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Nutrition Literacy Strategies for Improving Healthy and Nutritious Food Consumption Practices in Preschool Children

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Abstract

Background: Food consumption practices in preschool children play a crucial role in shaping their dietary habits in later years. Effective nutrition literacy strategies are essential to foster healthy and nutritious food consumption among preschoolers. Aims: To identify problems, interviews were conducted with members of the kindergarten community, including teachers, parents, and students, and observations of the school environment. Methods: Community service with problem-based learning activities were conducted at At Tiin Kindergarten in Semarang City from July to September 2024. The participants in this initiative included 52 preschool children attending Class A at At Tiin Kindergarten. Participants were divided into two groups, namely a control group (Class A1) receiving a single storytelling session with story books, and an intervention group (Class A2) receiving repeated storytelling sessions with story books. Results: The identified issues among the preschoolers included overnutrition (WHZ 17%; WAZ 7%; and BAZ 12%), undernutrition (WHZ 4%; WAZ 10%; BAZ 7%), and stunting (HAZ 4%). Following the implementation of storytelling and storybook-based interventions, children's nutritional literacy improved, especially in the intervention group (16 children) who participated in repeated storytelling sessions, compared to the control group (13 children) who only received one session. Conclusion: Repeated storytelling sessions led to greater gains in balanced nutrition knowledge and improved understanding of the MyPlate guidelines in preschool children. Suggestion: To further enhance nutritional literacy and promote balanced nutrition practices among preschool children, it is recommended that periodic activities be implemented to address and mitigate the issue of malnutrition in this age group.

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INTRODUCTION

Preschool-aged children (3–5 years) are in a critical phase of physical and psychological development, where nutritional problems can cause long-term, irreversible effects (Afrinis *et al.*, 2021). Indonesia currently faces a triple burden of malnutrition: undernutrition, rising rates of overnutrition, and micronutrient deficiencies. Micronutrients play an important role in the metabolism and physiological functions of the body to achieve optimal health. Those issues significantly impact preschool children, leading to increased risk of disease morbidity, weakened immunity, growth failure, impaired cognitive development, and reduced future productivity (Bailey *et al.*, 2015; Conti *et al.*, 2021; Kobylińska *et al.*, 2022; Utami & Mubasyiroh, 2019).

Data from the 2022 Indonesian Nutrition Status Survey (SSGI) and the 2018 Basic Health Research (Riskesdas) indicate a rising trend in undernutrition among children under five. The prevalence of underweight increased from 16.3% in 2018 to 17.1% in 2022, while wasting rose from 7.4% to 7.7% in the same period. In Semarang City, the waste rate is 6.2%, lower than the national average but still above the 5% threshold (Kemenkes, 2018, 2022). Meanwhile, the prevalence of overweight among children under five declined nationally from 4.5% (2018) to 3.5% (2022), although Semarang's rate remains higher at 4.3%. This condition is still classified as a mild public health

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problem (de Onis *et al*., 2019; Kemenkes, 2022). Despite being classified as a mild public health concern, overnutrition during early childhood often persists into adolescence and adulthood (Utami & Mubasyiroh, 2019). Riskesdas 2018 also reported a steady increase in adult overnutrition and obesity from 2007 to 2018, with overnutrition rising from 8.6% to 13.6% and obesity from 10.5% to 21.8% (Kemenkes, 2018)

Inappropriate eating habits in both quantity and quality are a key contributor to nutritional problems in preschool children (Bailey *et al*., 2015; Conti *et al*., 2021; Kobylińska *et al*., 2022). Children commonly exhibit picky eating behavior at this age, such as showing strong preferences for certain foods while rejecting others, especially new or unfamiliar items. Studies in China report picky eating in 54% of children aged 3–7 years and 36% in those aged 2–3 years (Chao, 2018; Li *et al*., 2017; Xue *et al*., 2015). Similar findings were observed in Lampung and Semarang, with the prevalence of picky eating in preschool children (3-6 years old) at 62.5% and 52.4%, respectively (Angraini *et al*., 2022; Hardianti *et al*., 2018). Preschoolers prefer sweet and salty snacks over healthier options like fruits and vegetables (Afrinis *et al*., 2021). A study in Singapore showed that as many as 14% of children refused fruits and vegetables, 13.3% favored sweets, and 11.1% preferred snacks over main meals (Goh & Jacob, 2012).

Eating habits develop early in life, and childhood dietary patterns strongly predict eating behavior in adulthood (Nix *et al*., 2021). Parental strategies such as pressuring children to eat healthy foods or restricting access to unhealthy foods are often counterproductive. Research shows that such pressure is negatively associated with healthy eating outcomes. The more a food is restricted, the more children desire it. Similarly, forcing children to eat fruits and vegetables can increase resistance and a stronger dislike for these foods (Jarman *et al*., 2015). These findings highlight the need for positive, supportive approaches to foster healthy eating behaviors from an early age.

Picky eating in children has been directly linked to suboptimal growth, increased risk of stunting, undernutrition, obesity, and impaired brain development (Astuti *et al*., 2023; Chao, 2018). Studies consistently show a significant correlation between picky eating and poor nutritional status indicators, including height-for-age (HAZ), weight-for-age (WAZ), and BMI-for-age (BAZ) in preschool children (Chao, 2018; Xue *et al*., 2015). Children with picky eating are reported to have lower intakes of energy, protein, fiber, iron, zinc, vitamin A, vitamin B1, vitamin B2, vitamin B3, vitamin B6, vitamin E, and vitamin C and higher intakes of fat than non-picky eating children (Angraini *et al*., 2022; Li *et al*., 2017; Xue *et al*., 2015). If this condition occurs for a long period, it will impact children's growth, development, and health.

Nutrition education at the preschool level is critical for establishing lifelong healthy eating habits (Hassanzadeh-Rostami *et al*., 2018). While short-term interventions, such as two weeks of education, are known to improve children's knowledge related to healthy snacks, they have not been able to influence actual food choices (Joseph *et al*., 2015). Some studies suggest that using interactive and engaging methods such as taste exposure, sensory learning, storytelling, and games can enhance understanding and retention of nutrition messages in young children. These approaches also make the content more accessible and appealing, supporting more effective behavior change (Hassanzadeh-Rostami *et al*., 2018; Joseph *et al*., 2015; Lestari, 2019; Melnick *et al*., 2020; Nekitsing *et al*., 2018).

The effect of nutrition education interventions will be more optimal if integrating several nutrition education strategies with the early childhood education curriculum (Nekitsing *et al*., 2018). Kindergarten is an educational unit that aims to provide educational stimulation to help the process of early childhood development (< 6 years) both physically and mentally. Providing the right stimulation needs to be considered because it greatly affects the life and behavior of children until adulthood (Maryatun, 2016).

This community service initiative is designed to enhance preschool children's knowledge and practices of healthy and nutritious food through targeted nutritional literacy strategies. The program was implemented at At Tiin Kindergarten in Semarang City, an educational institution offering playgroup (KB) and kindergarten (TK) programs. At Tiin Kindergarten plays a vital role in supporting early childhood development and is firmly committed to shaping resilient, well-rounded children through holistic education that integrates health and nutrition as key components.

Findings from initial observations conducted in collaboration with teachers and parents, along with nutritional screening results, clearly highlight critical issues requiring immediate action, namely, risks of malnutrition (underweight and wasting), low intake of vegetables and fruits, excessive consumption of sugar and sodium, and limited understanding of healthy eating habits. These findings underscore the urgent need for targeted nutritional interventions within the At Tiin Kindergarten environment.

MATERIALS AND METHODS

Implementation Time

Community service activities were carried out at At Tiin Kindergarten in Semarang City in July-September 2024.

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Target Group

This community service activity involved 82 children at TK A. A total of 52 children completed the entire program. Subjects were selected based on inclusion criteria, which consisted of children aged 4-6 years from classes A1, A2, and A3 who were present during the implementation program. The intervention was implemented in three classes (A1, A2, and A3) with varying levels of exposure.

1. Class A2 received the full intervention, consisting of three sessions of storytelling-based nutrition education and the distribution of storybooks.
2. Classes A1 and A3 received a single storytelling session and storybook distribution.
3. Monitoring and evaluation were conducted only in Class A2 (intervention group) and Class A1 (control group) due to the need to match group sizes and limited resources. Therefore, Class A3 was excluded from the follow-up assessment.
4. Problem identification was carried out through interviews with school stakeholders (teachers, parents, and students) and direct observation of the school environment.

Problem-solving Approach Method

The activity was carried out using the Problem-Based Learning (PBL) method involving students, teachers, and parents. Children are given story books and encouraged to discuss, identify healthy and nutritious foods, and apply healthy daily habits. The steps taken in this PBL method are:

1. Problem identification
   Problem identification was conducted in July-August 2024 through initial observations, discussions with teachers and parents, and nutritional screening of TK A students at At Tiin Kindergarten, Semarang. The results revealed several potential nutrition-related issues, including:
   a) There is a risk of malnutrition in students, either undernutrition or overnutrition.
   b) Lack of vegetable/fruit consumption among students.
   c) High consumption of foods/drinks with added sugar among students.
   d) High consumption of foods high in sodium among students.
   e) Lack of knowledge and attitude about healthy and nutritious food consumption among students, teachers, and parents.
2. Problem presentation through storybooks and storytelling
   The community service team developed and utilized a storybook and storytelling method to address issues of balanced nutrition consumption in preschool children.
   a) The first storytelling session was conducted for all Class A students (A1, A2, and A3) at At Tiin Kindergarten, Semarang City, in a large-group setting accompanied by parents and teachers.
   b) The second and third storytelling sessions were conducted only for Class A2 students (intervention group) in the classroom, without parental accompaniment. These sessions used the storybook as the main teaching tool. In contrast, classes A1 and A3 received only the storybook and did not have further storytelling sessions.
   c) Each session was conducted at one-week intervals throughout August 2024.

   During storytelling, the facilitator actively engaged the children by asking reflective questions to encourage participation and reinforce learning.
3. Discussion and exploration
   After telling the story, children are invited to discuss the content of the story, and children are asked to classify healthy foods according to the contents of their plate and not.
4. Reflection and evaluation activities
   At the end of August through September, reflection and evaluation activities were conducted in Classes A1 and A2 to assess changes in children's knowledge and attitudes toward balanced nutrition. A simple evaluation game using emoticon boards was employed to gauge food preferences. Two boards displayed images of healthy, nutritious foods aligned with the "My Plate" guidelines, and the other showed less aligned with these guidelines. Children selected emoticons to express their preferences and were asked to verbally explain their choices, providing insight into their understanding and attitudes.

Alternative Solution Offered

1. Nutritional status measurement
   Measurement of nutritional status is carried out for screening as well as monitoring the nutritional status of children before the implementation of education and assistance. The measurements taken are measuring the child's weight and height.
2. Providing education on healthy and nutritious food consumption to students through storytelling and storybooks
   Storytelling is a method that suits preschool children's cognitive and affective development. When storytelling takes place, it is an important process; the storyteller absorbs knowledge and conveys it to the audience. The advantages of the storytelling method are (1) it can foster and develop children's imagination, (2) instill moral values early on, (3) develop children's intellect, and (4) train children's attention and concentration. The results showed that the

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storytelling method can increase vegetable and fruit consumption in preschool children. Learning that involves multiple senses is also considered to provide better results. Learning about food by involving exposure to taste, smell, visual, hearing, and touch encourages children to consume food, including fruit and vegetable consumption. Learning using games is also appropriate for preschoolers. Preschoolers spend their daily lives playing, so inserting educational material in games is considered one of the right ways.

3. Educate teachers and parents.
   Providing education to parents aims to provide environmental support for preschool children. Parents play a role in providing food for children and educating children about healthy food. The same applies to teachers. Kindergarten teachers play a role in providing growth and development stimulation for children, including providing nutrition education. Improving kindergarten teachers' nutrition knowledge is expected to affect the students' understanding.

RESULTS AND DISCUSSION

Community service activities aim to improve nutritional literacy in pre-school children by focusing on introducing the importance of consuming healthy and nutritious food, as well as implementing healthy living habits at an early age. This activity was carried out at At Tiin Kindergarten by involving students and lecturers. The implementing group participated in providing nutritional education to children (Fig. 1).

Fig. 1. Community service implementers

The demographic data gathered during this community service activity included the child's gender. Fig. 2 illustrates a nearly balanced gender distribution, with 52% girls and 48% boys. Nutritional status was assessed using the WAZ, HAZ, BAZ, and WHZ parameters. The nutritional status monitoring results of the target group are presented in Fig. 3.

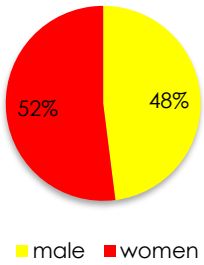

Fig. 2. Gender of preschool children enrolled in the program

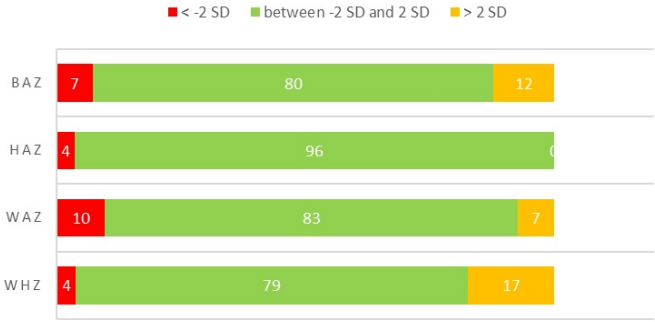

Fig. 3. Nutritional status of preschool children enrolled in the program

Fig. 4 presents the results of further identification of students experiencing undernutrition and those affected by two or more forms of malnutrition. Based on the WHZ parameter, 2 children (4%) were undernourished, and 9 children (17%) were overnourished. WAZ data identified 8 (10%) undernourished and 6 (7%) overnourished children. HAZ results revealed 3 (4%) cases of stunting, while BAZ indicated 6 (7%) children with undernutrition and 10 (12%) with overnutrition (Fig. 3). Additionally, 45% and 33% of children had two and three types of malnutrition at the same time, respectively (Fig. 4).

Fig. 5 shows the process of measuring the nutritional status of preschool children, which is an important indicator for evaluating nutritional status. This measurement helps assess their growth and detect possible malnutrition problems. The observation of eating habits in the target group shows that the students tend to prefer high-risk foods due to their taste, affordability, and easy availability. These findings are consistent with a study in Surabaya, which reported frequent consumption of snack foods such as fruit syrups, flavored drinks, chocolate,

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papeda, fried foods, "otak-otak", sausages, "pentol", syrup, sauces, and various toppings among school-aged children (Nisak & Mahmudiono, 2017).

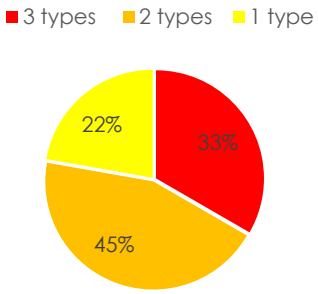

Fig. 4. Dual burden of undernutrition in preschool children enrolled in the program

Fig. 5. Nutritional status measurements of preschool children enrolled in the program

Parents' understanding of feeding influences the selection and provision of diverse and balanced nutrition for children. However, internal factors, such as the child's food preferences, also play a role. At ages 3-5, children develop the ability to choose foods they like or dislike, making it crucial to introduce a variety of foods early on. This age is characterized by high curiosity, making children more receptive to the various things they see and hear, such as new foods and experiences (Chao, 2018; Li *et al.*, 2017; Xue *et al*., 2015).

Nutrition education is essential for establishing lifelong healthy eating habits in preschool children (Hassanzadeh-Rostami *et al*., 2018). Although short-term interventions, such as two-week programs, can improve children's knowledge about healthy snacks, they are often insufficient to change food choices. Evidence shows that interactive approaches such as taste exposure, sensory learning, storytelling, and games effectively enhance nutrition knowledge and simplify material delivery in this age group (Pontes *et al*., 2022).

Fig. 6. Storytelling activity for At Tiin Kindergarten students

Balanced nutrition education for preschool children is still limited in Semarang, particularly in the Tembalang District. To address this, a storytelling-based intervention was implemented at At Tiin Kindergarten (Fig. 6), consisting of three sessions using storybooks (Fig. 7). The first session coincided with the Orientation to the School Setting program, followed by sessions conducted in each classroom. Each student received a storybook to reinforce learning at home through repeated reading with parents. The activities were well-received by both students and parents (Fig. 8). Results showed increased children's knowledge of balanced nutrition, specifically the "My Plate" concept.

Fig. 7. Distribution of *story books* to preschool children enrolled in the program

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Fig. 8. Education to parents

Storytelling and story book media were used as the main educational method in this community service activity, targeting students, teachers, and parents. Storytelling and story book media is effective for nutrition education in preschool children due to several advantages: (1) it enhances engagement and interest of preschool students; (2) it promotes healthy behavior change by effectively conveying messages that shape eating habits; (3) it helps children recall the actions of story characters, fostering critical thinking and nutritional literacy; and (4) it is practical, easily implemented, and adaptable to various formats, including digital media (Agosto, 2013; Bellows *et al*., 2013; Pontes *et al*., 2022; Prasetya & Hirashima, 2018; Preradovic *et al*., 2016; Shruti *et al*., 2021).

Story books and storytelling can significantly influence children's vegetable consumption. For example, using picture books with characters that promote healthy eating has been shown to increase vegetable intake when children are actively engaged in the reading process. Repeated exposure to vegetables through various educational interventions, including story books, has been shown to increase children's willingness to try and consume these foods. For example, children who are repeatedly exposed to vegetables through storybooks will consume more of these vegetables compared to children who are not exposed (Heath *et al*., 2014).

Although changes in food consumption behavior could not be directly evaluated in this community services activity, the differences in nutrition knowledge were observed between the intervention group (Class A2) and the control group (Class A1), as shown in Table 1. The control group, which did not receive repeated storytelling, demonstrate lower knowledge of balanced nutrition and less understanding of the "My Plate" concept compared to the intervention group (Fig. 9). In the intervention group, 16 children showed a preference for balanced meals, while only 13 children in the control group did. Additionally, 5 children in the intervention group preferred an unbalanced diet, compared to 9 children in the control group. When they asked to explain their choice, the children selected the image representing an unbalanced meal because it featured crispy fried chicken, which was their preferred food.

Table 1. Changes resulting from services activities

Initial condition	Intervention	Condition change
Lack of knowledge, attitude, and practice of vegetables / Fruits consumption and high consumption of foods/ drinks with sugar in	Nutrition literacy with story books and storytelling , as well as education to parents/ guardians of students	Improved knowledge and attitude towards vegetables/fruits consumption and high consumption of foods/drinks with sugar among students. A total of 16 children in the intervention group preferred a balanced diet, while 13 children in the control group preferred a balanced diet. There were 5 children in the intervention group who preferred unbalanced food consumption and 9 children in the control group who preferred unbalanced food consumption.

These findings indicate that the nutritional problems and the different of improvement in nutritional knowledge regarding eating habits among preschool children at At Tiin Kindergarten are shaped by multiple contributing factors. Several factors, including food availability, household income, and maternal education, are also influence preschool children's intake of balanced nutrition. Limited access to educational resources, parental busyness, and household income constraints often restrict healthy food consumption in preschool children. Previous studies demonstrate the impact of parenting and parental socioeconomic status on children's eating habits (Scaglioni *et al*., 2018).

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(A) (B)

Fig. 9. Evaluation of consumption preferences in the control group (A) and intervention group (B)

Nutritional adequacy is closely linked to socioeconomic factors, particularly household income. Higher household income improve access to nutritious food, which in turn positively impacts children's nutritional status (Hasyim & Saputri, 2022). But due to data limitations, this community service activity did not assess the direct relationship between household income and children's eating habits and nutritional status.

Maternal education and employment status are key factors influencing children's nutrition and related behaviors. Stable employment and higher education levels in mothers are associated with improved knowledge, attitudes, and practices regarding healthy food, which positively impact children's nutritional status (Hasyim & Saputri, 2022; Meilini *et al*., 2024). This community service activity found that most mothers of At Tiin Kindergarten students were highly educated and employed, which aligns with the generally good nutritional status observed among the children. However, cases of undernutrition and overnutrition persist, indicating the need for strengthening mothers' roles in educating their children about healthy eating and reinforcing nutritious food habits remains essential, especially amid their busyness.

Efforts to change behavior related to food preferences cannot be instantaneous. This is because preschoolers' food preferences are influenced by a complex interaction between intrinsic and extrinsic factors. Understanding these factors can help in developing strategies to promote healthier eating habits. Intrinsic factors include sensory processes and taste perception (children have innate preferences for sweet, salty and savory tastes, and often dislike bitter tastes), neophobic tendencies in preschool children. Extrinsic factors include parental influence in shaping food consumption, parental feeding patterns, and socio-cultural factors(Galloway *et al*., 2006; Heath *et al*., 2014).

CONCLUSION

Preschoolers at At Tiin Kindergarten face multiple nutritional issues, with 78% of affected children experiencing more than one form of malnutririon. Storytelling-based interventions improved preschool children nutritional literacy, with the intervention group (16 children) showing greater improvement in understanding of the "My Plate" concept compared to the control group (13 children) who not given repeated storytelling.

The limitation in this community service lies in the fact that there has been no visible change in the behavior of balanced nutrition consumption in the target group. This is due to the relatively short duration of service. Periodic activities are needed to continue to improve nutritional literacy and balanced nutrition consumption practices in preschool children to overcome the problem of malnutrition in children.

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REFERENCES

Afrinis, N., Indrawati, I., & Raudah, R. (2021). Hubungan.Pengetahuan.Ibu, Pola Makan dan Penyakit.Infeksi Anak dengan Status.Gizi Anak Prasekolah. *Aulad: Journal on Early Childhood*, *4*(3), 144–150. https://doi.org/10.31004/aulad.v4i3.99

Agosto, D. E. (2013). If I Had Three Wishes: The Educational and Social/Emotional Benefits of Oral Storytelling. *Storytelling, Self, Society*, 9(1), 53–76. https://doi.org/10.13110/storselfsoci.9.1.0053

Angraini, D. I., Arisandi, R., Rosa, E., & Zuraida, R. (2022). The relation between "Picky Eating" behavior and nutritional status of pre-school children. *Jurnal Gizi Dan Dietetik Indonesia (Indonesian Journal of Nutrition and Dietetics)*, 9(1), 49. https://doi.org/10.21927/ijnd.2021.9(1).49-55

Astuti, Y., Magdalena, A., & Aisyaroh, N. (2023). Narrative Review: Faktor Faktor Yang Mempengaruhi Picky Eater Pada Anak Usia Prasekolah. *Jurnal Pendidikan Sejarah Dan Riset Sosial Humaniora*, *3*(3), 207–214. https://ejournal.penerbitjurnal.com/index.php/humaniora/article/view/301

Bailey, R. L., West Jr., K. P., & Black, R. E. (2015). The Epidemiology of Global Micronutrient Deficiencies. *Annals of Nutrition and Metabolism*, *66*(2), 22–33. https://doi.org/10.1159/000371618

Bellows, L., Spaeth, A., Lee, V., & Anderson, J. (2013). Exploring the Use of Storybooks to Reach Mothers of Preschoolers With Nutrition and Physical Activity Messages. *Journal of Nutrition Education and Behavior*, *45*(4), 362–367. https://doi.org/10.1016/j.jneb.2012.10.011

Chao, H.-C. (2018). Association of Picky Eating with Growth, Nutritional Status, Development, Physical Activity, and Health in Preschool Children. *Frontiers in Pediatrics*, *6*, 1–9. https://doi.org/10.3389/fped.2018.00022

Conti, M. V., Kalmpourtzidou, A., Lambiase, S., De Giuseppe,

R., & Cena, H. (2021). Novel Foods and Sustainability as Means to Counteract Malnutrition in Madagascar. *Molecules*, *26*(8), 2142. https://doi.org/10.3390/molecules26082142

de Onis, M., Borghi, E., Arimond, M., Webb, P., Croft, T., Saha, K., De-Regil, L. M., Thuita, F., Heidkamp, R., Krasevec, J., Hayashi, C., & Flores-Ayala, R. (2019). Prevalence thresholds for wasting, overweight and stunting in children under 5 years. *Public Health Nutrition*, *22*(1), 175–179. https://doi.org/10.1017/S1368980018002434

Galloway, A. T., Fiorito, L. M., Francis, L. A., & Birch, L. L. (2006). 'Finish your soup': Counterproductive effects of pressuring children to eat on intake and affect. *Appetite*, *46*(3), 318–323. https://doi.org/10.1016/j.appet.2006.01.019

Goh, D. Y., & Jacob, A. (2012). Perception of picky eating among children in Singapore and its impact on caregivers: a questionnaire survey. *Asia Pacific Family Medicine*, *11*(1), 5. https://doi.org/10.1186/1447-056X-11-5

Hardianti, R., Dieny, F. F., & Wijayanti, H. S. (2018). Picky eating dan status gizi pada anak prasekolah. *Jurnal Gizi Indonesia (The Indonesian Journal of Nutrition)*, *6*(2), 123–130. https://doi.org/10.14710/jgi.6.2.123-130

Hassanzadeh-Rostami, Z., Mirshekari, M., Ranjbaran, H., Khosravi, S., & Faghih, S. (2018). Effect of Game-Based Nutrition Education on Nutritional Knowledge of Preschool Children. *International Journal of Nutrition Sciences*, *3*(1), 50–55. https://ijns.sums.ac.ir/article_43435.html

Hasyim, D. I., & Saputri, N. (2022). Hubungan faktor sosiodemografi dengan status gizi pada anak balita. *Jurnal Riset Kebidanan Indonesia*, *6*(1), 18–23. https://doi.org/10.32536/jrki.v6i1.215

Heath, P., Houston-Price, C., & Kennedy, O. B. (2014). Let's look at leeks! Picture books increase toddlers' willingness to look at, taste and consume unfamiliar vegetables. *Frontiers in Psychology*, *5*(MAR), 1–11. https://doi.org/10.3389/fpsyg.2014.00191

Jarman, M., Ogden, J., Inskip, H., Lawrence, W., Baird, J., Cooper, C., Robinson, S., & Barker, M. (2015). How do mothers manage their preschool children's eating habits and does this change as children grow older? A longitudinal analysis. *Appetite*, *95*, 466–474. https://doi.org/10.1016/j.appet.2015.08.008

Joseph, L. S., Gorin, A. A., Mobley, S. L., & Mobley, A. R. (2015). Impact of a Short-Term Nutrition Education Child Care Pilot Intervention on Preschool Children's Intention To Choose Healthy Snacks and Actual Snack Choices. *Childhood Obesity*, *11*(5), 513–520. https://doi.org/10.1089/chi.2015.0028

Kemenkes. (2018). *Laporan Nasional Hasil Riset Kesehatan Dasar (Riskesdas) Indonesia tahun 2018*. Kemenkes. https://repository.badankebijakan.kemkes.go.id/id/eprint/3514/1/Laporan Riskesdas 2018 Nasional.pdf

Kemenkes. (2022). *Hasil Survei Status Gizi Indonesia (SSGI) 2022*. Kemenkes. https://ayosehat.kemkes.go.id/pub/files/files46531._MATERI_KABKPK_SOS_SSGI.pdf

Kobylińska, M., Antosik, K., Decyk, A., & Kurowska, K. (2022). Malnutrition in Obesity: Is It Possible? *Obesity Facts*, *15*(1), 19–25. https://doi.org/10.1159/000519503

Lestari, T. W. (2019). Application of Storytelling Methods in Optimizing Fruit and Vegetable Consumption in Preschool Children. *Journal of Medical Science And Clinical Research*, *7*(3), 724–729. https://doi.org/10.18535/jmscr/v7i3.131

Li, Z., van der Horst, K., Edelson-Fries, L. R., Yu, K., You, L., Zhang, Y., Vinyes-Pares, G., Wang, P., Ma, D., Yang, X., Qin, L., & Wang, J. (2017). Perceptions of food intake and weight status among parents of picky eating infants and toddlers in China: A cross-sectional study. *Appetite*, *108*, 456–463. https://doi.org/10.1016/j.appet.2016.11.009

Maryatun, I. B. (2016). Peran Pendidik PAUD dalam Membangun Karakter Anak. *Jurnal Pendidikan Anak*, *5*(1), 747–752. https://doi.org/10.21831/jpa.v5i1.12370

Meilini, I., Khairunnisa, K., & Sinaga, H. T. (2024). Hubungan Faktor Sosiodemografi dan Pola Makan terhadap Status Gizi Balita di Desa Bakaran Batu Kab. Deli Serdang. *Mitra Raflesia (Journal of Health Science)*, *16*(2), 95–108. https://doi.org/10.51712/mitraraflesia.v16i2.420

Melnick, E. M., Thomas, K., Farewell, C., Quinlan, J., LaFlamme, D., Brogden, D., Scarbro, S., & Puma, J. E. (2020). Impact of a nutrition education programme on preschool children's willingness to consume fruits and vegetables. *Public Health Nutrition*, *23*(10), 1846–1853. https://doi.org/10.1017/S1368980019005032

Nekitsing, C., Hetherington, M. M., & Blundell-Birtill, P. (2018). Developing Healthy Food Preferences in Preschool Children Through Taste Exposure, Sensory Learning, and Nutrition Education. *Current Obesity Reports*, *7*(1), 60–67. https://doi.org/10.1007/s13679-018-0297-8

Nisak, A. J., & Mahmudiono, T. (2017). Snacking At School Increased The Risk Of Overweight/Obesity In Children. *Jurnal Berkala Epidemiologi*, *5*(3), 311. https://doi.org/10.20473/jbe.V5I32017.311-324

Nix, R. L., Francis, L. A., Feinberg, M. E., Gill, S., Jones, D. E., Hostetler, M. L., & Stifter, C. A. (2021). Improving Toddlers' Healthy Eating Habits and Self-regulation: A Randomized Controlled Trial. *Pediatrics*, *147*(1), 1–8. https://doi.org/10.1542/peds.2019-3326

Pontes, C. B., Pratas, E., Novo, Â., Domingues, B., Miguens, R., & Simões-Dias, S. (2022). Nutrition Education Intervention to Promote Nutrition Knowledge in Preschool Children at District of Leiria, Portugal. *Current Research in Nutrition and Food Science Journal*, *10*(3), 1105–1115. https://doi.org/10.12944/CRNFSJ.10.3.24

Prasetya, D. D., & Hirashima, T. (2018). Design of Multimedia-based Digital Storybooks for Preschool Education. *International Journal of Emerging Technologies in Learning (IJET)*, *13*(02), 211. https://doi.org/10.3991/ijet.v13i02.8188

Preradovic, N. M., Lesin, G., & Boras, D. (2016). Introduction of digital storytelling in preschool education: A case study from Croatia. *Digital Education Review*, *30*, 94–105. https://dialnet.unirioja.es/descarga/articulo/5772439.pdf

Scaglioni, S., De Cosmi, V., Ciappolino, V., Parazzini, F., Brambilla, P., & Agostoni, C. (2018). Factors Influencing Children's Eating Behaviours. *Nutrients*, *10*(6), 706. https://doi.org/10.3390/nu10060706

Shruti, T., Govindraju, H. A., & Sriranga, J. (2021). Incorporation of Storytelling as a Method of Oral Health Education among 3–6-year-old Preschool Children. *International Journal of Clinical Pediatric Dentistry*, *14*(3), 349–352. https://doi.org/10.5005/jp-

DOI: https://dx.doi.org/10.30656/jpmwp.v9i1.10286

journals-10005-1946

Utami, N. H., & Mubasyiroh, R. (2019). Masalah Gizi Balita Dan Hubungannya Dengan Indeks Pembangunan Kesehatan Masyarakat. *Penelitian Gizi Dan Makanan (The Journal of Nutrition and Food Research)*, *42*(1), 1–10. https://doi.org/10.22435/pgm.v42i1.2416

Xue, Y., Zhao, A., Cai, L., Yang, B., Szeto, I. M. Y., Ma, D., Zhang, Y., & Wang, P. (2015). Growth and Development in Chinese Pre-Schoolers with Picky Eating Behaviour: A Cross-Sectional Study. *PLOS ONE*, *10*(4), e0123664. https://doi.org/10.1371/journal.pone.0123664