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An Online Cross-Sectional Survey: Changes in Food Group Consumption on Complementary Feeding during COVID-19 Pandemic in Indonesia ABSTRACT This study aimed to assess the impact of COVID-19 pandemic on food group consumption of complementary feeding in Indonesia. Data were collected using online self-administered questionnaires on Indonesian mothers of children aged 6–23 months. The result showed that households with decreased ability to provide food during the COVID-19 pandemic tended to choose unhealthy food groups on complementary feeding.

There were higher odds of unhealthy food consumption, such as sweetened beverages, including fruit juice (OR=3.181; 95% CI:1.788-5.657) and homemade drink with sweeteners 95% sugar (OR=2.066; CI:1.240-3.444); frozen (OR=2.270; CI:1.400-3.681), or confection 95% CI:1.435-3.235); and foods 95% -2.517). the of food group consumption which lower during COVID-19 pandemic mostly are animal source foods group, including yogurt (OR=0.297; 95% CI:0.161-0.548); drink 95% CI:0.138-0.464); (OR=0.355; CI:0.230-0.549); (OR=0.675; CI:0.461-0.991); fish seafood 95% organ (OR=0.304; CI:0.180-0.512); meats 95% and (OR=0.339; CI:0.225-0.511). effective strategy for enhancing complementary feeding quality during pandemic should be formulated.

Keywords: complementary feeding, COVID-19, food group, unhealthy food

*Corresponding Author: email: herwinda@almaata.ac.id (Received 21-07-2023; Revised 06-11-2023; Accepted 10-03-2024; Published 31-08-2024) This work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License J. Gizi Pangan, Volume 19, Supp.2, August 2024 322 Available online:

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19(Supp.2):322-331 Accredited based on DGHE, Republic of Indonesia 79/E/KPT/2023

ISSN 1978-1059 EISSN 2407-0920 INTRODUCTION The COVID-19 pandemic was

declared by on 2020 has to many countries, including Indonesia in 2020.

The spread of COVID-19 is very fast and is transmitted through droplets (Setiadi et al. 2022; 2020). rapid of COVID-19 has led to government policies such as large-scale social restrictions, including stay-at-home regulations, school-from-home, and restrictions on public and private gatherings (Laborde et al. 2021; Picchioni et al. The large-scale social restrictions policy impacted the household economic, including the decrease in production, wage cuts, and termination of employment (Syafiq et al. 2022).

Child nutrition and health issues have been negatively affected by the COVID-19 pandemic (Ntambara Chu Low economic level due to COVID-19 pandemic lead to decreasing purchasing power for nutritious and varied food, as well as access to health facilities. Children with poor dietary practices are more susceptible to illness, and if it persists for a long time, it will lead to malnutrition. (Kundu et al. 2021). complementary that timely, appropriate (frequency, amount, and consistency), and feeding one strategy to improve children's health.

Infant and Young Child Feeding guidelines suggest that children aged 6–23 months should be provided various foods to ensure that nutrient needs are met (UNICEF 2020). There were eight food groups should provide during complementary feeding, including grains, roots, tubers, and plantains; pulses; nuts and dairy flesh eggs; vitamin-A rich fruits and vegetables; and other fruits and vegetables (Binns et al. On other hand, it is crucial to limit the consumption of unhealthy food groups such as sugar-sweetened beverages, sweet food, and fried or salty food (WHO & UNICEF 2021). 323 J. Gizi Pangan, Volume 19, Supp.2, August 2024 Rahayu et al.

During the COVID-19 pandemic, the practice of providing complementary feeding was quite challenging, this was due to socioeconomic changes, including restrictions on social activities and decreased household income (Widyaningrum et al. Low income the type and amount of food given to children (Lovelace Rabiee-Khan Furthermore, socioeconomic changes impacted the choice of food group ingredients for complementary feeding (French et al. 2019). Currently, there are limited studies analysing the complementary feeding practice in Indonesia during the COVID-19 pandemic.

This study aimed to assess the impact of COVID-19 pandemic on household ability to provide adequate complementary feeding practice in Indonesia. METHODS Design, location, and time The research used a cross-sectional study. This study was conducted through an online self-administered questionnaire from April-May 2022 during the COVID-19 pandemic in Indonesia. The ethical clearance was obtained from the ethical

committee of the Faculty of Health Sciences, Universitas Alma Ata (with the number KE/AA/ VI/ EC/ Participants this gave informed after out voluntary consent form.

Sampling The population for this study was mothers of child who had a healthy child aged 6 to 23 months and currently living in Indonesia. The sampling technique used was convenience sampling where participation was open to all mothers who had been introduced to solid foods to their child. For practical reasons, only participants with access to the internet and a computer or smartphone were invited to participate. Data collection For timing and clarity, the questionnaire was piloted with three researchers and two mothers.

changes made comments the and The was created on the online platform Google Form. An online survey was chosen as the format due to the pandemic situation and COVID-19 physical restrictions. Several target groups in Indonesia received links to the online survey through social media, including Instagram, Whatsapp, Line, Facebook, and Twitter. For a quick and effective way to reach respondents, data was gathered from nearby communities by Asosiasi Ibu Menyusui Indonesia Total sample in this study. Of the total sample, we excluded 56 participants for incomplete data, resulting in 574 participants.

The self-administered questionnaire collects information related to sociodemographic data, food group consumption on complementary feeding, and the impact of the COVID-19 pandemic on household economic aspects. Sociodemographic data include area of residence, household income level (low or IDR <1,500,000, middle or IDR 1,500,000 - 2,500,000, high or IDR >2,500,000), child's age, child's gender, maternal educational status (low or junior high school and below, middle or senior high school, high or college above), and occupation (formal worker like civil servants, army, police, private sectors, infomal worker like labourer, farmers).

related to the impact of the COVID-19 pandemic on household economic aspects include the impact on the household's ability to provide food, the impact on mother's employment status, and the impact on father's employment status. Food group consumption in complementary feeding defined children <23 months who consumed each food group on the previous day. Food group recommendations based on Infant and Young Child Feeding from UNICEF and WHO 2021 guidelines (WHO & UNICEF 2021). The type of food group including (1) Breastmilk; (2) Grains; (3) Starchy tubers or starchy tuberous roots; Legumes, and etc.;

Infant (6) from such fresh, or milk; (8) Yoghurt (9) (10) (11) seafood, shellfish; Organ (13) Meats; Poultry; Processed (16) Vitamin deep and fleshed vegetable; (17) Dark green leafy

vegetables; (18) Vitamin A-rich (19) Any vegetables; (20) Any other fruits. Furthermore, the consumption of other types of food groups that are recommended to limit their consumption in complementary feeding are also analysed, including sweetened beverages. J. Gizi Pangan, Volume 19, Supp.2, August 2024 324 Changes in food group consumption on complementary feeding and unhealthy foods. Sweetened beverage group including Commercially and packaged; Fruit (3) drinks added with any kind of sweeteners.

Unhealthy food included Sugar (2) Frozen (3) or confections; Sentinel fried and salty foods. Data analysis Food group consumption and sociodemographic data were analysed using a descriptive analysis for frequency distribution. Pearson's test was to conduct a bivariate analysis of food group consumption and the impact of COVID-19 pandemic on household ability to provide food. To determine the adjusted odds ratios and 95% confidence for association sociodemographic factors and unhealthy food and beverage consumption, multinomial logistic regression analysis was employed for adjusted analyses.

Statistical analysis was performed using Statistical Package for Social Sciences (SPSS) 26 Software. RESULTS AND DISCUSSION The total respondents of this study were 574 of aged months. Majority of respondents are residents in Java 403 (70.21%), level (39.9%), middle of status (62.89%), and 350 Most were 12-17, the gender was half boys and half girls. COVID-19 pandemic had an impact on household economic aspects, including decreased household ability to provide food 422 (73.52%) (Table 1). Figure 1 reports the percentage of each food group's consumption on complementary feeding the previous day. Almost all children consumed such rice (90.77%) their complementary feeding. The consumption of milk higher (56.97%) breastmilk (56.97%).

all source food, organ meat was most consumed 419 Most consumed other 324 and 206 (35.89%) than A fruits (30.49%) and 111 Yogurt 460 (80.14%) was the most consumed dairy food group. Consumption of commercially produced and food (88.33%) sugar confections (78.05%) high the unhealthy food groups. Table 2 shows the odds of healthy food groups consumption on complementary feeding were lower compared to unhealthy food groups if their household ability to provide food during COVID-19 pandemic had been affected.

Healthy food group consumption that was statistically significant lowering odds COVID-19 pandemic were dairy and animal source foods group. Dairy foods were significant, including yoghurt, yoghurt drink, and cheese. Animal foods were including fish seafood, meats, meats and poultry. Meanwhile, consumption most plant-based food groups were higher in household that affected the ability to provide food during

COVID-19 pandemic, including vitamin A-rich deep and fleshed dark green leafy vegetables, vitamin A-rich fruits any other vegetables, and any other fruits. There were higher odds of unhealthy food groups consumption on complementary feeding shown in Table 3 on households that affected their ability to provide food during COVID-19 pandemic.

Among sweetened beverage consumption, fruit juice and homemade drinks with sweeteners were high. Consumption of unhealthy food group were also have high odds, such as sugar confections, frozen treats, baked or fried confections, fried and salty foods. The consumption of unhealthy food and sugar-sweetened beverages tended to have higher odds in households with a decreased ability to provide food. During the pandemic there was an increase in food prices on the market, generally healthy foods have a higher price than unhealthy food groups.

This condition is related to consumer demand for healthy food due to panic buying behaviour during a pandemic (Sobaih & Moustafa As result these food prices, there has been a shift in food choices, due to higher levels of stress, fewer resources, and less access to food (Laborde et al. 2021). Household with food insecurity will tend to choose food with cheap sources of calories and generally non-perishable ingredients or food that can be stored on shelves to deal with food supply disruptions and social distancing policies and depend on high energy density for a longer 325 J. Gizi Pangan, Volume 19, Supp.2, August 2024 Rahayu et al. period of time (Adams et al.

Compared to food-secure households, food-insecure households tend to choose higher intake of added sugar food and beverage which is also liked by children because of its taste (Landry et al. Based on this research, it is known that the types of unhealthy foods that are widely consumed in this study are long-shelf life foods, such as frozen food and other packaged snacks. As well as the majority of respondents in this study are domiciled Java (urban which a location where many packaged food products are sold around the neighbourhood compared to outside Java island (rural areas).

Based on multivariate analysis (Table 4), it is known that the consumption of sugar-sweetened beverages were higher on older children, primarily 18-23 (AOR=1.296; Table 1. Respondent characteristics

Characteristic	Frequency (n)	Percentage (%)
Area of residence		
Java	403	70.21
Outside Java	171	29.79
Income Level		
High	229	39.90
Middle	203	35.37
Low	142	24.73
Child's age (months)		
6-11	235	40.92
12-17	236	41.21
18-23	102	17.77
Child's gender		
Male	287	50.00
Female	287	50.00
Maternal educational status		
High	201	35.02
Middle	361	62.89
Low	12	2.09
Maternal employment status		
Housewife/Unemployed	350	60.98
Formal worker	102	17.77
Informal worker	122	21.25
Father's occupation		
Unemployed	5	0.87
Formal worker	179	31.18
Informal worker	390	

67.95 COVID-19 pandemic impacts on the household ability to provide food Not affected 152 26.48 Decrease 422 73.52 COVID-19 pandemic impacts on mother's employment status No 319 55.57 Yes 255 44.43 COVID-19 pandemic impacts on father's employment status No 135 23.52 Yes 439 76.48 J. Gizi Pangan, Volume 19, Supp.2, August 2024 326 Changes in food group consumption on complementary feeding Figure 1. Consumption of several food groups on complementary feeding during the previous day Table 2.

Impacts COVID-19 pandemic related to household ability to provide food of several healthy food group consumption on complementary feeding Variables Food group consumption OR 95% CI p Yes No n % n % Breast milk Decreased 73 17.3 349 82.7 0.816 0.511-1.304 0.396 Not affected 31 20.39 121 79.61 1 Grains Decreased 379 89.81 43 10.19 1.611 0.788-3.292 0.191 Not affected 142 93.42 10 6.58 1 Starchy tubers or starchy tuberous roots Decreased 160 37.91 262 62.09 0.299 0.202-0.443 <0.001 Not affected 102 67.11 50 32.89 1 Legumes, nuts, and seeds Decreased 82 19.52 338 80.48 0.284 0.190-0.422 <0.001 Not affected 71 46.71 81 53.29 1 Infant formula Decreased 250 59.24 172 40.76 0.816 0.511-1.304 0.396 Not affected 77 30.92 172 69.08 1 Milk from animals Decreased 238 56.4 184 43.6 0.733 0.500-1.075 0.112 Not affected 97 63.82 55 36.18 1 Yogurt Decreased 321 76.07 101 23.93 0.297 0.161-0.548 <0.001 Not affected 139 91.45 13 8.55 1 327 J. Gizi Pangan, Volume 19, Supp.2, August 2024 Rahayu et al. Variables Food group consumption OR 95% CI p Yes No n % n % Yogurt Decreased 321 76.07 101 23.93 0.297 0.161-0.548 <0.001* Not affected 139 91.45 13 8.55 1 Yogurt drink Decreased 308 72.99 114 27.01 0.253 0.138-0.464 <0.001* Not affected 139 91.45 13 8.55 1 Cheese Decreased 241 57.11 181 42.89 0.355 0.230-0.549 <0.001* Not affected 120 78.95 32 21.05 1 Eggs Decreased 134 31.75 288 68.25 0.675 0.461-0.991 0.045 Not affected 62 40.79 90 59.21 1 Fish, seafood, or shellfish Decreased 174 41.23 248 58.77 0.409 0.279-0.600 <0.001* Not affected 96 63.16 56 36.84 1 Organ meats Decreased 287 68.01 135 31.99 0.304 0.180-0.512 <0.001* Not affected 133 87.5 19 12.5 1 Meats Decreased 209 49.53 213 50.47 0.339 0.225-0.511 <0.001* Not affected 113 74.34 39 25.66 1 Poultry Decreased 245 58.06 177 41.94 0.313 0.199-0.492 <0.001* Not affected 124 81.58 28 18.42 1 Processed meats Decreased 177 41.94 245 58.06 0.617 0.425-0.896 0.011* Not affected 82 53.95 70 46.05 1 Vitamin A-rich deep yellow and orange-fleshed vegetable Decreased 66 15.64 356 84.36 2.268 1.467-3.509 <0.001* Not affected 45 29.61 107 70.39 1 Dark green leafy vegetables Decreased 86 20.38 336 79.62 2.479 0.656-3.709 0.066 Not affected 59 38.82 93 61.18 1 Vitamin A-rich fruits Decreased 109 25.83 313 74.17 2.204 0.495-3.248 0.121 Not affected 66 43.42 86 56.58 1 Any other vegetables Decreased 120 28.44 302 71.56 3.275 2.233-4.815 <0.001* Not affected 86 56.58 66 43.42 1 Any other fruits Decreased 217 51.42 205 48.58 2.246 1.510-3.341 <0.001* Not affected 107 70.39 45 29.61 1 * Pearson's Chi-square Test, significant if p <0.05 Continue from Table 2 J. Gizi Pangan, Volume 19, Supp.2, August

2024 328 Changes in food group consumption on complementary feeding 95% CI:1.179-1.491) and children with working mothers 95% Meanwhile, consumption unhealthy were also higher in older children, especially aged months 95% CI:1.140-1.393) children live Java (AOR=1.708; 95% CI :1.486-1.830). Consumption of sugar-sweetened beverages and unhealthy food or mostly defined Ultra-Processed (UPF), both are by child's the of consumption increased in children aged 18-23 months.

Consumption of ultra-processed food increases as children get older, this is associated with reduced breastfeeding as children get older, so parents provide other food on complementary feeding et al. 2020). Furthermore, child preference and demand was a prominent factor in older children (Green et al. 2019). Guidance regarding the selection of types of food in complementary feeding for parents is still needed, especially in relation to limiting added sugar consumption.

Consumption of UPF in the first 2 years of life is not recommended due to high level of energy density, added sugar, fat, sodium and additives (Dunford & Popkin 2023; Murray 2017). UPF can also affect a child's future food preferences. Consumption of UPF is also associated with a higher prevalence of obesity, chronic disease, and nutritional deficiencies in the first years of life and may also interfere with child growth and development (Calcaterra et al. 2023). Whereas in this study, the consumption of sugar sweetened beverages and unhealthy food were high accompanied by a low consumption of ASFs and dairy food.

However, people will tend to reduce portions or even not consume ASFs due to economic reasons (Headey et al. 2018; et al. In the of ASFs is quite expensive compared to other foodstuffs, especially during the pandemic due to the lockdown which caused problems in the food supply chain and also because of the Table 3. Impacts COVID-19 pandemic related to household ability to provide food on sweetened beverage and unhealthy food consumption Variables Food group consumption OR 95% CI p Yes No n % n % Commercially produced and packaged Decreased 367 86.97 55 13.03 0.572 0.297-1.00 0.094 Not affected 140 92.11 12 7.89 1 Fruit juice Decreased 313 74.17 109 25.83 3.181 1.788-5.657 <0.001* Not affected 137 90.13 15 9.87 1 Homemade drinks added with sweeteners Decreased 311 71.33 125 28.67 1.652 1.034-2.641 0.032 Not affected 111 80.43 27 19.57 1 Sugar confections Decreased 317 75.12 105 24.88 2.066 1.240-3.444 0.005 Not affected 131 86.18 21 13.82 1 Frozen treats Decreased 235 55.69 187 44.31 2.27 1.400-3.681 0.001* Not affected 111 73.03 41 26.97 1 Baked or fried confections Decreased 296 70.14 126 29.86 2.154 1.435-3.235 <0.001* Not affected 128 84.21 24 15.79 1 Sentinel fried and salty foods Decreased 287 68.01 135 31. 99 1.633 1.059-2.517 0.026* Not affected 118 77.63 34 22.37 1 * Pearson's Chi-square Test, significant if p< 0.05 329 J. Gizi Pangan, Volume 19, Supp.2, August 2024 Rahayu et al.

Table 4.

Multivariable logistic regression of factors associated with sugar-sweetened beverages and unhealthy food consumption on complementary feeding during COVID-19 pandemic

Characteristic	Sugar sweetened beverage (95% CI)	Unhealthy food (95% CI)	COR (95% CI)	AOR (95% CI)
Area of residence				
Java	1.049 (0.700-1.571)	1.735 (1.499-1.820)	1.708* (1.486-1.830)	
Outside Java	1	1	1	1
Income Level				
High	0.838 (0.469-1.496)	0.589 (0.314-1.104)	0.809 (0.426-1.534)	0.728 (0.412-1.285)
Middle	1	1	1	1
Low	1	1	1	1
Child's age				
18-23 months	1.273 (1.163-1.457)	1.296* (1.179-1.491)	1.353 (1.240-1.520)	1.235* (1.140-1.393)
12-17 months	0.296 (0.195-0.450)	0.918 (0.574-1.470)	0.218 (0.129-0.369)	0.629 (0.373-1.059)
6-11 months	1	1	1	1
Child's gender				
Female	1.021 (0.711-1.466)	1.124 (0.791-1.596)	1.037 (0.309-3.479)	0.838 (0.236-2.974)
Male	1	1	1	1
Maternal educational status				
Low	1.360 (0.381-4.862)	0.594 (0.177-1.992)	1.037 (0.309-3.479)	0.838 (0.236-2.974)
Middle	1	1	1	1
High	1	1	1	1
Maternal employment status				
Work	1.960 (0.978-3.928)	1.854* (1.235-2.786)	1.180 (0.620-2.244)	1.960 (0.978-3.928)
Housewife	1	1	1	1
Father's occupation				
Unemployed	1.430 (0.906-2.256)	1.008 (0.650-1.562)	1.027 (0.139-7.589)	1.762 (0.266-11.663)
Informal worker	1	1	1	1
Formal worker	1	1	1	1
COVID-19 pandemic impacts on the household ability to provide food				
Decrease	1.573 (1.055-2.344)	1.361 (1.112-1.975)	1	1
Not affected	1	1	1	1

*Pearson's Chi-square Test, significant if $p < 0.05$ long production process (Rahimi et al.

According to the findings, the proportion of ASFs consumed is higher when compared to other types of food and beverage, particularly sugar-sweetened beverages and unhealthy foods. To ensure price stability for ASFs on the market, further policies are required. In order to meet the consumption of ASFs in CF, a safety net is needed. *J. Gizi Pangan, Volume 19, Supp.2, June 2024 330* Changes in food group consumption on complementary feeding also required for families who experience food insecurity. As a limitation of this study, we used convenience sampling, which may have been representative of the general population of mothers' children 6-23 months.

The respondents were recruited through social media and a community group, which may cause selection bias and affect the generalizability of findings. The study used self-administered questionnaires, which may be subject to recall bias, social desirability bias, and measurement error. CONCLUSION The result showed that households with decreased ability to provide food during the COVID-19 pandemic tended to choose unhealthy foods for complementary feeding.

There was a higher odd of unhealthy food such as sweetened beverage consumption, including fruit juice and homemade with. Meanwhile, the odds of food group consumption were low, mostly animal source foods and dairy. To improve nutritional quality on complementary feeding during pandemic, effective strategy for enhancing

complementary feeding quality should be taken into account. ACKNOWLEDGEMENT We would like to thank the enumerators and AIMI (Asosiasi Ibu Menyusui Indonesia) helping us distribute the survey link throughout the Indonesian region.

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