PHYSICAL HOME FOOD ENVIRONMENT AND ITS CORRELATION WITH IRON AND VITAMIN C INTAKE AMONG CHILDREN IN PEJAGALAN

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ABSTRACT

Despite the fact that Indonesia has established nutrition and health measures to prevent childhood malnutrition, more than 70% of children aged 2 to 5 consume less iron than the Indonesian dietary recommendations. Iron deficiency harms children's cognitive and motor development, and increases morbidity. Sixty-five to 72% of children's daily calories are consumed at home, hence the environment is crucial. The purpose of this study is to observe if the iron and vitamin C consumption of children aged 2 to 6 in Pejagalan, North Jakarta, is related to their eating environment. A total of 191 samples was examined. To assess children's intake, 2x24h food recalls were performed. A modified version of the NHANES CBQ was used to assess the home food environment. SPSS Version 20 was used to perform Spearman correlation and multiple linear regression. The iron and vitamin consumption of the subjects was lower than the estimated average requirement (EAR) for Indonesia. It was shown that children who had more access to fruits and vegetables ingested more iron and vitamin C. Iron consumption was enhanced by fruits, vegetables, sweets, and sugar sweetened beverages. Fruit accessibility ($p<0.05$) and availability ($p<0.05$) were related to vitamin C consumption. A variety of home food environment characteristics such as the availability and accessibility of food, are related to a child's consumption, particularly of micronutrients.

Keywords: food availability, home food environment, toddler intake, vitamin C, iron intake

INTRODUCTION

Iron deficiency, often known as ID, is most common in children younger than five years old (Subramaniam & Girish, 2015). More than 50% of urban children had an iron intake that was lower than the recommended daily allowance for children in Indonesia, while the iron intake of children aged two to five years was more than 70% lower than the RDA (Sandjaja et al., 2013). Anemia, poor academic performance, and a diminished capacity to concentrate for extended periods can all be caused by a deficiency in iron (Cerami, 2017). Children who don't consume enough iron have poorer brain and motor development, and they are more likely to get sick. Iron deficiency also makes children more susceptible to infections (Subramaniam & Girish, 2015).

Iron deficiency anemia (IDA) is a condition that exists even in developed countries. Children under the age of five in Indonesia have higher rates of anemia each year (Ministry of Health Indonesia, 2018). Insufficient iron in the diet, along with deficits in other nutrients including lipids, protein, and vitamin C, can lead to iron deficiency anemia (IDA). The substantial correlation between insufficient dietary vitamin C consumption and anemia may have a potential explanation in the fact that vitamin C is known to aid the conversion of ferric ion to ferrous, which is a form of ferric that is more readily absorbed by the body (Sunardi et al., 2021). Therefore, getting enough vitamin C through food is helpful in protecting prevent anemia.

Children might get iron deficiency if they do not get enough iron in their diet. Because children consume between 65 and 72% of their daily calorie intake at home, the atmosphere of the home is quite important (Herawati et al., 2019). Numerous researches have found a correlation between diet and home food environment (Ansem et al., 2017; Ding et al., 2012; Prasetyaningrum

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et al., 2018; Quick et al., 2018; Trofholz et al., 2016; Vereecken et al., 2010). Increased fruit and vegetable consumption was shown to be positively correlated with the frequency with which parents feed their children aged 2-5 years old these meals as well as their accessibility and availability in the house, according to an Australian research (Wyse et al., 2011). There is a lack of study in Indonesia on how the home food environment affects children between the ages of 2 and 6 in their consumption of micronutrients, notably iron and vitamin C. It appears that the food availability in the neighborhood influences the availability of food in households. The presence of a locally owned food shop (warung) was shown to be associated with higher levels of calorie consumption as well as consumption of foods high in energy density that were devoid of diversity and micronutrients (Taylor & Emmett, 2020). In a research conducted in East Jakarta, it was shown that low-income urban dwellers mostly relied on buying ready-to-eat foods from neighborhood food stands and frequently bought foods from outside that were high in calories and/or low in nutrients (e.g. fewer fruits and vegetables) (Sufyan et al., 2019). This study will investigate whether there is a correlation between the intake of iron and vitamin C by children ages 2 to 6 and the food environment in their homes in Pejagalan, which is located in North Jakarta.

METHOD

This observational study uses a cross-sectional design and secondary data collection. Throughout this study, the relationship between the dependent and independent variables is investigated concurrently. This research was conducted in the province of Jakarta, specifically in the Penjaringan subdistrict of North Jakarta's urban hamlet Pejagalan. Data collection was conducted from January to April 2020. The neighborhood of Pejagalan, which is located in North Jakarta, was chosen as the study's location by multistage random selection process. Four were Posyandu selected by consecutive random and made a list of children based on the Posyandu's registered children and family certificates (*kartu keluarga*). Progressively, inclusion-eligible children were chosen. Completed questionnaires, data on the characteristics of the caregiver and child, and two 24-hour food recalls were included as samples; 191 samples were available for data analysis after the data were cleaned and 195 samples were required based on sample size calculations. The intake of children was determine utilizing a 2x24h food recall and the conversion of RDI to EAR was performed using a conversion factor of RDI =1.2 x EAR (Hamner & Moore, 2020). Using a modified version of the NHANES CBQ (CDC, 2011), the home food environment was studied by obtaining information on food availability and family food features. Ethical approval was obtained from the Ethic Commission at Universitas Indonesia's Faculty of Medicine with No. Protocol: 22-02-0142 dated 13 January 2022, No. Ethical Approval: KET-311/UN2.F1/ETIK/PPM.00.02/2022 dated 28 March 2022.

Food availability was determined by asking respondents how often they had food at home over the previous week (CDC, 2011). This research modified the food category to include a range of vegetables and fruits, along with salty and sweet snacks and sugar-sweetened beverages, excluding low fat milk, as its consumption is uncommon in Indonesia (Birahmatika et al., 2020). Food accessibility was measured by determining the frequency with which foods were stored in an easily accessible location for children and in a ready-to-eat state. A four-point Likert scale (never, sometimes, usually, always) was utilized for survey responses. Each answer was graded on a scale of 1 to 4, with 1 indicating "never" and 4 indicating "always," and a total score for each food group was calculated. As this component of accessibility involves two unique types of questions, the mean score for each food category was calculated. SPSS Version 20 was utilized to conduct the Spearman correlation and multiple linear regression analysis.

RESULTS AND DISCUSSIONS

The total number of eligible participants was 191. Table 1 lists the broad characteristics of the participants. More than half of participants were between the ages of four and six, with boys comprising 56% of the total. A great

majority of caregivers possessed only secondary education, and the vast majority of them were unemployed. Majority of fathers were employed. The majority of the participants' families earn less than the minimum wage of Rp 4,200,000. Sociodemographic and socioeconomic characteristics of the participants in this study appeared to be very similar.

This study identified the physical aspects of the home food environment based on the availability and accessibility. The median score of 3 in Table 2 indicates that the availability of fruit and salty snacks was low. In contrast, the median score for vegetables, sweet food, and sugar-sweetened beverages reached a maximum of seven days, showing that these products are often available at homes. Vegetables and sugary beverages were always available in the homes of the respondents. The availability of vegetables from mobile vendors, regardless of price, was the key reason vegetables were always available in the homes of our respondents. In contrast, fruits are often more costly and harder to get. This was supported by Marty et al.'s (2015) discovery that fruits were the most costly source of energy. In low-income neighborhoods, a common perception was that healthy food was too expensive. This finding was bolstered by an evaluation of the obstacles to healthy eating, which revealed that the perception that bad diets are more affordable than healthy diets increased as a result of financial insecurity (Birahmatika et al., 2020).

Table 1. Respondent Characteristics

Variables	Median(Q1-Q3)	n(%)
Children's age (years old)	4.21(3.26–5.34)	
2–3 years old		86(45)
4–6 years old		105(55)
Children's Sex		
Male		107(56)
Female		84(44)
Caregiver's age (years old)	33.58(28.83–37.34)	
Caregiver education		
Low education level		66(34.6)
Intermediate education level		120(62.8)
High education level		5(2.6)
Mother Occupation		
Unemployed		130(68.1)
Employed		61(31.9)
Father Occupation		
Employee		83(43.5)
Laborer		50(26.2)
Self-employed		23(12)
Other		35(18.3)
Family income (Rp)	3,000,000 (2,000,000–4,200,000)	
Below and minimum wage		145(75.9)
Above minimum wage		46(24.1)

Consequently, it is likely that the cost of providing some food categories, notably fruits, was a disincentive for the group. Prior studies in Jakarta have repeatedly highlighted the features of the food environment in a typical densely populated urban slum neighborhood, which were substantially the same as the present research in that kitchen facilities were limited (Birahmatika et al., 2020). The neighborhood was frequently surrounded by food enterprises, many of which

were locally owned and run, as well as grocery stores. Vegetables may have been readily available at home most of the time due to the prevalence of traditional wet markets and mobile vegetable vendors in our research area. Unfortunately, the abundance of food outlets in urban slum areas increased the availability of snack foods and sugar-sweetened beverages, which was damaging to the community's health. In families led by jobless moms with a low level of education, there may be more access to highly appetizing "junk" foods, notably soda and sweetened beverages (Fernández-Alvira et al., 2013). This is consistent with the findings of our study, which revealed that homes headed by unemployed moms had a larger supply of sugary beverages.

Food accessibility, according to Nepper et al. (2014), is defined as retrievable, ready-to-eat, and reachable food. Food accessibility in the study is defined by Boles et al. (2013) as the capacity of children to reach, physically touch, and receive a food. The median score for food accessibility is 2-4, suggesting that food is occasionally stored at home and is not always stored in a ready-to-eat state. The sweet food earned the highest score overall. This is achievable because sweet foods are abundantly available surrounding the location. Mothers were regularly observed providing sweet snacks such as cookies and biscuits, and these treats were usually supplied alongside sweet beverages (Birahmatika et al., 2020; Putri et al., 2021).

Using a 24-hour food recall questionnaire, the children's nutritional consumption was calculated. Even though there are participants who fall into the under-eating and over-eating categories by using equation for calculation BMR in children, they are included in the analysis to guarantee that the number of subjects does not fall below the minimum number of samples. There were 30% children that have under-eating and 12% over-eating. The average vitamin C and iron intakes of the individuals were calculated using the results of two 24-hour food recalls. Overall, the vitamin C and iron intakes of the participants were lower than the 2019 Indonesian RDIs, with the median iron consumption being 6.71 mg and the 2019 Indonesian EARs for iron being 5.8 mg for the 1–3 years-old group and 8.3 mg for the 4–6 years-old group. While the median consumption of vitamin C in Indonesia is 20.30 mg, the EAR is 33.3 mg for the 1-3 years-old group and 37.5 mg for the 4-6 years-old group. We can observe that the median consumption of both iron and vitamin C is below the EAR, indicating that children's intake is insufficient. Anemia, difficulty concentrating, a short attention span, and poor academic performance might arise from iron deficiency (Cerami, 2017). In iron-deficient children, it can also impede psychomotor and mental development, increase susceptibility to infection, and cause several other issues (Subramaniam & Girish, 2015). Iron deficiency is the leading cause of anemia, accounting for 50% of all instances (Mj & Mt, 2021). Even in developing nations, iron deficiency anemia (IDA) remains a severe health concern. In Indonesia, the prevalence of anemia among children under five years of age is growing annually (Ministry of Health Indonesia, 2018). The prevalence of anemia in Indonesia was significantly associated with inadequate dietary intake of nearly all key nutrients, namely, more than 30% of deficient iron and vitamin C consumption (Sunardi et al., 2021).

According to national studies conducted in Brazil, Germany, Russia, and the United States, poor intakes in toddlers are still prevalent (Hilger et al., 2015). In terms of iron consumption, 4% of 2-year-old Brazilian children fall below the EAR for iron consumption. A Brazilian multicenter study found that the diversity of children's nutritional intake is influenced by their age and body mass index (Carvalho et al., 2015). According to the statistics in Germany, 18.50% of the population consumes less iron than is recommended (Report, 2008). While the comparable statistics of children who consumed less than EAR for Russia and the United States are 13.9% and 10.92%, respectively (Butte et al., 2010; Eussen et al., 2015). In Europe, a comprehensive review of iron intakes in children aged 6–36 months revealed deficient intakes ranging from 10% to 50% below EAR (Eussen et al., 2015). Statistics from the German VELS research and the implementation of the UK EAR result in considerably more defects (range: 33.1% to 43.6% below EAR) (Report, 2008).

Vitamin C is heat-labile and may be damaged by cooking; it is believed that the poorer vitamin C status of Indians and Malays residing in Singapore is partially attributable to its breakdown by more extensive cooking, especially prolonged high heat cooking, such as grilling and making soup (Carr & Rowe, 2020). This method of cooking is highly common in Indonesia, where many meals are prepared with soup and cooked at sustained high temperatures. In the United States, another study was done to assess the vitamin C consumption of toddlers. The 2017–2018 survey indicated that 4.9% of toddlers aged 1–3 years did not consume enough vitamin C, while 13.5% of toddlers aged 4–8 years did not get enough vitamin C (Brauchla et al., 2021).

Table 2. Physical Aspects of Home Food Environment Distribution

Variables	Median(Q1–Q3)
Food availability	
Fruit	3.00(1.00–4.00)
Vegetables	7.00(4.00–7.00)
Salty snacks	3.00(0.00–7.00)
Sweet food	7.00(2.00–7.00)
Sugar-sweetened beverages	7.00(7.00–7.00)
Food accessibility	
Fruit	4.00(3.00–4.00)
Vegetables	2.00(1.00–4.00)
Salty snacks	3.00(2.00–4.00)
Sweet food	4.00(3.00–4.00)
Sugar-sweetened beverages	3.00(1.00–4.00)
Micronutrient Intake	
Iron (mg)	6.71(4.49-10.91)
Vitamin c (mg)	20.30(8.18-79.51)

After conducting a bivariate statistical test on Spearman's average iron intake, it was shown that several aspects are associated, including the availability of fruit, vegetables, and sweet food, and sugar-sweetened beverages. In contrast to the association results for vitamin C, the variables with p-value less than 0.05 are the availability of fresh fruits and vegetables in the diet. Children are likely getting more iron and vitamin C due to the increasing availability of fruits and vegetables at home.

Environments surrounding food that are child-friendly are ones that encourage children to engage or interact with the food in some way. Depending on how they are constructed, they have the ability to either improve or worsen the nutritional health of children in a variety of different ways. It was discovered that the availability of fruits and vegetables, sweet food and sugar-sweetened beverages all had a correlation with the amount of iron that was consumed. Because of the significant use of iron-fortified dairy products such as milk, increasing availability of sugar-sweetened beverages was correlated with higher iron intake (Subramaniam & Girish, 2015). The availability of fruits and vegetables is one of the factors that are connected with the two variables that are an issue. This is due to the fact that fruits and vegetables are both strong sources of vitamin C and iron. A number of other studies have found a positive link between the availability and accessibility of fruits and vegetables and the amount of fruit and vegetable consumption by children (Bassul et al., 2020; Bogl et al., 2017). These findings are consistent with the findings of previous research.

This finding highlights the significant role that parents play in supporting the eating of fruits and vegetables by making these items readily available to their children. Several studies have indicated that children's vegetable and fruit consumption is linked to their parents' consumption of these foods (Trofholz et al., 2016; Wyse et al., 2011). The findings also show that there is great potential to further enhance the amount of fruit and vegetables that children consume by encouraging more frequent supply (Ding et al., 2012; Wyse et al., 2011). In addition, the findings of this study as well as the findings of previous research including children who were older suggest that there is a larger possibility for children to consume fruits and vegetables if they are stored at home in a form that is ready to eat (Ansem et al., 2017; Trofholz et al., 2016). Because time spent preparing fruits and vegetables is a barrier that is frequently noted (Yeh et al., 2008), having ready-to-eat fruits and vegetables on hand may improve the probability that parents would offer their preschool child these foods rather than quick, pre-packaged snack meals (Wyse et al., 2011).

Table 3. Correlation of Home Food Environment and Iron and Vitamin C Intake

Variables	R	
	Iron intake	Vitamin C intake
Physical aspect		
Fruit availability	0.206**	0.308**
Vegetable availability	0.179*	0.246**
Salty snack availability	0.092	0.065
Sweet food availability	0.214**	0.117
Sugar-sweetened beverages availability	0.265**	0.089
Fruit accessibility	0.020	0.088**
Vegetable accessibility	0.037	0.035
Salty snack accessibility	0.067	0.088
Sweet food accessibility	0.116	0.085
Sugar-sweetened beverages accessibility	0.000	-0.057

*significance level at P-value<0.005, **significance level at P-value <0.01

CONCLUSION

According to the findings, it is clear that toddlers in Pejagalan did not consume the adequate amounts of iron and vitamin C that are advised. A child's consumption, in particular of micronutrients, is connected to a range of aspects of the home food environment linked with the availability and accessibility of food. One of the treatments that may be included in plans for improving child health is home gardening, which can be done to increase availability and accessibility in the home.

REFERENCES

Ansem, W. J. C. Van, Schrijvers, C. T. M., Rodenburg, G., & Mheen, D. Van De. (2017). Maternal Educational Level and Children's Healthy Eating Behaviour: Role of the Home Food Environment (Cross-Sectional Results from the INPACT Study). *Pediatric Behavioral Nutrition Factors*, 197–220. https://doi.org/10.1201/9781315365732-18

Bassul, C., Corish, C. A., & Kearney, J. M. (2020). Associations between the home environment, feeding practices and children's intakes of fruit, vegetables and confectionary/sugar-sweetened beverages. *International Journal of Environmental Research and Public Health*, *17*(13), 1–21. https://doi.org/10.3390/ijerph17134837

Birahmatika, F. S., Chandra, D. N., & Wiradnyani, L. A. A. (2020). *Home Food Environment as Mediator Between Health Concern and Diet Quality Among Mothers of Young Children in Urban Slum in North Jakarta*. Universitas Indonesia.

Bogl, L. H., Silventoinen, K., Hebestreit, A., Intemann, T., Williams, G., Michels, N., Molnár, D., Page, A. S., Pala, V., Papoutsou, S., Pigeot, I., Reisch, L. A., Russo, P., Veidebaum, T., Moreno, L. A., Lissner, L., & Kaprio, J. (2017). Familial resemblance in dietary intakes of children, adolescents, and parents: Does dietary quality play a role? *Nutrients*, *9*(8). https://doi.org/10.3390/nu9080892

Boles, R. E., Scharf, C., Filigno, S. S., Saelens, B. E., & Stark, L. J. (2013). Differences in home food and activity environments between obese and healthy weight families of preschool children. *Journal of Nutrition Education and Behavior*, *45*(3), 222–231. https://doi.org/10.1016/j.jneb.2012.09.012

Brauchla, M., Dekker, M. J., & Rehm, C. D. (2021). Trends in vitamin c consumption in the united states: 1999–2018. *Nutrients*, *13*(2), 1–18. https://doi.org/10.3390/nu13020420

Butte, N. F., Fox, M. K., Briefel, R. R., Siega-Riz, A. M., Dwyer, J. T., Deming, D. M., & Reidy, K. C. (2010). Nutrient Intakes of US Infants, Toddlers, and Preschoolers Meet or Exceed Dietary Reference Intakes. *Journal of the American Dietetic Association*, *110*(12), S27–S37. https://doi.org/10.1016/j.jada.2010.09.004

Carr, A. C., & Rowe, S. (2020). Factors affecting vitamin c status and prevalence of deficiency: A global health perspective. *Nutrients*, *12*(7), 1–19. https://doi.org/10.3390/nu12071963

Carvalho, C. A. De, Fonsêca, P. C. D. A., Priore, S. E., Franceschini, S. D. C. C., & Novaes, J. F. De. (2015). Food consumption and nutritional adequacy in Brazilian children: A systematic review. *Revista Paulista de Pediatria*, *33*(2), 211–221. https://doi.org/10.1016/j.rpped.2015.03.002

CDC. (2011). *Target Group : Family Questionnaire*. *2*, 8–10.

Cerami, C. (2017). Iron Nutriture of the Fetus, Neonate, Infant, and Child. *Annals of Nutrition and Metabolism*, *71*(3), 8–14. https://doi.org/10.1159/000481447

Ding, D., Sallis, J. F., Norman, G. J., Saelens, B. E., Harris, S. K., Kerr, J., Rosenberg, D., Durant, N., & Glanz, K. (2012). Community Food Environment, Home Food Environment, and Fruit and Vegetable Intake of Children and Adolescents. *Journal of Nutrition Education and Behavior*, *44*(6), 634–638. https://doi.org/10.1016/j.jneb.2010.07.003

Eussen, S., Alles, M., Uijterschout, L., Brus, F., & Van Der Horst-Graat, J. (2015). Iron intake and status of children aged 6-36 months in Europe: A systematic review. *Annals of Nutrition and Metabolism*, *66*(2–3), 80–92. https://doi.org/10.1159/000371357

Fernández-Alvira, J. M., Mouratidou, T., Bammann, K., Hebestreit, A., Barba, G., Sieri, S., Reisch, L., Eiben, G., Hadjigeorgiou, C., Kovacs, E., Huybrechts, I., & Moreno, L. A. (2013). Parental education and frequency of food consumption in European children: The IDEFICS study. *Public Health Nutrition*, *16*(3), 487–498. https://doi.org/10.1017/S136898001200290X

Hamner, H. C., & Moore, L. V. (2020). Dietary quality among children from 6 months to 4 years, NHANES 2011-2016. *American Journal of Clinical Nutrition*, *111*(1), 61–69. https://doi.org/10.1093/ajcn/nqz261

Herawati, A. N., Palupi, N. S., Andarwulan, N., & Efriwati, E. (2019). Kontribusi Asupan Zat Besi Dan Vitamin C Terhadap Status Anemia Gizi Besi Pada Balita Indonesia. *Penelitian Gizi Dan Makanan (The Journal of Nutrition and Food Research)*, *41*(2), 65–76. https://doi.org/10.22435/pgm.v41i2.1886

Hilger, J., Goerig, T., Weber, P., Hoeft, B., Eggersdorfer, M., Carvalho, N. C., Goldberger, U., & Hoffmann, K. (2015). Micronutrient intake in healthy toddlers: A multinational perspective. *Nutrients*, *7*(8), 6938–6955. https://doi.org/10.3390/nu7085316

Lytle, L. A. (2009). Measuring the Food Environment. State of the Science. *American Journal of Preventive Medicine*, *36*(4 SUPPL.), 1–18. https://doi.org/10.1016/j.amepre.2009.01.018

Marty, L., Dubois, C., Gaubard, M. S., Maidon, A., Lesturgeon, A., Gaigi, H., & Darmon, N. (2015). Higher nutritional quality at no additional cost among low-income households: Insights from food purchases of "positive deviants." *American Journal of Clinical Nutrition*, *102*(1), 190–198. https://doi.org/10.3945/ajcn.114.104380

Ministry of Health Indonesia. (2018). Hasil Utama Laporan Riskesdas 2018 [Main Report of Indonesia Basic Health Research 2018]. *National Institute of Health Reseach and Development Jakarta*. https://doi.org/1 Desember 2013

Mj, W., & Mt, K. (2021). *Iron Deficiency Anemia* (pp. 7–12). https://www.ncbi.nlm.nih.gov/books/NBK448065/?report=classic

Nepper, M. J., Ludemann, M., & Chai, W. (2014). Validation of Instruments to Assess Home Food Environment of Pre-Adolescents: A Pilot Study. *Journal of Nutritional Health & Food Science*, *2*(4). https://doi.org/10.15226/jnhfs.2014.00132

Prasetyaningrum, Y. I., Kertia, N., & Gunawan, I. M. A. (2018). Differences in home food availability and macronutrients intake : study on obese and non obese preschool children. *The First International Conference of Food and Agriculture*, 317–324.

Putri, A. R., Chandra, D. N., & Wiradnyani, L. A. A. (2021). *Appetitive Traits Children Aged 2-6 Years in Jakarta and Its Correlation With Diet Quality*. Universitas Indonesia.

Quick, V., Golem, D., Alleman, G. P., Martin-Biggers, J., Worobey, J., & Byrd-Bredbenner, C. (2018). Moms and dads differ in their family food gatekeeper behaviors. *Topics in Clinical Nutrition*, *33*(1), 3–15. https://doi.org/10.1097/TIN.0000000000000127

Report, T. H. E. N. (2008). *The Nutrition Report. German Nutrition Society*. www.dge.de

Sandjaja, S., Budiman, B., Harahap, H., Ernawati, F., Soekatri, M., Widodo, Y., Sumedi, E., Rustan, E., Sofia, G., Syarief, S. N., & Khouw, I. (2013). Food consumption and nutritional and biochemical status of 0 · 5 – 12-year-old Indonesian children : the SEANUTS study. *British Journal of Nutrition*, *110*(S3). https://doi.org/10.1017/S0007114513002109

Spurrier, N. J., Magarey, A. A., Golley, R., Curnow, F., & Sawyer, M. G. (2008). Relationships

between the home environment and physical activity and dietary patterns of preschool children: A cross-sectional study. *International Journal of Behavioral Nutrition and Physical Activity*, *5*, 1–12. https://doi.org/10.1186/1479-5868-5-31

Subramaniam, G., & Girish, M. (2015). Iron Deficiency Anemia in Children. *Indian Journal of Pediatrics*, *82*(6), 558–564. https://doi.org/10.1007/s12098-014-1643-9

Sufyan, D., Februhartanty, J., Bardosono, S., & Khusun, H. (2019). Food purchasing behaviour among urban slum women in East Jakarta: a qualitative study. *Malaysian Journal Of Nutrition*, *25*, 33-46. Retrieved 28 July 2022, from https://nutriweb.org.my/mjn/publication/25-s/25-s.pdf#page=41.

Sunardi, D., Bardosono, S., Basrowi, R. W., Wasito, E., & Vandenplas, Y. (2021). *Dietary Determinants of Anemia in Children Aged 6 – 36 Months : A Cross-Sectional Study in Indonesia*. *2*, 1–10.

Taylor, C. M., & Emmett, P. M. (2020). *Picky eating in children : causes and consequences*. 1–9. https://doi.org/10.1017/S0029665118002586. Picky

Trofholz, A. C., Tate, A. D., Draxten, M. L., Neumark-Sztainer, D., & Berge, J. M. (2016). Home food environment factors associated with the presence of fruit and vegetables at dinner: A direct observational study. *Appetite*, *96*, 526–532. https://doi.org/10.1016/j.appet.2015.10.019

Vereecken, C., Vereecken, C., Haerens, L., Haerens, L., Maes, L., & de Bourdeaudhuij, I. (2010). The relationship between children's home food environment and dietary patterns in childhood and adolescence. *Public Health Nutrition*, *13*(10A), 1729–1735. https://doi.org/10.1017/S1368980010002296

W. Basrowi, R., & Dilantika, C. (2021). Optimizing iron adequacy and absorption to prevent iron deficiency anemia: The role of combination of fortified iron and vitamin C. *World Nutrition Journal*, *5*(1–1), 33–39. https://doi.org/10.25220/wnj.v05.s1.0005

Wyse, R., Campbell, E., Nathan, N., & Wolfenden, L. (2011). Associations between characteristics of the home food environment and fruit and vegetable intake in preschool children: A cross-sectional study. *BMC Public Health*, *11*. https://doi.org/10.1186/1471-2458-11-938

Yeh, M. C., Ickes, S. B., Lowenstein, L. M., Shuval, K., Ammerman, A. S., Farris, R., & Katz, D. L. (2008). Understanding barriers and facilitators of fruit and vegetable consumption among a diverse multi-ethnic population in the USA. *Health Promotion International*, *23*(1), 42–51. https://doi.org/10.1093/heapro/dam044