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# Physical Activity and Stress Levels on the Eating Behavior of Elementary School Amid the Covid-19 Pandemic

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**Abstract**

The objective of this study is to analyze the relationship between physical activity and stress levels on the eating behavior of elementary school-aged children amid the Covid-19 pandemic in Garuda Village, Bandung, West Java. A cross-sectional research design was used in this study. We recruited 173 elementary school children in Garuda Village, Bandung, West Java. Research data were collected by questionnaire. Study measures included a general information survey, anthropometric measurements, a Perceived Stress Scale (PSS), an International Physical Activity Questionnaire (IPAQ), and Food Frequency Questionnaire (FFQ). Univariate, bivariate, and multivariate analyses were used. The result showed children's nutrition intake is associated with the education of fathers and mothers. Students with mild stress levels showed a good eating pattern (55.8%) and students with moderate stress levels had a poor diet (54.2%). There was a relationship between physical activity and the diet of elementary school students (p-value = 0.049) ($p < 0.05$) and students with sedentary physical activity have an opportunity of 2.289 times to have an adequate diet. Gender, father's education, mother's education, father's occupation, mother's occupation, income, and perception of stress were not related to the student's diet (p-value > 0.05).

## Introduction

Primary school children aged 6-12 years have physical growth that has reached maturity, they have been able to control their bodies and balance so they move actively and have the intelligence ability to sort numbers, letters, and words, enjoy talking, understand cause and effect and develop understanding against space and time (Bégin et al., 2020). At this time, children begin to think logically and concretely but they are not able to think abstractly because their reasoning is still limited (Bégin et al., 2020). This causes children to begin to be able to express whether they like or dislike the food and their activities, so parents need to regulate their children's food to maintain their food intake, activities, and screen time.

The study found that among children aged 6–12 years and 13–18 years, the prevalence of overweight increased from 5.1% to 15.6% and from 7.1% to 14.1% between 1993 and 2014, mainly in urban areas (Oddo et al., 2019). Low physical activity independently or moderate physical activity and high energy intake are risk factors for Indonesian children to get overweight (Harahap et al., 2018). Mothers play a key role as individuals who help sort and prepare family food intake whose selection is influenced by knowledge, attitudes, beliefs, income, and family support to regulate and prevent cases of obesity in children (Pradanie et al., 2020). For example, children frequently eating fruits and vegetables and reporting a low junk food energy intake were 70% less likely (OR = 0.30; 0.15–0.59) to be obese (Hadi et al., 2020). Preventive interventions for child obesity need multiple components to improve diets and raise levels of physical activity rather than just addressing one of the three types of assessed behaviors(Hadi et al., 2020).

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The ecological system that surrounds children as proposed by Bronfenbrenner shows that the experience of fear, anxiety, stress, and loneliness of parents and society will affect the psychological well-being of children aged 6-12 years(An, 2020). During the COVID-19 pandemic, school - age children experience stress due to the impact of online learning and the decline in student active living from the moderate category to the low category, so it is important for children and parents to talk to each other more and to do physical activities. together so that the children can develop and grow healthy ((Beltasar & Hidayat, 2022; Budury & Khamida, 2020; Emilia & Mulyono, 2021). During the pandemic where the children should have online study at home also requires parents to be able to implement online learning, parents are expected to be better prepared to play a positive and dynamic role in their learning so the stress that occurs can be prevented (Tri Nugroho et al., 2022).

The program of each school activates children's activities, namely by providing a weekly schedule for the field of physical education and health studies, every Friday in several schools there are also morning exercises, as well as extracurricular activities such as drum band, scouting, volleyball, and soccer. The children are enthusiastic about participating in this school activity but still, some children are overweight. A poor physical activity pattern will cause an increase in overweight cases in children, low levels of child fitness, and affect the health level of children into adulthood (Fraysse et al., 2019; Mora-Gonzalez et al., 2020; Song et al., 2019).

But unfortunately, when the Covid-19 case soared, Physical Distancing was imposed so one of the effects was that schools were closed and students learned from home. Limited personal movement and being confined at home can increase stress levels in children and reduce physical activity. Lack of activity will affect bone growth, bone mass, and bone flexibility, so children who have less activity will not have optimal bone growth. One of the factors that affect physical activity is diet. People who are overweight tend to eat excessively. Obese people are usually more responsive than normal-weight people to external hunger cues, such as the taste and smell of food, or the timing of meals. They tend to eat when they feel like eating, not when they are hungry. This overeating pattern makes it difficult for them to get out of obesity if they do not have self-control and strong motivation to lose weight.

The importance of maintaining essential health services for children while mitigating the impact of the pandemic is an unprecedented challenge. There is a need to increase physical activity in primary school children during the pandemic. This study was conducted to determine the relationship between physical activity and stress levels with eating behavior in school children during the Covid-19 pandemic.

**Method**

In this study, we used a cross-sectional research design. Data were collected from March 2021 to October 2021. We recruited 102 elementary school children in Garuda Village, Bandung, West Java. Research data were collected by questionnaire. Study measures included a general information survey, anthropometric measurements, stress level and physical activity questionnaires, and food frequency questionnaires. Multiple logistic regression was used. Participants were invited to participate in the study through the distribution of WhatsApp messages and printed letters facilitated by the school administrations and community stakeholders. We included children between six and twelve years old who had no chronic disease that affected their nutritional status or physical activity pattern. Ethical considerations Approval to conduct the study was obtained from Komite Etik Fakultas Kedokteran Universitas Gajah Mada, Yogyakarta, Indonesia. Before participating in the study, the risks and benefits were explained to all potential mothers and children participants. After answering all the questions, written consent from mothers and assent from children were collected. Instruments and measures Study instruments included anthropometric measurements of children, a Perceived Stress Scale (PSS), International Physical Activity Questionnaire (IPAQ), and Food Frequency Questionnaire (FFQ).

This research uses statistical software with the following stages such as Edit Data,

Data Coding, Data Entry, and Data Analysis. Edit Data is the activity stage of cleaning the data that has been collected, both how to fill it, filling errors, and consistency of each answer contained in the questionnaire. Data coding is done by providing a code for each answer given to facilitate data entry. Data Entry is the list of questions that have been completed by filling in the answer code that is then entered into a computer program in the form of codes only. And the last Data Analysis is the variables that have been selected and stored in the form of a database program and are then analyzed using the statistical software STATA version 16. First, descriptive statistics are compiled to describe physical activity, stress levels, and eating behavior. Second, all data were analyzed using ordinal logistic regression.

**Result and Discussion**

The research was conducted at SD Kelurahan Garuda, Andir Subdistrict, Bandung City in June 2021. A total of 107 students in grades 4, 5, and 6 were interviewed to fill out the questionnaire. However, only 93 could be analyzed because 14 student data were incomplete. The characteristics of the respondents can be described in the following Table:

Table 1. Descriptive Analysis

| Variable | Adequate diet (n=47) | | Good diet (n=46) | |
|---|---|---|---|---|
| | Total | Percentage | Total | Percentage |
| Gender | | | | |
| - Male | 27 | 50 | 27 | 50 |
| - Female | 20 | 51,3 | 19 | 48,7 |
| Father Education | | | | |
| - Elementary | 5 | 38,5 | 8 | 61,5 |
| - Junior High School | 13 | 54,2 | 11 | 45,8 |
| - Senior High School | 27 | 51,9 | 25 | 48,1 |
| - D1/D2/D3/D4/S1 Graduated | 2 | 50 | 2 | 50 |
| Mother Education | | | | |
| - Elementary | 9 | 45 | 11 | 55 |
| - Junior High School | 15 | 51,7 | 14 | 48,3 |
| - Senior High School | 22 | 55 | 18 | 45 |
| - D1/D2/D3/D4/S1 Graduated | 1 | 33,3 | 2 | 66,7 |
| - Magister Graduated | 0 | 0 | 1 | 100 |
| Father's Job | | | | |
| - Does not work | 0 | 0 | 1 | 100 |
| - PNS (Public worker) | 1 | 33,3 | 2 | 66,7 |
| - Entrepreneur | 11 | 37,9 | 18 | 62,1 |
| - Laborer | 24 | 52,2 | 22 | 47,8 |
| - Other | 11 | 78,6 | 3 | 21,4 |
| Mother's job | | | | |
| - Does not work/housewife | 36 | 52,9 | 32 | 47,1 |
| - PNS (Public worker) | 1 | 100 | 0 | 0 |
| - Entrepreneur | 4 | 28,6 | 10 | 71,4 |
| - Laborer | 4 | 66,7 | 2 | 33,3 |
| - Other | 2 | 50 | 2 | 50 |
| Family income | | | | |
| - < Rp 500.000,- | 3 | 60 | 2 | 40 |
| - Rp 500.000 - Rp 1.000.000,- | 9 | 56,3 | 7 | 43,7 |
| - Rp 1000.000,- - Rp 3.000.000,- | 21 | 47,7 | 23 | 52,3 |
| - Rp 3.000.000,- - Rp 5.000.0000,- | 12 | 54,5 | 10 | 45,5 |
| - > Rp 5.000.0000,- | 2 | 33,3 | 4 | 66,7 |
| Stress perception | | | | |
| - Mild | 14 | 45,2 | 17 | 55,8 |
| - Moderate | 32 | 54,2 | 27 | 45,8 |
| - High | 1 | 33,3 | 2 | 66,7 |
| Physical activity | | | | |
| - *sedentary* | 29 | 60,4 | 19 | 39,6 |
| - *moderate activity* | 18 | 40 | 27 | 60 |

Source: Primary Data, 2021

The results of the descriptive analysis showed that the children's diet was good and adequate with almost equal percentages, namely 49.5% and 50.5%. The cut-off point set in the diet variable uses the median value because the data is not normally distributed. The family environment greatly influences healthy behavior habits in children, especially boys, other factors that affect children's food consumption such as knowledge, attitudes, and habits of bringing lunch and their peers (Gibson et al., 2020; Williams et al., 2018). Activities to improve healthy dietary practices are certainly highly recommended for good growth and development of children, starting with the food they eat (Fernández-Álvarez et al., 2021). Most of the respondent's mothers are housewives who can prepare food for their children at home so that their children's diet can be maintained properly. Children who have good consumption patterns can improve or maintain good nutritional status, while children who consume a lot of unhealthy snacks such as fruit syrup, flavored drinks, fried foods, pentol, brains, and sausages can trigger overweight or obesity in children (Desalew et al., 2017; Khamis et al., 2019).

Most of the respondents are male with the same proportion as those with good and sufficient eating patterns (50%). Meanwhile, more female students had a poor diet (51.3%) than students with a good diet (48.7%). The education of fathers and mothers are mostly high school graduates/equivalent both in the group with a good and sufficient diet. Most of the fathers work as laborers, while most of the mothers do not work/housewives. Most of the family income is in the category of IDR 1,000,000 to IDR 3,000,000. During the Covid-19 pandemic, all countries in the world experienced losses that resulted in mass job losses, especially in poor and developing countries, so at that time some communities experienced difficulties in accessing food security and medicines (Josephson et al., 2021). Families who suffered losses due to Covid-19 (through reduced income and stopped working) had 3 times higher risk to experience food insecurity compared to those who did not (Syafiq et al., 2022). Research respondents have a fairly high education, an average of 3 family members, and sufficient income. High income can maximize food diversity (amount and type) such as the consumption of animal food (meat, eggs, chicken, and fish) in the household so that it can meet nutritional adequacy (Workicho et al., 2016).

Description of stress perception variable using Perceived Stress Scale (PSS) questions shows students have moderate stress level of 63.4%. Students with mild stress levels showed a good eating pattern by 55.8%, the value was higher when compared to students whose diet was less (45.2%). On the other hand, students with moderate levels of stress had more of a poor diet (54.2%), when compared to students who had a good diet (45.8%). During the pandemic, the stress level of primary school children in large classes is higher than in small classes due to the difficulty of accepting the latest learning methods for elementary school students, most of whom ultimately need to learn on their own (Cusinato et al., 2020). In addition to increasing children's stress levels during the pandemic, parents' stress levels also increase due to high screen time in children which triggers a sedentary lifestyle (Seguin et al., 2021). Screentime that is too high can interfere with children's physical activity and cognitive development, affect the quality and duration of sleep, increase the risk of hypertension, cause a decrease in HDL cholesterol, and is associated with depression in children (Domingues-Montanari, 2017; Lissak, 2018). Stress levels in children need to be reduced by getting used to physical activities outside the home with the family so that it can affect eating patterns in children.

Physical activity carried out during this pandemic is in the sedentary category with a percentage of 51.6%. Physical activity variables were divided into sedentary and moderate with a cut-off point of the mean value because the data were normally distributed (p-value of normality > 0.05). Students with more sedentary activities had a poor diet (60, 4%), while the rest had a good diet (39,6%). On the other hand, students with moderate activity had more good diets (60%) when compared to those with adequate diets. Higher levels of Physical Activity were associated with more favorable cardiometabolic health, with increasing levels

of stress minimizing the beneficial effect of Physical Activity on Body Mass Index (Schultz et al., 2020). Typical activities of daily living -days are like playing group games which will affect the physical and emotional development of children (Webster et al., 2019). Bivariate analysis was conducted to examine the relationship between characteristics, physical activity, and stress levels on the diet of elementary school students. The analysis used is chi-square. The data will be presented in the following table:

Table 2. Bivariate Analysis

| Variable | Adequate diet (n=47) | | Good diet (n=46) | | *P-value* |
|---|---|---|---|---|---|
| | Total | Percentage | Total | Percentage | |
| Gender | | | | | 0,903 |
| - Male | 27 | 50 | 27 | 50 | |
| - Female | 20 | 51,3 | 19 | 48,7 | |
| Father Education | | | | | 0,819 |
| - Elementary | 5 | 38,5 | 8 | 61,5 | |
| - Junior High School | 13 | 54,2 | 11 | 45,8 | |
| - Senior High School | 27 | 51,9 | 25 | 48,1 | |
| - D1/D2/D3/D4/S1 Graduated | 2 | 50 | 2 | 50 | |
| Mother Education | | | | | 0,744 |
| - Elementary | 9 | 45 | 11 | 55 | |
| - Junior High School | 15 | 51,7 | 14 | 48,3 | |
| - Senior High School | 22 | 55 | 18 | 45 | |
| - D1/D2/D3/D4/S1 Graduated | 1 | 33,3 | 2 | 66,7 | |
| - Magister Graduated | 0 | 0 | 1 | 100 | |
| Father's Job | | | | | 0,104 |
| - Does not work | 0 | 0 | 1 | 100 | |
| - PNS (Public worker) | 1 | 33,3 | 2 | 66,7 | |
| - Entrepreneur | 11 | 37,9 | 18 | 62,1 | |
| - Laborer | 24 | 52,2 | 22 | 47,8 | |
| - Other | 11 | 78,6 | 3 | 21,4 | |
| Mother's job | | | | | 0,347 |
| - Does not work/housewife | 36 | 52,9 | 32 | 47,1 | |
| - PNS (Public worker) | 1 | 100 | 0 | 0 | |
| - Entrepreneur | 4 | 28,6 | 10 | 71,4 | |
| - Laborer | 4 | 66,7 | 2 | 33,3 | |
| - Other | 2 | 50 | 2 | 50 | |
| Family income | | | | | 0,848 |
| - < Rp 500.000,- | 3 | 60 | 2 | 40 | |
| - Rp 500.000 - Rp 1.000.000,- | 9 | 56,3 | 7 | 43,7 | |
| - Rp 1000.000,- - Rp 3.000.000,- | 21 | 47,7 | 23 | 52,3 | |
| - Rp 3.000.000,- - Rp 5.000.0000,- | 12 | 54,5 | 10 | 45,5 | |
| - > Rp 5.000.0000,- | 2 | 33,3 | 4 | 66,7 | |
| Stress perception | | | | | 0,463 |
| - Mild | 14 | 45,2 | 17 | 55,8 | |
| - Moderate | 32 | 54,2 | 27 | 45,8 | |
| High | 1 | 33,3 | 2 | 66,7 | |
| Physical activity | | | | | **0,049** |
| - *sedentary* | 29 | 60,4 | 19 | 39,6 | |
| - *moderate activity* | 18 | 40 | 27 | 60 | |

Source: Primary Data, 2021

The results of the analysis showed that there was a relationship between physical activity and the diet of elementary school students, as evidenced by the p-value = 0.049 ($p < 0.05$). The value of the Odd Ratio (OR) is 2.289, which means that students with sedentary physical activity have an opportunity of 2.289 times to have an adequate diet when compared to students with moderate physical activity. These results indicate that the online learning process causes the average level of physical activity of students to be in the sedentary group which causes students' eating patterns to be less good or sufficient. As a result, if children do

not get good nutrition it will have an impact on obesity, besides that childhood obesity is closely related to the level of child fitness and motoric development, and causes cases of morbidity in children such as hypertension, psychological impacts, sleep apnea, gastroesophageal reflux disease, iron deficiency, anemia, and asthma (Han et al., 2018; Sahib et al., 2021; Tambalis et al., 2018). During a pandemic, increasing screen time and decreasing physical activity causes unhealthy behavior and affects stress levels for both father, mother, and child (Carroll et al., 2020). Students with moderate physical activity have a good diet because physical activity is a movement that involves skeletal muscles that require energy, school children have the characteristics of always being active in physical activities, so they require high energy intake to meet their needs (Al-Jawaldeh et al., 2020). Physical activity balances calories in food with calories used during physical activity to control body weight (Scaglioni et al., 2018).

Other variables such as gender, father's education, mother's education, father's occupation, mother's occupation, income, and perception of stress were not related to the student's diet because they had a p-value > 0.05. Strategies to improve dietary quality for groups that have easy access to healthier foods focus on improving the types of high-quality protein foods, such as milk and seafood, while the groups who have difficulty accessing healthier foods can choose to increase the types of high-quality but relatively cheap foods like vegetables and fruits considering the availability and living cost (Lan Wang et al., 2022).

## Conclusion

Children's nutrition intake is associated with the education of fathers and mothers. Students with mild stress levels showed a good eating pattern (55.8%) and students with moderate stress levels had a poor diet (54.2%). There was a relationship between physical activity and the diet of elementary school students (p-value = 0.049) ($p < 0.05$) and students with sedentary physical activity have an opportunity of 2.289 times to have an adequate diet. Gender, father's education, mother's education, father's occupation, mother's occupation, income, and perception of stress were not related to the student's diet (p-value > 0.05).

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## References

Al-Jawaldeh, A., Taktouk, M., Nasreddine, L., 2020. Food Consumption Patterns and Nutrient Intakes of Children and Adolescents in the Eastern Mediterranean Region: A Call for Policy Action. *Nutrients,* 2020.

An, R., 2020. Projecting the Impact of the Coronavirus Disease-2019 Pandemic on Childhood Obesity in the United States: A Microsimulation Model. *J Sport Health Sci,* 9.

Bégin, F., Elder, L., Griffiths, M., Holschneider, S., Piwoz, E., Ruel-Bergeron, J., & Shekar, M., 2020. Promoting Child Growth and Development in the Sustainable Development Goals Era: Is It Time for New Thinking?. *Journal of Nutrition,* 150.

Beltasar, T., & Hidayat, T., 2022. Effects of the COVID-19 Pandemic on Active Life Behavior of Elementary School Students in West Java. *Journal Sport Area*, 7, pp.69–78.

Budury, S., & Khamida, K., 2020. Playing "Walk And Stop" and Expressive Writing to Reduce Children's Stress During the Covid Pandemic 19. *Indonesian Journal of Cultural and Community Development*, 8.

Carroll, N., Sadowski, A., Laila, A., Hruska, V., Nixon, M., Ma, D.W.L., & Haines, J., 2020. The Impact of Covid-19 on Health Behavior, Stress, Financial and Food Security Among Middle to High Income Canadian Families with Young Children. *Nutrients,* 12.

Cusinato, M., Iannattone, S., Spoto, A., Poli, M., Moretti, C., Gatta, M., & Miscioscia, M., 2020. Stress, Resilience, and Well-Being in Italian Children and Their Parents During the COVID-19 Pandemic. *Int J Environ Res Public Health* ,17.

Desalew, A., Mandesh, A., & Semahegn, A., 2017. Childhood Overweight, Obesity and Associated Factors Among Primary School Children in Dire Dawa, Eastern Ethiopia; A Cross-Sectional Study. *BMC Obes,* 4.

Domingues-Montanari, S., 2017. Clinical and Psychological Effects of Excessive Screen Time on Children. *J Paediatr Child Health,* 2017.

Emilia, P.S., & Mulyono, 2021. Pengaruh Terapi Bermain Game Online terhadap Tingkat Stres Anak Usia Sekolah Dimasa Pandemi Covid-19. *Jurnal Ilmu Keperawatan Jiwa,* 4, pp.633–638.

Fernández-Álvarez, M. del M., Martín-Payo, R., Zabaleta-del-Olmo, E., García-García, R., Cuesta-Izquierdo, M., & González-Méndez, X., 2021. Assessment of Diet Quality and Physical Activity of Soccer Players Aged 13 to 16, from the Principality of Asturias, Spain. *An Pediatr (Engl Ed)*, 95.

Fraysse, F., Grobler, A.C., Muller, J., Wake, M., & Olds, T., 2019. Physical Activity and Sedentary Activity: Population Epidemiology and Concordance in Australian Children Aged 11-12 Years and Their Parents. *BMJ Open*, 9.

Gibson, E.L., Androutsos, O., Moreno, L., Flores-Barrantes, P., Socha, P., Iotova, V., Cardon, G., De Bourdeaudhuij, I., Koletzko, B., Skripkauskaite, S., & Manios, Y., 2020. Influences of Parental Snacking-Related Attitudes, Behaviours and Nutritional Knowledge on Young Children's Healthy and Unhealthy Snacking: The ToyBox Study. *Nutrients,* 12.

Hadi, H., Nurwanti, E., Gittelsohn, J., Arundhana, A.I., Astiti, D., West, K.P., & Dibley, M.J., 2020. Improved Understanding of Interactions between Risk Factors for Child Obesity May Lead to Better Designed Prevention Policies and Programs in Indonesia. *Nutrients,* 12.

Han, A., Fu, A., Cobley, S., & Sanders, R.H., 2018. Effectiveness of Exercise Intervention on Improving Fundamental Movement Skills and Motor Coordination in Overweight/ Obese Children and Adolescents: A Systematic Review. *J Sci Med Sport,* 2018.

Harahap, H., Sandjaja, S., Soekatri, M., Khouw, I., & Deurenberg, P., 2018. Association of Energy Intake and Physical Activity with Overweight among Indonesian Children 6-12 Years of Age. *Asia Pac J Clin Nutr,* 27.

Josephson, A., Kilic, T., & Michler, J.D., 2021. Socioeconomic Impacts of COVID-19 in Low-Income Countries. *Nat Hum Behav,* 5.

Khamis, A.G., Mwanri, A.W., Ntwenya, J.E., & Kreppel, K., 2019. The Influence of Dietary Diversity on the Nutritional Status of Children Between 6 and 23 Months of Age in Tanzania. *BMC Pediatr,* 19.

Lan Wang., Huang, W., Zhao, C., Hu, Y., & Cui, S., 2022. Exploring the Environment-Nutrition-Obesity Effects Associated with Food Consumption in Different Groups in China. *J Environ Manage,* 317, pp.115–287.

Lissak, G., 2018. Adverse Physiological and Psychological Effects of Screen Time on Children and Adolescents: Literature Review and Case Study. *Environ Res,* 164.

Mora-Gonzalez, J., Esteban-Cornejo, I., Solis-Urra, P., Migueles, J.H., Cadenas-Sanchez, C., Molina-Garcia, P., Rodriguez-Ayllon, M., Hillman, C.H., Catena, A., Pontifex, M.B., & Ortega, F.B., 2020. Fitness, Physical Activity, Sedentary Time, Inhibitory Control, and Neuroelectric Activity in Children with Overweight or Obesity: The ActiveBrains project. *Psychophysiology,* 57.

Oddo, V.M., Maehara, M., Rah, J.H., 2019. Overweight in Indonesia: An Observational Study of Trends and Risk Factors Among Adults and Children. *BMJ Open*, 9.

Pradanie, R., Rachmawati, P.D., & Cahyani, M.D., 2020. Factors Associated with Mothers' Behaviors in Selecting Complementary Feeding in Surabaya, Indonesia. *Nurse Media Journal of Nursing*, 10.

Sahib, H.S., Mohsin, R.K., & Mutlag, S.S., 2021. The Burden of Obesity on Children Health, Its Correlation to Their Age. *Revista Latinoamericana de Hipertension,* 15.

Scaglioni, S., De Cosmi, V., Ciappolino, V., Parazzini, F., Brambilla, P., & Agostoni, C., 2018. Factors Influencing Children's Eating Behaviours. *Nutrients,* 2018.

Schultz, N.S., Chui, K.K.H., Economos, C.D., Lichtenstein, A.H., Volpe, S.L., & Sacheck, J.M., 2020. Impact of Physical Activity, Diet Quality and Stress on Cardiometabolic Health in School Employees. *Prev Med Rep,* 20.

Seguin, D., Kuenzel, E., Morton, J.B., & Duerden, E.G., 2021. School's Out: Parenting Stress and Screen Time Use in School-Age Children During the COVID-19 Pandemic. *J Affect Disord Rep, 6*.

Song, C., Gong, W., Ding, C., Yuan, F., Zhang, Y., Feng, G., Chen, Z., & Liu, A., 2019. Physical Activity and Sedentary Behavior Among Chinese Children Aged 6-17 Years: A Cross-Sectional Analysis of 2010-2012 China National Nutrition and Health Survey. *BMC Public Health,* 19.

Syafiq, A., Fikawati, S., & Gemily, S.C., 2022. Household Food Security During the COVID-19 Pandemic in Urban and Semi-Urban Areas in Indonesia. *J Health Popul*

*Nutr,* 41.

Tambalis, K.D., Panagiotakos, D.B., Psarra, G., & Sidossis, L.S., 2018. Insufficient Sleep Duration is Associated with Dietary Habits, Screen Time, and Obesity in Children. *Journal of Clinical Sleep Medicine*, 14.

Tri Nugroho, W., Lisdianti, K.M., & Yusfar., 2022. The Relationship Between Online Learning Methods and The Stress Level of Parents of Primary School Students in Cimaung Village, Cimaung District, Bandung Regency. *KESANS: International Journal of Health and Science,* 1, pp.703–717.

Webster, E.K., Martin, C.K., & Staiano, A.E., 2019. Fundamental Motor Skills, Screen-Time, and Physical Activity in Preschoolers. *J Sport Health Sci,* 8.

Williams, B., Smith, C., Hubbs-Tait, L., Baldwin, J., Guseman, E., & Sisson, S., 2018. The Effect of Family Environment and Behaviors on Child Weight Status, Physical Activity, and Diet. *J Nutr Educ Behav,* 50.

Workicho, A., Belachew, T., Feyissa, G.T., Wondafrash, B., Lachat, C., Verstraeten, R., & Kolsteren, P., 2016. Household Dietary Diversity and Animal Source Food Consumption in Ethiopia: Evidence from the 2011 Welfare Monitoring Survey. *BMC Public Health,* 16.