and anxious because, during the pandemic, the amount of food consumed by the child is decreasing; usually he ate dishes [animal protein] every day, now three times a week. So the protein intake in children is reduced, including infrequent consumption of vegetables and fruit."* —Father, North Lampung (rural)

The second concern was children's decreased physical activity, because they more often preferred sitting and using the mobile phone rather than playing outside with friends, doing household chores or biking. This matched with the survey results, where 52.7 percent of the children reported that they did sedentary activities more often. The third concern was skipping regular meals (because the children's focus was on the mobile phone) and changes in food choices (because they preferred a "simple meal," such as instant noodles and snacks, over a complete meal).

6 *Pemberdayaan Kesejahteraan Keluarga* (Family Welfare Empowerment/Women's Association) is a community organization that empowers women to participate in Indonesia's development)

> *"He frequently uses his mobile phone, because of the shorter duration of learning hours now [during the pandemic]. I am afraid he will get a problem with his eyes. His food practices as well [are disturbed]. He eats rice in small amounts now. He eats instant noodles a lot, instead."* — Mother, Pasuruan (rural)

The fourth concern was children's frequent consumption of sweet and salty snacks. Staying at home during distance learning and hybrid learning has made children feel bored and triggered them to eat snacks more frequently. This, as highlighted earlier, was aggravated by the easy access of children to sugary drinks and other snacks at home and in school.

Parents' roles and readiness to support children's dietary practices. Parents acknowledged their role and responsibility in support of good dietary practices of their children, including providing necessary information on food and nutrition as well as being a role model and example of good practices. Parents also highlighted the intensive exposures by the children to the Internet, particularly to social media, which required parents' close monitoring.

> *"Currently, information on social media is widely open; there are no restrictions. Parents should supervise their children. Parents' knowledge is very influential. How will a child have healthy behaviour if their parents do not provide explanations?" —Father, North Lampung (urban)*

The importance of good nutrition knowledge among parents was acknowledged to equip them with the necessary skills to manage challenges in providing nutritious foods for their children. Good nutrition knowledge was believed to enable parents to better cope with their limited resources.

> *"When parents have been provided with knowledge of the importance of nutrition, even though the available foods are simple, parents will try to improve their child's diet. So, nutrition information is important for parents. In the city, facilities to find information are widely available. However, getting a signal in the village is difficult, hindering the information-seeking intention." —PTA member, North Lampung (rural)*

Parents report that they have limited knowledge on nutrition, and UKS/M staff at the community health centre (Puskesmas or PHC) reported this as well. It was viewed as one of the barriers to support good dietary practices for children. The PHC staff admitted that awareness-raising on balanced nutrition was not intensive enough to improve the parents' knowledge, which the parents confirmed.

> *"In general, the family's economic condition here is quite good. The constraint is the limited knowledge of parents about nutrition. Therefore, the food quality for their children is inadequate. Even when they have limited income, they still provide simple healthy dishes for their children if they know [have the knowledge]. And, we [government] are also changing [the food guidelines], right? From '4 Sehat 5 Sempurna' promotion becoming 'Gizi Seimbang.' So, yes, it takes a process for them [parents] to understand." —PHC staff, North Lampung (rural)*

Schools' roles and readiness to support children's dietary practices. Schools reported that their role includes disseminating nutrition information and building good nutrition habits among the students. This must be done by improving the students' nutrition knowledge, providing reminders, disseminating information to parents, giving information to school canteen providers on what to sell and not to sell at the canteen and placing posters at school. Parents and PHCs also expected schools to do this, since they have a close relationship with the children.

Interestingly, the discussions during the FGDs inspired a number of teachers to start simple nutrition education at schools, such as organizing breakfast together at school in which the children bring their foods from home. But they also shared that they need more guidance to be ready to provide comprehensive nutrition education.

> *"Because I have never thought about it [nutrition education at school] before. To be honest, nutrition is a new thing for me. Indeed, nutrition is mentioned in the [school] teaching materials, so indirectly, we have conveyed the theories. However, there was no clear guidance about the so-called '4 Sehat 5 Sempurna.' I mean the implementation. So that I can have a good understanding and I can design those activities at school."* —Homeroom teacher, Kupang (rural)

School staff was able to identify the kind of support that they need most to facilitate nutrition-related activities. This included reading materials for improving children's nutrition literacy and guidance in facilitating experiential learning activities or nutrition practice sessions at school.

> *"Quite ready, because we have many teachers to provide education and supervise students. We also have hand-washing facilities, even though they are not yet available for each classroom. A trash bin is also available, so students do not litter when eating snacks. What needs to be improved are to have nutrition practice sessions. We need support from the Education Office and the Puskesmas for this."* — School principal, North Lampung (rural)

Some teachers identified themselves as being ready since they had received such support from the PHCs, particularly in facilitating nutrition practice sessions at school.

> *"I am always ready. Because I have support. Puskesmas comes almost once a week. If I don't know about nutrition, I can simply ask the Puskesmas officer how to do it. So, I can teach that to my students. I do not only [explain] the theories but also complement them by practice. I am so ready."* —Homeroom teacher, Pasuruan (rural)

The PTA's roles and readiness in supporting children's dietary practices. Teachers considered that PTA performance was below expectation in improving the nutrition practices of the children. The PTA only participates in meetings hosted by the school, to formally share relevant information about the new academic year, final examination, students' academic report and school facilities.

> *"They come [to the school] when invited, but there is no active role. We want them to hold dissemination to parents about nutrition because it is their job to reach out to parents. But in fact, they only come during students' academic report distribution and new academic year. So, the existence of the PTA is just a formality."* — Homeroom teacher, North Lampung (urban)

The PTA members shared that they lack understanding of nutrition education, and they were hampered by procedural issues at school. They were not able to act directly because any proposal of activities has to go through the school principal, teachers and the head of the organization [for the private school]. As a result, the PTA members considered that the school management and teachers should take the responsibility of implementation of balanced nutrition practices at school. Funding, including hesitance to facilitate crowdfunding from parents, was a constraint as well.

> *"Basically, the concrete role of PTA has not been seen. A few years ago, I was involved in the technical guidance meeting of committees attended by several sub-districts,*

"No, the UKS was not able to support it [children's dietary practices] because no nutrition education has ever been done. I would say UKS is not implemented. Learning material about nutrition for elementary school is also not available. Because it [UKS] is simply not running. The [district] UKS team is not active, there is no UKS secretariat/ office either." —District TP UKS, North Lampung

The desk review showed a potential for the PTA to provide support to school nutrition activities. According to *Peraturan Menteri Pendidikan dan Kebudayaan Nomor 75 Tahun 2016* (Ministry of Education and Culture's Regulation Number 75 of 2016), PTA responsibilities include planning, implementing and supervising school policies and programmes. The PTA is also expected to raise funds and educational resources from the community, individuals, organizations, business entities, industries and other stakeholders through creative and innovative efforts. This guidance would also include programmes related to nutrition education.

Objective 4

To recommend strategic options and pathways of change that will be catalytic to improved, adaptive UKS/M nutrition education modalities within the context of COVID-19 and other disasters

Key Finding 8: UKS/M stakeholders proposed strategic options to improve UKS/M nutrition education, including prioritisation of nutrition, awareness raising, capacity building and monitoring. However, several challenges were still in the way.

- UKS/M key stakeholders were able to provide suggestions to improve the impact of UKS/M on school children's dietary behaviour. They suggested prioritisation through health screenings and official engagement through the head of the district; awareness raising, sharing lessons learned and coordination; capacity building of all stakeholders; strengthening monitoring; and exploring alternative implementation options.
- Challenges brought up included limited resources (including availability of materials), turnover of staff, non-mandatory nutrition education, limited engagement of parents and lack of interest of children.

At the time of the data collection, the TP UKS/M, particularly at the district level, focused on adaptation of face-to-face learning implementation, especially to catch up students' learning performance, rebuild students' personality/character and habit, ensure functional hand-washing facilities and implement a health protocol by students and school communities. Before COVID-19, nutrition education had not been a focus in the UKS/M programme in most schools/madrasahs.

but no concrete action has been taken. Our role in school is limited, even though it is significant. If the school holds a [nutrition information] dissemination, it needs funding, especially if we invite parents to school, because there is a lot of them. It would be a sensitive case to invite only a few parents. Furthermore, it would also be a sensitive case to hold crowdfunding from parents. The parents' mindset is that school [services] should be free of charge. So, until now, this problem has not been settled." —PTA member, North Lampung (urban)

Proposed Strategic Options for UKS/M to Improve Nutrition Education

Stakeholders in TP UKS/M at the national and sub-national levels were asked what they considered as strategic options to improve the UKS/M programme, and below is the outcome of this question.

1. Nutrition of school-aged children should become a priority programme.
    a. Implementation of the Minimum Service Standard on Health, including provision of necessary nutrition interventions as a follow-up to health screenings, can help achieve this.
    b. The head of the district can contribute by strongly recommending the implementation of nutrition education and strengthening school canteens through official communication.
2. Intensive and massive awareness raising on the UKS/M programme to all key stakeholders at the national and sub-national levels.
    a. Utilize the Healthy School Campaign and RAN PIJAR as potential platforms for raising awareness.
    b. Disseminate lessons learned and best practices under the UKS/M implementation by schools, and district TP UKS/M with good UKS/M performance, via various channels.
    c. Conduct UKS/M coordination meetings for exchange of information and experience, and for efficient activity and budget planning.
3. Build capacity of various stakeholders on nutrition education for school-aged children.
    a. Provide capacity building for school principals since their leadership and innovation are key for UKS/M and other programmes at schools.
    b. Conduct capacity building for teachers on nutrition, to enable them to facilitate nutrition education at school. The UKS/M website should be used as one of the sources of nutrition information.
    c. Build the capacity of parents for their stronger involvement in nutrition education, including through the PTA.
4. Strengthen monitoring and evaluation of the UKS/M programme.
    a. Conduct self-assessment of UKS/M performance in all schools. Appropriate appreciation should be given to schools that perform well.
    b. Joint monitoring by high officials from multiple sectors visiting the schools would increase school motivation and commitment to nutrition education.
5. Explore additional pathways to implement or integrate nutrition education.
    a. Arrange nutrition education not only as part of UKS/M programme but also under a "character education programme" since healthy lifestyle is part of children's personality/character.
    b. Integrate nutrition education in other subjects, such as school gardens in spaces available at school, and the use of loudspeakers for regular nutrition information dissemination before the class break.

Challenges to Improving Nutrition Education under UKS/M

The stakeholders also shared their thoughts on some estimated challenges that may occur in implementing nutrition education at school/madrasah.

1. Limited availability of learning materials including "My Health Report Book" and facilities (weighing scale, height measurement tool and school canteens).
2. Rotation of dedicated UKS/M teachers and school principals.
3. Limitation of resources (budget and personnel) of the community health centres to provide adequate coaching and monitoring of UKS/M implementation at school/madrasah.
4. Nutrition education is not always seen as mandatory, and, therefore, schools do not always actively participate.
5. Limited involvement of parents (due to time constraints and lack of awareness) and lack of children's interest towards healthy eating.

V. Conclusions and Recommendations

Objective 1

To assess the effects of school closures on food consumption patterns, knowledge and practices of school-aged children in Indonesia

Conclusion

During the COVID-19 pandemic, children's frequency of consumption of fruit and animal protein decreased, while frequency of consumption of vegetables, carbohydrate-source foods and breakfast increased, especially in urban areas. Though there was increased attention to health and nutrition during COVID-19 and more time to eat at home due to different learning schedules, this sometimes but not always translated into healthier food consumption. One of the reasons was the families' income loss during the pandemic. Moreover, children displayed limited knowledge about good dietary practices especially related to not skipping breakfast and consuming vegetables and fruit. In addition, sugary drinks were consumed more often. Easy access to sugary drinks and salty snacks through food vendors around school using pocket money provided by parents made it possible for children to continue and even increase their consumption when at school.

Recommendation

Ensure that the food environment in and around schools is healthy, by enhancing knowledge and skills of food vendors. Strengthen the assessment and monitoring of food sold by vendors by including indicators for both nutritional value and food safety of the food items that they sell to children.

Increase access of school-aged children to affordable nutritious foods, especially among the most vulnerable families through the existing social safety net programmes, including increasing awareness of the programme beneficiaries towards nutritious foods.

Objective 2

To identify existing policies and programmes that ensure good dietary practices of school-aged children, as schools started to reopen for face-to face learning

Conclusion

Though nutrition is included in many regulations, laws, plans and strategies, it is rarely prioritized and monitored for school-aged children. The three pillars of the UKS/M include nutrition education and good dietary practices, but nutrition education is not provided in a structured and well-organised manner. Data on dietary practices and on the safe food environment are not collected, and data on children's nutrition status not accessible beyond DHO/ PHC (see also Objective 1). Moreover, awareness among stakeholders about regulations and policy is low, and coordination far from perfect. As for UKS/M, although it aims at supporting children's good dietary practices at school, its implementation is limited and was focused mainly on hand washing during the pandemic. The RAN PIJAR is found promising, but as it is still in its infancy, no concrete results could be observed. Thus, though in theory frameworks and programmes are in place, in practice they are insufficiently implemented and monitored to produce a positive effect on children's dietary practices and ultimately their nutritional status.

Recommendations

Support existing national policy frameworks by issuance of sub-national policy/regulations, to gain better commitment, including financial and human resource allocation to ensure nutrition-related policies, regulations and activities for school-aged children are implemented as intended.

Support a better implementation and monitoring of the UKS/M programme in terms of nutrition. Establish a UKS/M information system, to enable sharing of information and good practices related to policies, programme guidelines and learning materials for all UKS/M stakeholders at sub-national level. Strengthen UKS/M programme monitoring and evaluation by conducting individual level assessments (nutritional status and dietary practices of school-aged children) and institutional-level assessments (UKS/M stratification).

Integrate dietary practices of school-aged children into the existing health screening tools as part of nutrition surveillance and analyse these to inform national and sub-national nutrition programme planning and development.

Objective 3

To explore relevance and effectiveness of existing nutrition education interventions for protecting and promoting healthy diets among primary school-aged children in the context of the COVID-19 pandemic

Conclusion

Although nutrition education did not take place in as structured a manner as it was intended, in the areas where it was implemented at all, nutrition education was relevant to the gaps in children's

knowledge and behaviour. Parents and school staff were aware that for nutrition education to be effective, it needed to be repetitive, mandatory, experiential, continuously monitored and strongly engage school staff and parents. They were ready to take on such roles, but had concerns about their own limited nutrition knowledge and insufficient reliable sources of information.

Recommendations

Improve awareness, capacity building, mentoring and access to nutrition information for district stakeholders, schools and parents, to improve their nutrition knowledge and skills in facilitating nutrition education for school-aged children. Strengthen the role of PTAs in nutrition education activities in schools.

Objective 4

To recommend strategic options and pathways of change that will be catalytic to improved, adaptive UKS/M nutrition education modalities within the context of COVID-19 and other disasters

Conclusion

UKS/M stakeholders were generally able to provide strategic options to improve nutrition education under UKS/M, but they also saw some challenges. These options and challenges coincide with the findings of this study. The options were related to prioritizing nutrition for school-aged children, capacity building, awareness raising, monitoring and exploring alternative options. Challenges linked to these suggested options included limited resources, turnover of staff, nutrition education not being mandatory, limited engagement of parents and lack of interest of children in nutrition.

Recommendations

The above suggestions have been included into the recommendations under Objectives 1, 2 and 3.

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Annexes

Annex 1. Total Numbers of SDNs and MIN/MIS in the Respective Area

List of all *Sekolah Dasar Negeri* (SDN, or public elementary schools) and *Madrasah Ibtidaiyah Negeri* (MIN, or public Islamic school)/*Madrasah Ibtidaiyah Swasta* (MIS, or private Islamic school) of each study sites were obtained from the Data Pokok Pendidikan/ Dapodik (Basic Data on Education, MoECRT) and EMIS (Education Management Information System, MoRA), respectively (accessed in March 2022).

	North Lampung	Pasuruan	Kupang
Number of SDNs			
Rural	356	581	262
Urban	50	48	26
SUBTOTAL	406	629	288
Number of MIN/ MIS	60	305	4
TOTAL	466	934	292

Source: DAPODIK: https://dapo.kemdikbud.go.id/.

EMIS: https://dashboardemis.kemenag.go.id/views/DashboardEMISPublic/summary_madrasah?%3Aembed=y#1.

Annex 2. Data Collection Procedures and Study Tools

Available upon request

Annex 3. Ethical Approval

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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:

"Efek Pandemi COVID-19 terhadap Praktik Gizi Seimbang pada Siswa Sekolah Dasar."

Protocol Number	: **22-03-0316**
Peneliti Utama *Principal Investigator*	: **Dr. Luh Ade Ari Wiradnyani**
Nama Institusi *Name of the Institution*	: **SEAMEO Regional Center for Food and Nutrition (RECFON)**
Lokasi Penelitian *Site*	: **Kabupaten Lampung Utara, Kabupaten Pasuruan, dan Kabupaten Kupang**
Tanggal Persetujuan *Date of Approval*	: 21 MAR 2022 ***(valid for one year beginning from the date of approval)***
Dokumen Disetujui *Document Approved*	: **Proposal Penelitian, Version 1.0 tanggal 21 Maret 2022** **Lembar Penjelasan kepada Calon Subjek, Version 1.0 tanggal 27 Februari 2022** **Formulir Informed Assent, Version 1.0 tanggal 27 Februari 2022**

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

Ditetapkan di : Jakarta
Specified in

Ketua
Chair

Prof. dr. Rita Sita Sitorus, Ph.D., Sp.M(K)

** 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 2 minggu 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.

Annex 4. Learning Schemes as Responses to the Pandemic at the National Level

Stage 1 (2020): Early Pandemic

This year could also be called the beginning of the COVID-19 pandemic. The MoEC responded quickly to the COVID-19 outbreak by issuing a circular letter to study at home, no national exams and prohibition of crowds (Kemendikbud RI 2020). Furthermore, in accordance with the joint decision of the four ministers, the policy principle at the start of the pandemic was health and safety. The new school year continued to start in June 2020. At this time, the type of learning was determined by zone. In areas with green zones, face-to-face learning could be carried out by considering the ability of students to apply the health protocol. However, face-to-face learning in the green zone still had to get permission from the local government, school readiness and permission from parents. As for the yellow, orange and red zones, it was forbidden to conduct face-to-face learning in the education unit and continue to use distance learning approach (SKB 4 Menteri, 2020).[7]

For the yellow, orange and red areas, learning was performed fully online through an online messaging application. However, for areas where there was absolutely no internet, the teacher supervised by visiting students' homes. At this time, school assignments were taken directly to the school to be later collected and taken every week. This year, for schools that conducted face-to-face learning, it must be limited to a maximum of 15 people and only be carried out in areas with green zones according to applicable regulations. For boarding schools, it was still prohibited from opening dormitories and conducting face-to-face learning during the transition period (i.e., first two months), although the boarding schools were located in the green zone.

In accordance with the regulations, schools located in the study areas had conducted learning according to government regulations. Schools conducted distance learning using online messaging applications such as WhatsApp Group and Zoom Meeting. For schools that didn't have access to internet and online tools, the submission of school assignments directly to the school prevented crowds and maintained health protocols. In addition, in some areas there were several teachers, those who lived near the students, also occasionally conducted monitoring to the students' homes, which were near to ensure that they could follow the lesson well.

Stage 2 (2021): Second Year Pandemic

This year was also known as the year of the COVID-19 pandemic. There was an adjustment to the joint decision of the four ministers, especially regarding the vaccination of teachers and education personnel and the adjustment of learning policies in 2021. Elementary school teachers and education personnel were the top priority. It was an effort to accelerate face-to-face learning. In accordance with this year's regulations, face-to-face learning was allowed, if permission was obtained from the local government and the school met the requirements. However, distance learning was still a choice of the majority of education units in Indonesia. After educators and education personnel were completely vaccinated against COVID-19, the government required

limited face-to-face learning to be carried out while still implementing health protocols or distance learning. Parents/guardians were allowed to choose between doing limited face-to-face learning or distance learning. In addition, educational units that carry out limited face-to-face learning even though they had not been vaccinated were still allowed to, as long as they received permission from the local government.

This year, several schools in the study sites had implemented hybrid learning or a mix of online and offline learning while still implementing the health protocol. Online learning was performed through WhatsApp and Zoom Meeting. This year, there had been a declining condition of COVID-19 pandemic, so that limited face-to-face learning was carried out, which was entering school as much as 50 percent for several weeks. However, this activity was not carried out in a sustainable manner and distance learning was being carried out again. Teachers also sometimes supervised students' homes to monitor the distance learning process.

During the transition period (the first two months), it was not allowed to open a canteen (people in the education unit were suggested to bring food/drinks with a balanced diet menu), sports and extracurricular activities, and activities other than learning in the education unit environment were not allowed as well. Learning activities outside the education unit environment (such as visiting teachers) were allowed as long as health protocols were maintained.

This year, MoECRT released a pocketbook related to the implementation of the UKS triad during the pandemic (Kemdikbudristek, 2021). This pocket book contains the steps in opening an educational unit to improve the health status of students. Some of the things described in this book include the preparation of the education unit to conduct face-to-face learning, the application of the health protocol in the education unit and an explanation of the *Usaha Kesehatan Sekolah* (UKS). The implementation of the health protocol must still be carried out strictly to accelerate limited face-to-face learning, for example, in classroom locations, canteens and throughout the education unit environment (Kemdikbudristek, 2021).

Stage 3 (2022): Third Year Pandemic

In the 2022 learning year, further policies and directions from a joint decree of four ministers have been carried out by considering the well-known pandemic situation, and for more than two years, Indonesian children have not studied properly. Limited face-to-face learning arrangements are adjusted to school categories based on regional conditions (related to the PPKM level), as well as second doses of vaccinations for educators and education personnel and the elderly.

Starting in January 2022, educational units located in regions with PPKM levels 1, 2 and 3 are required to carry out limited face-to-face learning. The setting of student capacity and duration of learning is regulated based on the coverage of the second dose of vaccination, except for special areas due to appropriate conditions. Parents/guardians are required to participate in face-to-face learning limited to the second semester of the academic year (January 2022). The temporary suspension of limited face-to-face learning is carried out if there is a cluster of COVID-19 transmission in the education unit and other conditions. For teachers and education staff who have not been vaccinated, they are required to teach distance learning. This year, eligible students are encouraged to vaccinate.

This year, learning activities in study sites have been limited to face-to-face learning as much as 50 percent with the division of two time groups, such as Monday–Wednesday or Thursday–Saturday.

For grades 4–6, 100 percent face-to-face learning is carried out with longer lesson hours. This year, vaccinations for elementary school children have been carried out so that it becomes one of the preparations for face-to-face learning. This is in accordance with the government's directive to start face-to-face learning after previously being vaccinated twice for school children.

Annex 5. Table of Children's Dietary Practices, by characteristics

Dietary practices by gender

Dietary practices (N= 660)	n (%)		p-value[1]
	Boy	Girl	
Sources of carbohydrates (rice, noodles, bread, tubers)			0.981
Never	0 (0)	0 (0)	
Rarely (1–3 days/week)	21 (6.5)	22 (6.5)	
Frequently (4–7 days/week)	302 (93.5)	314 (93.5)	
Vegetables			0.072
Never	21 (6.5)	10 (3.0)	
Rarely (1–3 days/week)	146 (45.1)	146 (43.5)	
Frequently (4–7 days/week)	157 (48.5)	180 (53.6)	
Fruits			0.300
Never	83 (25.6)	69 (20.5)	
Rarely (1–3 days/week)	199 (61.4)	220 (65.5)	
Frequently (4–7 days/week)	42 (13.0)	47 (14.0)	
Red meat (beef, pork), poultry (chicken, duck, others) Liver, innards			0.803
Never	70 (21.6)	79 (23.5)	
Rarely (1–3 days/week)	216 (66.7)	216 (64.3)	
Frequently (4–7 days/week)	38 (11.7)	41 (12.2)	
Egg			0.861
Never	47 (14.5)	44 (13.1)	
Rarely (1–3 days/week)	189 (58.3)	201 (59.8)	
Frequently (4–7 days/week)	88 (27.2)	91 (27.1)	
Fish / other seafood (shrimp, clams, squid)			0.379
Never	56 (17.3)	50 (14.9)	
Rarely (1–3 days/week)	220 (67.9)	224 (66.7)	
Frequently (4–7 days/week)	48 (14.8)	62 (18.5)	
Beans (soy, tofu, tempeh)			0.413
Never	57 (17.6)	53 (15.8)	
Rarely (1–3 days/week)	174 (53.7)	170 (50.7)	
Frequently (4–7 days/week)	93 (28.7)	112 (33.4)	
Milk, ice cream, cheese, other dairy product			0.045*
Never	103 (31.8)	80 (23.8)	
Rarely (1–3 days/week)	170 (52.5)	187 (55.7)	
Frequently (4–7 days/week)	51 (15.7)	69 (20.5)	
Sweet food (Bread/cake/biscuits)			0.050*
Never	52 (16.1)	33 (9.9)	
Rarely (1–3 days/week)	181 (56.0)	208 (62.3)	
Frequently (4–7 days/week)	90 (27.9)	93 (27.8)	
Sugary drinks (sweetened tea, syrup, condensed milk, sugary drinks in ready-to-drink packaging or powder, others)			0.550
Never	33 (10.2)	29 (8.7)	
Rarely (1–3 days/week)	169 (52.2)	167 (49.9)	
Frequently (4–7 days/week)	122 (37.7)	139 (41.5)	
Water			0.006*

Dietary practices (N= 660)	n (%)		p-value[1]
	Boy	Girl	
Never	1 (0.3)	0 (0)	
Rarely (1–3 days/week)	19 (5.9)	5 (1.5)	
Frequently (4–7 days/week)	304 (93.8)	331 (98.5)	
Fried foods (including snacks and side dishes)			0.664
Never	19 (5.9)	15 (4.5)	
Rarely (1–3 days/week)	154 (47.5)	157 (46.7)	
Frequently (4–7 days/week)	151 (46.6)	164 (48.8)	
Salty foods such as chips/crisps			0.615
Never	73 (22.5)	65 (19.4)	
Rarely (1–3 days/week)	173 (53.4)	186 (51.8)	
Frequently (4–7 days/week)	78 (24.1)	84 (25.1)	
Instant noodles			0.532
Never	51 (15.7)	55 (16.4)	
Rarely (1–3 days/week)	207 (63.9)	224 (66.7)	
Frequently (4–7 days/week)	66 (20.4)	57 (17.0)	
Have you ever felt afraid / worried that the food at home is not enough because the money to buy food is not available?			0.407
Yes	186 (57.4)	197 (58.6)	
No	128 (39.5)	127 (37.8)	
Do not know	8 (2.5)	12 (3.6)	
Do not answer	2 (0.6)	0 (0)	
How many times did you eat (including breakfast) yesterday?			0.823
Did not eat	0 (0)	1 (0.3)	
1 time	11 (3.4)	13 (3.9)	
2 times	79 (24.4)	87 (25.9)	
3 times	202 (62.3)	206 (61.3)	
> 3 times	32 (9.9)	29 (8.6)	
Have you ever received food, snacks or takeaway for free from school?			0.294
Yes	118 (36.4)	140 (41.7)	
No	199 (61.4)	184 (54.8)	
Do not know	6 (1.9)	11 (3.3)	
Do not answer	1 (0.3)	1 (0.3)	

[1] Chi Square Test. *Significantly different.

Dietary practices by districts

Dietary practices (N= 660)	n (%)			p-value[1]
	North Lampung	Pasuruan	Kupang	
Sources of carbohydrates (rice, noodles, bread, tubers)				0.035*
Never	0 (0)	0 (0)	0 (0)	
Rarely (1–3 days/week)	13 (5.9)	22 (9.9)	8 (3.8)	
Frequently (4–7 days/week)	616 (93.5)	302 (93.5)	314 (96.2)	
Vegetables				<0.001*
Never	17 (7,1)	14 (6.2)	0 (0)	

Dietary practices (N= 660)	n (%)			p-value[1]
	North Lampung	Pasuruan	Kupang	
Rarely (1–3 days/week)	111 (50.0)	116 (51.6)	65 (30.5)	
Frequently (4–7 days/week)	94 (42.3)	95 (42.2)	148 (69.5)	
Fruits				
Never	48 (21.6)	41 (18.2)	63 (29.6)	<0.001*
Rarely (1–3 days/week)	149 (67.1)	138 (61.3)	132 (62.0)	
Frequently (4–7 days/week)	25 (11.3)	46 (20.4)	18 (8.5)	
Red meat (beef, pork), poultry (chicken, duck, others) Liver, innards				
Never	54 (24.3)	35 (15.6)	60 (28.2)	<0.001*
Rarely (1–3 days/week)	150 (67.6)	139 (64.6)	143 (67.1)	
Frequently (4–7 days/week)	18 (8.1)	51 (22.7)	10 (4.7)	
Egg				<0.001*
Never	29 (13.3)	17 (7.6)	45 (21.1)	
Rarely (1–3 days/week)	125 (56.3)	120 (53.3)	145 (68.1)	
Frequently (4–7 days/week)	68 (30.6)	88 (39.1)	23 (10.8)	
Fish / other seafood (shrimp, clams, squid)				<0.001*
Never	35 (15.8)	44 (19.6)	27 (12.7)	
Rarely (1–3 days/week)	155 (69.8)	125 (55.6)	164 (77.0)	
Frequently (4–7 days/week)	32 (14.4)	56 (24.9)	22 (10.3)	
Beans (soy, tofu, tempeh)				<0.001*
Never	35 (15.8)	13 (5.8)	62 (29.2)	
Rarely (1–3 days/week)	126 (56.8)	84 (37.3)	134 (63.2)	
Frequently (4–7 days/week)	61 (27.5)	128 (56.9)	16 (7.5)	
Milk, ice cream, cheese, other dairy product				<0.001*
Never	69 (31.3)	35 (15.6)	79 (37.1)	
Rarely (1–3 days/week)	108 (48.6)	132 (58.7)	117 (54.9)	
Frequently (4–7 days/week)	45 (20.3)	58 (25.8)	17 (8.0)	
Sweet food (Bread/cake/biscuits)				<0.001*
Never	48 (21.8)	18 (8.0)	19 (8.9)	
Rarely (1–3 days/week)	127 (57.7)	119 (53.1)	143 (67.1)	
Frequently (4–7 days/week)	45 (20.5)	87 (38.8)	51 (23.9)	
Sugary drinks (sweetened tea, syrup, condensed milk, sugary drinks in ready-to-drink packaging or powder, others)				<0.001*
Never	32 (14.4)	6 (2.7)	24 (11.3)	
Rarely (1–3 days/week)	119 (53.6)	116 (51.6)	101 (47.6)	
Frequently (4–7 days/week)	71 (32.0)	103 (45.8)	87 (41.0)	
Water				0.021*
Never	0 (0)	0 (0)	0 (0)	
Rarely (1–3 days/week)	3 (1.7)	15 (6.7)	6 (2.8)	
Frequently (4–7 days/week)	218 (98.3)	210 (93.3)	207 (97.2)	
Fried foods (including snacks and side dishes)				<0.001*
Never	14 (6.3)	4 (1.8)	16 (7.5)	
Rarely (1–3 days/week)	102 (45.9)	55 (24.4)	154 (72.3)	
Frequently (4–7 days/week)	106 (47.7)	166 (73.8)	43 (20.2)	
Salty foods such as chips/crisps				<0.001*
Never	63 (28.4)	33 (14.7)	42 (19.8)	
Rarely (1–3 days/week)	102 (45.9)	116 (51.6)	141 (66.5)	

Dietary practices (N= 660)	n (%)			p-value[1]
	North Lampung	Pasuruan	Kupang	
Frequently (4–7 days/week)	57 (25.7)	76 (33.8)	29 (13.7)	
Instant noodles				0.270
Never	35 (15.8)	30 (13.3)	41 (19.2)	
Rarely (1–3 days/week)	145 (65.3)	158 (70.2)	128 (60.1)	
Frequently (4–7 days/week)	42 (18.9)	37 (16.4)	44 (20.7)	
Have you ever felt afraid / worried that the food at home is not enough because the money to buy food is not available?				<0.001*
Yes	121 (54.5)	105 (46.7)	157 (73.7)	
No	91 941.0)	110 (48.9)	54 (25.4)	
Do not know	10 (4.5)	8 (3.6)	2 (0.9)	
Do not answer	0 (0)	2 (0.9)	0 (0)	
How many times did you eat (including breakfast) yesterday?				0.002*
Did not eat	0 (0)	0 (0)	1 (0.5)	
1 time	9 (4.1)	11 (4.9)	4 (1.9)	
2 times	55 (24.8)	75 (33.3)	36 (16.9)	
3 times	132 (59.5)	125 (55.6)	151 (70.9)	
> 3 times	26 (11.7)	14 (6.2)	21 (9.9)	
Have you ever received food, snacks or takeaway for free from school?				<0.001*
Yes	29 (13.1)	138 (61.3)	91 (42.7)	
No	186 (83.8)	81 (36.0)	116 (54.5)	
Do not know	7 (3.3)	4 (1.8)	6 (2.8)	
Do not answer	0 (0)	2 (0.9)	0 (0)	

[1] Chi Square Test. *Significantly different.

Dietary practices by type of residence

Dietary practices (N= 660)	n (%)		p-value[1]
	Urban	Rural	
Sources of carbohydrates (rice, noodles, bread, tubers)			0.283
Never	0 (0)	0 (0)	
Rarely (1–3 days/week)	13 (8.4)	30 (6.0)	
Frequently (4–7 days/week)	142 (91.6)	474 (94.0)	
Vegetables			0.006*
Never	8 (5.2)	23 (4.6)	
Rarely (1–3 days/week)	85 (54.8)	207 (41.0)	
Frequently (4–7 days/week)	62 (40.0)	275 (54.5)	
Fruits			0.911
Never	34 (21.9)	118 (23.4)	
Rarely (1–3 days/week)	99 (63.9)	320 (63.4)	
Frequently (4–7 days/week)	22 (14.2)	67 (13.3)	
Red meat (beef, pork), poultry (chicken, duck, others) Liver, innards			0.001*
Never	36 (23.2)	113 (22.4)	
Rarely (1–3 days/week)	88 (56.8)	344 (68.1)	
Frequently (4–7 days/week)	31 (20.0)	48 (9.5)	
Egg			0.004*
Never	19 (12.3)	72 (14.3)	

Dietary practices (N= 660)	n (%)		p-value[1]
	Urban	Rural	
Rarely (1–3 days/week)	78 (50.3)	312 (61.8)	
Frequently (4–7 days/week)	58 (37.4)	121 (24.0)	
Fish / other seafood (shrimp, clams, squid)			0.946
Never	24 (15.5)	82 (16.2)	
Rarely (1–3 days/week)	104 (67.1)	340 (67.3)	
Frequently (4–7 days/week)	27 (17.4)	83 (16.4)	
Beans (soy, tofu, tempeh)			0.071
Never	17 (11.0)	93 (18.5)	
Rarely (1–3 days/week)	83 (53.5)	261 (51.8)	
Frequently (4–7 days/week)	55 (35.5)	150 (29.8)	
Milk, ice cream, cheese, other dairy product			0.003*
Never	29 (18.7)	154 (30.5)	
Rarely (1–3 days/week)	87 (56.1)	270 (53.5)	
Frequently (4–7 days/week)	39 (25.2)	81 (16.0)	
Sweet food (Bread/cake/biscuits)			0.150
Never	19 (12.4)	66 (13.1)	
Rarely (1–3 days/week)	82 (53.6)	307 (60.9)	
Frequently (4–7 days/week)	52 (34.0)	131 (26.0)	
Sugary drinks (sweetened tea, syrup, condensed milk, sugary drinks in ready-to-drink packaging or powder, others)			0.519
Never	11 (7.1)	51 (10.1)	
Rarely (1–3 days/week)	80 (51.6)	256 (50.8)	
Frequently (4–7 days/week)	64 (41.3)	197 (39.1)	
Water			0.765
Never	0 (0)	0 (0)	
Rarely (1–3 days/week)	5 (3.2)	19 (3.8)	
Frequently (4–7 days/week)	149 (96.8)	486 (96.2)	
Fried foods (including snacks and side dishes)			0.013*
Never	6 (3.9)	28 (5.5)	
Rarely (1–3 days/week)	59 (38.1)	252 (49.9)	
Frequently (4–7 days/week)	90 (28.6)	225 (71.4)	
Salty foods such as chips/crisps			0.992
Never	33 (21.3)	105 (20.8)	
Rarely (1–3 days/week)	84 (54.2)	275 (54.6)	
Frequently (4–7 days/week)	38 (24.5)	124 (24.6)	
Instant noodles			0.740
Never	24 (15.5)	82 (16.2)	
Rarely (1–3 days/week)	105 (67.7)	326 (64.6)	
Frequently (4–7 days/week)	26 (16.8)	97 (19.2)	
Have you ever felt afraid / worried that the food at home is not enough because the money to buy food is not available?			0.128
Yes	79 (51.0)	304 (60.2)	
No	72 (46.5)	183 (36.2)	
Do not know	4 (2.6)	16 (3.2)	
Do not answer	0 (0)	2 (0.4)	
How many times did you eat (including breakfast) yesterday?			0.497

Dietary practices (N= 660)	n (%)		p-value[1]
	Urban	Rural	
Did not eat	0 (0)	1 (0.2)	
1 time	4 (2.6)	20 (4.0)	
2 times	41 (26.5)	125 (24.8)	
3 times	91 (58.7)	317 (62.8)	
> 3 times	19 (12.3)	42 (8.3)	
Have you ever received food, snacks or takeaway for free from school?			0.083
Yes	58 (37.4)	200 (39.6)	
No	91 (58.7)	292 (57.8)	
Do not know	4 (2.6)	13 (2.6)	
Do not answer	2 (1.3)	0 (0)	

[1] Chi Square Test. *Significantly different.

Dietary practices by grade

Dietary practices (N= 660)	n (%)			p-value[1]
	Grade 4	Grade 5	Grade 6	
Sources of carbohydrates (rice, noodles, bread, tubers)				0.997
Never	0 (0)	0 (0)	0 (0)	
Rarely (1–3 days/week)	13 (6.6)	15 (6.5)	15 (6.5)	
Frequently (4–7 days/week)	183 (93.4)	217 (93.5)	216 (93.5)	
Vegetables				0.360
Never	7 (3.6)	11 (4.7)	13 (5.6)	
Rarely (1–3 days/week)	98 (49.7)	101 (43.5)	93 (40.3)	
Frequently (4–7 days/week)	92 (46.7)	120 (51.7)	125 (54.1)	
Fruits				0.167
Never	45 (22.8)	50 (21.6)	57 (24.7)	
Rarely (1–3 days/week)	116 (58.9)	156 (67.2)	147 (63.6)	
Frequently (4–7 days/week)	36 (18.3)	26 (11.2)	27 (11.7)	
Red meat (beef, pork), poultry (chicken, duck, others) Liver, innards				0.425
Never	54 (27.4)	47 (20.3)	48 (20.8)	
Rarely (1–3 days/week)	122 (61.9)	156 (67.2)	154 (66.7)	
Frequently (4–7 days/week)	21 (10.7)	29 (12.5)	29 (12.6)	
Egg				0.993
Never	27 (13.7)	32 (13.8)	32 (13.9)	
Rarely (1–3 days/week)	114 (57.9)	138 (59.5)	138 (59.7)	
Frequently (4–7 days/week)	56 (28.4)	62 (26.7)	61 (26.4)	
Fish / other seafood (shrimp, clams, squid)				0.794
Never	29 (14.7)	35 (15.1)	42 (18.2)	
Rarely (1–3 days/week)	133 (67.5)	161 (69.4)	150 (64.9)	
Frequently (4–7 days/week)	35 (17.8)	36 (15.5)	39 (16.9)	
Beans (soy, tofu, tempeh)				0.925
Never	30 (15.3)	38 (16.4)	42 (18.2)	
Rarely (1–3 days/week)	106 (54.1)	122 (52.6)	116 (50.2)	
Frequently (4–7 days/week)	60 (30.6)	72 (31.0)	73 (31.6)	
Milk, ice cream, cheese, other dairy product				0.392
Never	60 (30.5)	56 (24.1)	67 (29.0)	

Dietary practices (N= 660)	n (%)			p-value[1]
	Grade 4	Grade 5	Grade 6	
Rarely (1–3 days/week)	104 (52.8)	126 (54.3)	127 (55.0)	
Frequently (4–7 days/week)	33 (16.8)	50 (21.6)	37 (16.0)	
Sweet food (Bread/cake/biscuits)				0.833
Never	25 (12.8)	27 (11.6)	33 (14.3)	
Rarely (1–3 days/week)	117 (60.0)	135 (58.2)	137 (59.6)	
Frequently (4–7 days/week)	53 (27.2)	70 (30.2)	60 (26.1)	
Sugary drinks (sweetened tea, syrup, condensed milk, sugary drinks in ready-to-drink packaging or powder, others)				0.210
Never	21 (10.7)	19 (8.2)	22 (9.5)	
Rarely (1–3 days/week)	102 (51.8)	129 (55.8)	105 (45.5)	
Frequently (4–7 days/week)	74 (37.6)	83 (35.9)	104 (45.0)	
Water				0.145
Never	0 (0)	0 (0)	0 (0)	
Rarely (1–3 days/week)	10 (5.1)	10 (4.3)	4 (1.7)	
Frequently (4–7 days/week)	187 (94.9)	221 (95.7)	227 (98.3)	
Fried foods (including snacks and side dishes)				0.795
Never	13 (6.6)	12 (5.2)	9 (3.9)	
Rarely (1–3 days/week)	91 (46.2)	111 (47.8	109 (47.2)	
Frequently (4–7 days/week)	93 (47.2)	109 (47.0)	113 (48.9)	
Salty foods such as chips/crisps				0.420
Never	40 (20.4)	44 (19.0)	54 (23.4)	
Rarely (1–3 days/week)	115 (58.7)	127 (54.7)	117 (50.6)	
Frequently (4–7 days/week)	41 (20.9)	61 (26.3)	60 (26.0)	
Instant noodles				0.114
Never	36 (18.3)	32 (13.8)	38 (16.5)	
Rarely (1–3 days/week)	134 (68.0)	157 (67.7)	140 (60.6)	
Frequently (4–7 days/week)	27 (13.7)	43 (18.5)	53 (22.9)	
Have you ever felt afraid / worried that the food at home is not enough because the money to buy food is not available?				0.630
Yes	109 (55.3)	142 (61.2)	132 (57.1)	
No	79 (40.1)	84 (36.2)	92 (39.8)	
Do not know	9 (4.6)	5 (2.2)	6 (2.6)	
Do not answer	0 (0)	1 (0.4)	1 (0.4)	
How many times did you eat (including breakfast) yesterday?				0.906
Did not eat	0 (0.0)	1 (0.4)	0 (0)	
1 time	5 (2.5)	9 (3.9)	10 (4.3)	
2 times	51 (25.9)	58 (25.0)	57 (24.7)	
3 times	121 (61.4)	145 (62.5)	142 (61.5)	
> 3 times	20 (10.2)	19 (8.2)	22 (9.5)	
Have you ever received food, snacks or takeaway for free from school?				0.063
Yes	67 (34.0)	108 (46.6)	83 (35.9)	
No	126 (64.0)	116 (50.0)	141 (61.0)	
Do not know	3 (1.5)	8 (3.4)	6 (2.6)	
Do not answer	1 (0.5)	0 (0)	1 (0.4)	

[1] Chi Square Test. *Significantly different.

Annex 6. Table of Perceived Changes in Food Consumption, by Characteristics

Perceived changes in food consumption during the COVID-19 pandemic compared to before the pandemic period

Food Group (N= 660)	n (%)			p-value[1]
	Total	Boy	Girl	
Sources of carbohydrates (rice, noodles, bread, tubers)				0.764
Less frequent	93 (14.1)	49 (15.1)	44 (13.1)	
No changes	366 (55.5)	178 (54.9)	188 (56.1)	
More frequent	200 (30.3)	97 (29.9)	103 (30.7)	
Vegetables				0.135
Less frequent	130 (19.7)	74 (22.8)	56 (16.7)	
No changes	314 (47.6)	147 (45.4)	167 (49.7)	
More frequent	216 (32.7)	103 (31.8)	113 (33.6)	
Fruits				0.097
Less frequent	241 (36.5)	120 (37.0)	121 (36.0)	
No changes	309 (46.8)	152 (46.9)	157 (46.7)	
More frequent	110 (16.7)	52 (16.0)	58 (17.3)	
Red meat (beef, pork), poultry (chicken, duck, others) Liver, innards				0.394
Less frequent	213 (32.3)	111 (52.1)	102 (47.9)	
No changes	317 (48.0)	147 (45.4)	170 (50.6)	
More frequent	130 (19.7)	66 (20.4)	64 (19.0)	
Egg				0.992
Less frequent	142 (21.5)	70 (21.6)	72 (21.4)	
No changes	350 (53.0)	171 (52.8)	179 (53.3)	
More frequent	168 (25.5)	83 (25.6)	85 (25.3)	
Fish / other seafood (shrimp, clams, squid)				0.750
Less frequent	175 (26.5)	90 (27.8)	85 (25.3)	
No changes	325 (49.2)	158 (48.8)	167 (49.7)	
More frequent	160 (24.2)	76 (23.5)	84 (25.0)	
Beans (soy, tofu, tempeh)				0.358
Less frequent	150 (22.7)	81 (25.1)	69 (20.5)	
No changes	341 (51.7)	164 (50.8)	177 (52.7)	
More frequent	168 (25.5)	78 (24.1)	90 (26.8)	
Milk, ice cream, cheese, other dairy product				0.059*
Less frequent	195 (29.6)	107 (33.1)	88 (26.2)	
No changes	330 (50.1)	147 (45.5)	183 (55.5)	
More frequent	134 (20.3)	69 (21.4)	65 (19.3)	
Sweet food (Bread/cake/biscuits)				0.138
Less frequent	162 (24.6)	90 (27.9)	72 (21.5)	
No changes	345 (52.4)	159 (49.2)	186 (55.5)	
More frequent	151 (22.9)	74 (49.0)	77 (51.0)	
Sugary drinks (sweetened tea, syrup, condensed milk, sugary drinks in ready-to-drink packaging or powder, others)				0.157
Less frequent	130 (19.7)	70 (21.6)	60 (17.9)	
No changes	359 (54.4)	164 (50.6)	195 (58.0)	

Food Group (N= 660)	n (%)			p-value[1]
	Total	Boy	Girl	
More frequent	171 (25.9)	90 (27.8)	81 (24.1)	
Water				0.038*
Less frequent	23 (3.5)	17 (5.2)	6 (1.8)	
No changes	355 (53.8)	166 (51.2)	189 (56.3)	
More frequent	282 (42.7)	141 (43.5)	141 (42.0)	
Instant noodles				0.252
Less frequent	212 (32.4)	94 (29.3)	118 (35.3)	
No changes	302 (46.1)	154 (48.0)	148 (44.3)	
More frequent	141 (21.5)	73 (22.7)	68 (20.4)	
Breakfast				0.444
Less frequent	123 (18.6)	63 (19.4)	60 (17.9)	
No changes	351 (53.2)	177 (54.6)	174 (51.8)	
More frequent	186 (28.2)	84 (25.9)	102 (30.4)	
Lunch				0.060
Less frequent	101 (15.3)	49 (15.1)	52 (15.5)	
No changes	390 (59.1)	179 (55.2)	211 (62.8)	
More frequent	169 (25.6)	96 (29.6)	73 (21.7)	
Dinner				0.180
Less frequent	115 (17.5)	64 (19,8)	51 (17.5)	
No changes	384 (58.3)	178 (54.9)	206 (61.5)	
More frequent	160 (24.3)	82 (25.3)	78 (23.3)	
Consumption of salty snacks (chips, others)				0.851
Less frequent	210 (31.9)	101 (31.2)	109 (32.5)	
No changes	316 (48.0)	159 (49.1)	157 (46.9)	
More frequent	133 (20.2)	64 (19.8)	69 (20.6)	
Consumption of fried snacks (bakwan, others)				0.994
Less frequent	202 (30.6)	101 (31.2)	101 (30.1)	
No changes	319 (48.3)	156 (48.1)	163 (48.5)	
More frequent	139 (21.1)	67 (20.7)	72 (21.4)	

[1] Chi Square Test. *Significantly different.

Perceived changes in food consumption during the COVID-19 pandemic compared to before the pandemic period, by district

Food Group (N= 660)	n (%)			p-value[1]
	North Lampung	Pasuruan	Kupang	
Sources of carbohydrates (rice, noodles, bread, tubers)				<0.001*
Less frequent	35 (15.8)	51 (22.8)	7 (3.3)	
No changes	139 (62.6)	100 (44.6)	127 (59.6)	
More frequent	48 (21.6)	73 (36.5)	79 (37.1)	
Vegetables				<0.001*
Less frequent	44 (19.8)	65 (28.9)	21 (9.9)	
No changes	115 (51.8)	74 (32.9)	125 (58.7)	
More frequent	63 (28.4)	86 (38.2)	67 (31.5)	
Fruits				<0.001*
Less frequent	75 (33.8)	101 (44.9)	65 (30.5)	
No changes	118 (53.2)	70 (31.1)	121 (56.8)	

Food Group (N= 660)	n (%)			p-value[1]
	North Lampung	Pasuruan	Kupang	
More frequent	29 (13.1)	54 (24.0)	27 (12.7)	
Red meat (beef, pork), poultry (chicken, duck, others) Liver, innards				<0.001*
Less frequent	70 (31.5)	87 (38,7)	56 (26.3)	
No changes	112 (50.5)	73 (32.4)	132 (62.0)	
More frequent	40 (18.0)	65 (28.9)	25 (11.7)	
Egg				<0.001*
Less frequent	45 (20.3)	50 (22.2)	47 (22.1)	
No changes	123 (55.4)	87 (38.7)	140 (65.7)	
More frequent	54 (24.3)	88 (39.1)	26 (12.2)	
Fish / other seafood (shrimp, clams, squid)				<0.001*
Less frequent	44 (19,8)	81 (36.0)	50 (23.5)	
No changes	126 (56.8)	74 (32.9)	125 (58.7)	
More frequent	52 (23.4)	70 (31.1)	38 (17.8)	
Beans (soy, tofu, tempeh)				<0.001*
Less frequent	50 (22.6)	42 (18.7)	58 (27.2)	
No changes	122 (55.2)	93 (41.3)	126 (59.2)	
More frequent	49 (22.2)	90 (40.0)	29 (13.6)	
Milk, ice cream, cheese, other dairy product				<0.001*
Less frequent	55 (24.8)	76 (33.8)	64 (30.2)	
No changes	130 (58.6)	77 (34.2)	123 (58.0)	
More frequent	37 (16.7)	72 (32.0)	25 (11.8)	
Sweet food (Bread/cake/biscuits)				<0.001*
Less frequent	58 (26.1)	62 (27.7)	42 (19.8)	
No changes	132 (59.5)	93 (41.5)	120 (56.6)	
More frequent	32 (14.4)	69 (30.8)	50 (23.6)	
Sugary drinks (sweetened tea, syrup, condensed milk, sugary drinks in ready-to-drink packaging or powder, others)				<0.001*
Less frequent	38 (17.1)	58 (25.8)	34 (16.0)	
No changes	133 (59.9)	97 (43.1)	129 (60.6)	
More frequent	51 (23.0)	70 (31.1)	50 (23.5)	
Water				<0.001*
Less frequent	4 (1.8)	15 (6.7)	4 (1.9)	
No changes	158 (71.2)	91 (40.4)	106 (49.8)	
More frequent	60 (27.0)	119 (52.9)	103 (48.4)	
Instant noodles				<0.001*
Less frequent	66 (30.3)	109 (48.4)	37 (17.5)	
No changes	108 (49.5)	66 (29.3)	128 (60.4)	
More frequent	44 (20.2)	50 (22.2)	47 (22.2)	
Breakfast				<0.001*
Less frequent	40 (18.0)	61 (27.1)	22 (10.3)	
No changes	146 (65.8)	87 (38.7)	118 (55.4)	
More frequent	36 (16.2)	77 (34.2)	73 (34.3)	
Lunch				<0.001*
Less frequent	32 (14.4)	59 (26.2)	10 (4.7)	

Food Group (N= 660)	n (%)			p-value[1]
	North Lampung	Pasuruan	Kupang	
No changes	151 (68.0)	92 (40.9)	147 (69.0)	
More frequent	39 (17.6)	74 (32.9)	56 (26.3)	
Dinner				<0.001*
Less frequent	37 (16.7)	69 (30.7)	9 (4.2)	
No changes	145 (65.6)	91 (40.4)	148 (69.5)	
More frequent	39 (17.6)	65 (28.9)	56 (26.3)	
Consumption of salty snacks (chips, others)				<0.001*
Less frequent	48 (21.7)	85 (37.8)	77 (36.2)	
No changes	135 (61.1)	75 (33.3)	106 (49.8)	
More frequent	38 (17.2)	65 (28.9)	30 (14.1)	
Consumption of fried snacks (bakwan, others)				<0.001*
Less frequent	47 (21.2)	82 (36.4)	73 (34.3)	
No changes	129 (58.1)	77 (34.2)	113 (53.1)	
More frequent	46 (20.7)	66 (29.3)	27 (12.7)	

1 Chi Square Test. *Significantly different.

Perceived changes in food consumption during the COVID-19 pandemic compared to before the pandemic period, by type of residence

Food Group (N= 660)	n (%)		p-value[1]
	Urban	Rural	
Sources of carbohydrates (rice, noodles, bread, tubers)			0.069
Less frequent	29 (18.7)	64 (12.7)	
No changes	75 (48.4)	291 (57.7)	
More frequent	51 (32.9)	149 (29.6)	
Vegetables			0.011*
Less frequent	41 (26.5)	89 (17.6)	
No changes	59 (38.1)	255 (50.5)	
More frequent	55 (35.5)	161 (31.9)	
Fruits			0.83
Less frequent	67 (43.2)	174 (34.5)	
No changes	61 (39.4)	248 (49.1)	
More frequent	27 (17.4)	83 (16.4)	
Red meat (beef, pork), poultry (chicken, duck, others) Liver, innards			0.037
Less frequent	50 (32.3)	163 (32.3)	
No changes	64 (41.3)	253 (50.1)	
More frequent	41 (26.5)	89 (17.6)	
Egg			0.257
Less frequent	33 (21.3)	109 (21.6)	
No changes	75 (48.4)	275 (54.5)	
More frequent	47 (30.3)	121 (24.0)	
Fish / other seafood (shrimp, clams, squid)			0.829
Less frequent	43 (27.7)	132 (26.1)	
No changes	73 (47.1)	252 (49.9)	
More frequent	39 (25.2)	121 (24.0)	

Food Group (N= 660)	n (%)		p-value[1]
	Urban	Rural	
Beans (soy, tofu, tempeh)			0.052
Less frequent	42 (27.1)	108 (21.4)	
No changes	67 (43.2)	274 (54.4)	
More frequent	46 (29.7)	122 (24.2)	
Milk, ice cream, cheese, other dairy product			0.038
Less frequent	56 (36.1)	139 (27.6)	
No changes	64 (41.3)	266 (52.8)	
More frequent	35 (22.6)	99 (19.6)	
Sweet food (Bread/cake/biscuits)			0.105
Less frequent	48 (31.0)	114 (22.7)	
No changes	73 (47.1)	272 (54.1)	
More frequent	34 (21.9)	117 (23.3)	
Sugar Sweetened beverages (sweetened tea, syrup, condensed milk, sweetened beverages in ready-to-drink packaging or powder, others)			0.033
Less frequent	33 (21.3)	97 (19.2)	
No changes	71 (19.8)	288 (57.0)	
More frequent	51 (32.9)	120 (23.8)	
Water			0.049
Less frequent	8 (5.2)	15 (3.0)	
No changes	93 (60.0)	262 (51.9)	
More frequent	54 (34.8)	228 45.1)	
Instant noodles			0.011
Less frequent	65 (42.2)	147 (29.3)	
No changes	60 (39.0)	242 (48.3)	
More frequent	29 (18.8)	112 (22.4)	
Breakfast			0.435
Less frequent	27 (17.4)	96 (19.0)	
No changes	78 (50.3)	273 (54.1)	
More frequent	50 (32.3)	136 (26.9)	
Lunch			0.081
Less frequent	30 (19.4)	71 (14.1)	
No changes	80 (51.6)	310 (61.4)	
More frequent	45 (29.0)	124 (24.6)	
Dinner			0.234
Less frequent	33 (21.3)	82 (16.3)	
No changes	82 (52.9)	302 (59.9)	
More frequent	40 (25.8)	120 (23.8)	
Consumption of salty snacks (chips, others)			0.110
Less frequent	60 (38.7)	150 (29.8)	
No changes	66 (42.6)	250 (49.6)	
More frequent	29 (18.7)	104 (20.6)	
Consumption of fried snacks (bakwan, others)			0.027
Less frequent	47 (30.3)	155 (30.7)	
No changes	64 (41.3)	255 (50.5)	
More frequent	44 (28.4)	95 (18.8)	

1 Chi Square Test. *Significantly different.

Perceived changes in food consumption during the COVID-19 pandemic compared to before the pandemic period, by grade

Food Group (N= 660)	n (%)			p-value[1]
	Grade 4	Grade 5	Grade 6	
Sources of carbohydrates (rice, noodles, bread, tubers)				0.280
Less frequent	25 (12.7)	29 (12.6)	39 (16.9)	
No changes	109 (55.3)	124 (53.7)	133 (57.6)	
More frequent	63 (32.0)	78 (33.8)	59 (25.5)	
Vegetables				0.952
Less frequent	41 (20.8)	47 (20.3)	42 (18.2)	
No changes	94 (47.7)	110 (47.4)	110 (47.6)	
More frequent	62 (31.5)	75 (32.3)	79 (34.2)	
Fruits				0.016*
Less frequent	56 (28.4)	87 (37.5)	98 (42.4)	
No changes	97 (49.2)	109 (47.0)	103 (44.6)	
More frequent	44 (22.3)	36 (15.5)	30 (13.0)	
Red meat (beef, pork), poultry (chicken, duck, others) Liver, innards				0.566
Less frequent	64 (32.5)	78 (33.6)	71 (30.7)	
No changes	97 (49.2)	102 (44.0)	118 (51.1)	
More frequent	36 (18.3)	52 (22.4)	42 (18.2)	
Egg				0.608
Less frequent	41 (20.8)	54 (23.3)	47 (20.3)	
No changes	99 (50.3)	121 (52.2)	130 (56.3)	
More frequent	57 (28.9)	57 (24.6)	54 (23.4)	
Fish / other seafood (shrimp, clams, squid)				0.441
Less frequent	44 (22.3)	65 (28.0)	66 (28.6)	
No changes	100 (50.8)	109 (47.0)	116 (50.2)	
More frequent	53 (26.9)	58 (25.0)	49 (21.2)	
Beans (soy, tofu, tempeh)				0.474
Less frequent	42 (21.3)	53 (22.8)	55 (23.9)	
No changes	111 (56.3)	112 (28.3)	118 (51.3)	
More frequent	44 (22.3)	67 (28.9)	57 (24.8)	
Milk, ice cream, cheese, other dairy product				0.502
Less frequent	49 (24.9)	75 (32.5)	71 (30.7)	
No changes	106 (53.8)	109 (47.2)	115 49.8)	
More frequent	42 (21.3)	47 (20.3)	45 (19.5)	
Sweet food (Bread/cake/biscuits)				0.484
Less frequent	53 (26.9)	57 (24.7)	52 (22.6)	
No changes	101 (51.3)	114 (49.4)	130 (56.5)	
More frequent	43 (21.8)	60 (26.0)	48 (20.9)	
Sugary drinks (sweetened tea, syrup, condensed milk, sugary drinks in ready-to-drink packaging or powder, others)				0.730
Less frequent	40 (20.3)	50 (21.6)	40 (17.3)	
No changes	110 (55.8)	120 (51.7)	129 (55.8)	
More frequent	47 (23.9)	62 (26.7)	62 (26.8)	
Water				0.621
Less frequent	10 (5.1)	6 (2.6)	7 (3.0)	
No changes	105 53.3)	129 (55.6)	121 (52.4)	

Food Group (N= 660)	n (%)			p-value[1]
	Grade 4	Grade 5	Grade 6	
More frequent	82 (41.6)	97 (41.8)	103 (44.6)	
Instant noodles				0.212
Less frequent	65 (33.0)	69 (30.0)	78 (34.2)	
No changes	94 (47.7)	116 (50.4)	92 (40.4)	
More frequent	38 (19.3)	45 (19.6)	58 (25.4)	
Breakfast				0.724
Less frequent	31 (15.7)	45 (19.4)	47 (20.3)	
No changes	111 (56.3)	123 (53.0)	117 (50.6)	
More frequent	55 (27.9)	64 (27.6)	67 (29.0)	
Lunch				0.849
Less frequent	27 (13.7)	37 (15.9)	37 (16.0)	
No changes	117 (59.4)	133 (57.3)	140 (60.6)	
More frequent	53 (26.9)	62 (26.7)	54 (23.4)	
Dinner				0.394
Less frequent	29 (14.7)	47 (20.3)	39 (17.0)	
No changes	118 (59.9)	125 (53.9)	141 (61.3)	
More frequent	50 (25.4)	60 (25.9)	50 (21.7)	
Consumption of salty snacks (chips, others)				0.233
Less frequent	65 (33.0)	66 (28.4)	79 (34.3)	
No changes	100 (50.8)	109 (47.0)	107 (46.5)	
More frequent	32 (16.2)	57 (24.6)	44 (19.1)	
Consumption of fried snacks (bakwan, others)				0.480
Less frequent	55 (27.9)	74 (31.9)	73 (31.6)	
No changes	98 (49.7)	104 (44.8)	117 (50.6)	
More frequent	44 (22.3)	54 (23.3)	41 (17.7)	

[1] Chi Square Test. *Significantly different.

Annex 7. Table of Children's Knowledge Score, by Characteristics

Knowledge score about food consumption, by district

Variable (N= 660)	Median (25th, 75th)				p-value[1]
	Total	North Lampung	Pasuruan	Kupang	
Knowledge Score	62.5 (50.0 , 75.0)	62.5 (50.0 , 75.0)	50.0 (50.0 , 62.5)	62.5 (50.0 , 75.0)	<0.001*

[1] Kruskal-Wallis H test. *Significantly different.

Knowledge score about food consumption, by gender

Variable (N= 660)	Median (25th, 75th)		p-value[1]
	Boy	Girl	
Knowledge Score	62.5 (50.0 , 75.0)	62.5 (50.0 , 75.0)	0.440

[1] Mann Whitney.

Annex 8. List of PERGUB (Province Regulation) and PERBUP (District Regulation) Decree on UKS/M in Indonesia

Province/ District	Regulation	Year
Gorontalo Province	Implementation of School Health Programme in Gorontalo Province	2014
Central Java Province	Guidance and Development of School Health Programme in Central Java Province	2017
DKI Jakarta Province	School Health Programme	2018
Banjarnegara District	Guidance and Development of School Health Programme in Banjarnegara District	2018
Barru District	School Health Programme Implementation	2018
Cilacap District	Guidance and Development of School Health Programme in Cilacap District	2018
Demak District	School Health Programme Implementation in Demak District	2018
Jembrana District	Establishment of the Organization and Work Procedure of School Health Programme in Jembrana District	2006
Katingan District	Guidance and Development of School Health Programme in Katingan District	2020
Klaten District	Guidance and Development of School Health Programme in Klaten District	2019
Kolaka District	Incentives for Nurse for the Implementation of School Health Programme	2019
Kotawaringin Timur District	School Health Programme Revitalization in East Kotawaringin District	2020
Luwu District	School Health Programme Implementation	2018
Madiun District	Guidance and Development of School Health Programme in Madiun District	2018
Majalengka District	Guidance and Development of School Health Programme in Majalengka District	2020
Mamuju Utara District	School Health Programme Implementation	2016
Musi Rawas District	School Health Programme Implementation	2019
Solok District	Guidelines for Implementing School Health Programme in Solok District	2017
Bone District	School Health Programme Implementation	2018
Sukabumi City	Formation of the Organization, Main Duties, Functions, and Working Procedures of the School Health Programme Secretariat in Sukabumi City	2017

Annex 9. Performance Evaluation Tools: A Detailed Description

My Health Report Book (Kemenkes, 2018)

Health Monitoring Book (Kemenkes, 2018)

The SPM is a reference for performance evaluation for sub-national governments. SPM prescribes three health services targeted to primary education, namely 1) health screening for school children ("My Health Report Book"); 2) health screening for out-of-school children ("Health Monitoring Book"); and 3) follow-up on the health screening results. Health screening is considered as a mandatory activity.

"My Health Report Book" (*Buku Rapor Kesehatan Ku*) consists of two books. One book contains information on health and nutrition for adequate growth and development of school-aged children. Teachers and students use it to gain health and nutrition knowledge. The other book contains assessments and results of health screening. In the screening, risky behaviour (which includes skipping breakfast and snacking) and nutritional status (which includes body weight and height and clinical symptoms of anaemia) are assessed. The health screening must be done twice a year. Children who are malnourished are referred to PHCs for treatment. For out-of-school children, a similar health screening must be done regularly, referring to the "Health Monitoring Book" (*Buku Pemantauan Kesehatan*). Ideally, each child should receive both books ("My Health Report Book" and "Health Monitoring Book").

Technical Guidelines of Healthy School/Madrasah Implementation

Data on nutritional status and dietary practices of school children from regular health screenings should serve as nutrition surveillance data for programme evaluation and planning at national and sub-national levels. The results can be used to inform evidence-based nutrition programme planning for promoting healthy dietary practices for school-aged children.

To strengthen the UKS/M implementation, the four ministries have issued technical guidelines as a reference for UKS/M implementation, including integration of the three pillars of UKS/M into the routine school agenda. The guidelines also highlight the need to assess UKS/M programme performance based on several indicators. The performance is grouped into four strata: minimal, standard *(standar)*, optimal and excellent *(paripurna)*.

19. PERILAKU MAKAN MAKANAN BERGIZI	SELALU	SERING	KADANG	TIDAK PERNAH
a. Sarapan setiap pagi				
b. Makan makanan sumber karbohidrat setiap hari seperti nasi, mie, singkong, ketela, dll				
c. Makan makanan berprotein setiap hari, seperti daging, ayam, ikan, telur, dll				
d. Makan sayur dan buah setiap hari				
e. Minum air putih minimal 8 gelas setiap hari				

20. Berapa kali kamu makan setiap hari? Tuliskan	
a. Makan Besar	..... kali dalam sehari
b. Makan selingan/ snack	..... kali dalam sehari

21. Apakah kamu selalu melakukan olahraga atau aktifitas fisik minimal 30 menit setiap hari Contoh aktifitas fisik: membersihkan rumah, bermain, menyapu, mengepel, mencuci, memasak, berjalan kaki dll.	
a. Ya	b. Tidak

Guidelines of Health Services for School-Aged Children and Adolescents during COVID-19

During the pandemic, MoH released "Guidelines for Health Services for School-Aged Children and Adolescents during the COVID-19 Pandemic." In this guideline, the assessment of nutrition aspects is more comprehensive than in "My Health Report Book." The guidelines recommend assessment of balanced nutrition practices among children, which includes 1) washing hands with soap and running water; 2) eating nutritious foods such as breakfast, carbohydrate sources, protein sources, fruit and vegetables and water; and 3) physical activity.

Pocket Book UKS/M Implementation during COVID-19

In June 2021, the Directorate of Primary School MoECRT issued UKS/M implementation for face-to-face learning during the COVID-19 pandemic.

Kemenkes (2021)

BPOM (2013)

Kemendikbudristek (2021)

Guidelines for strengthening school canteens are available. They emphasize hygiene, sanitation and food safety (Kemenkes, 2021); food safety and balanced nutrition (BPOM, 2013); and hygiene,

sanitation and quality of foods sold at the school canteen (Kemendikbudristek, 2021). In addition, the regulation of mobile food vendors was included in the MoH guideline with a focus on hygiene, sanitation and food safety issues. Several stakeholders are in charge of strengthening the mobile food vendors. They include PHC for monitoring and evaluation; district government such as DHO, DEO, district-level MoA, and the Office of Micro, Small and Medium Enterprises for capacity building and mentoring.

School canteen monitoring is conducted once a year by PHC staff (sanitarian unit). The monitoring is done by filling out a standardized form received from the district health office, through the provincial health office. Out of a total of 96 points that can be obtained on the monitoring form, there are six points only for the quality of foods sold in the canteen. Four points are for packaged foods/drinks (i.e., availability of food label, distribution permit, expiry date information and packaging conditions), and two points for non-packaged foods (i.e., good quality and good conditions). The other 90 points are for availability and cleanliness of facilities and infrastructure (such as running water, lightning, ventilation, fridge, utensils and proper storage of raw and cooked foods) and personal hygiene practices of the food handlers.