Plagiarism Checker X Originality Report

Similarity Found: 4%

Date: Thursday, January 23, 2025
Statistics: 317 words Plagiarized / 7557 Total words
Remarks: Low Plagiarism Detected - Your Document needs Optional Improvement.

Nutrition and Food Science 5 2 pandemic in Indonesia 6 7 3 8 4 Abstract 9 10 5 Purpose – Complementary feeding practices was more difficult during the COVID-19 11 12 6 pandemic due to economic instability, especially for animal source foods (ASFs) consumption. 13 14 7 According to the problem, the purpose of the present study was to determine the economic 15 8 impact of COVID-19 pandemic on ASFs consumption and ASFs consumption related factors 16 17 9 on complementary feeding in Indonesia. 18 19 10 Design/methodology/approach – This cross-sectional study was targeted to mothers of child 20 11 aged 6-23 months during pandemic. A total of 574 respondents were obtain through online 22 12 questionnaire.

23 24 13 Findings – This study found that flesh food including fish/seafood, organ meat, meat, poultry, 25 26 14 and processed meat were associated with all economic impact of COVID-19 pandemic, in 27 15 contrast, those economic impacts did not affect the dairy product and egg consumption. 28 29 16 Multivariate analysis showed children with older age (AOR: 1.13, 95%CI: 1.04-3.26), meet 30 31 17 minimum dietary diversity (AOR:2.17, 95%CI: 1.56-5.44), and from high income level 32 33 18 household (AOR: 1.14, 95%CI: 1.09-2.10) were contributed to ASFs consumption. 34 19 Practical implication – Other strategies aimed at enhancing food security to increase ASFs 35 36 20 consumption on complementary feeding.

The government may consider short-term emergency 37 38 21 purchasing subsidies and macro-control of the ASFs market. Nutrition education is also 39 40 22 required to improve knowledge related to importance of ASFs consumption for children. 41 23 Originality/value – This study reveals the association between each food group of ASFs 42 43 24 consumption on complementary feeding and the economic impact of COVID-19 pandemic. 44 45 25 46 26 Keywords: COVID-19 pandemic, complementary

feeding, animal source foods 47 27 household income 48 28 49 50 29 51 52 53 54 55 56 57 58 59 60

1 2 3 30 Introduction 4 5 31 Malnutrition is a problem that occurs in most developing countries.

In Indonesia, nutrition 8 17 38 employment status, such as layoffs, reduced working hours, or reduced salaries. Many people 18 19 39 experience a decrease in household income which has a negative impact on purchasing power, 20 21 40 food availability, and a decrease in the level of household food security (No?tasari et al., 2023). 22 41 Lower household food security directly affects food consumption and nutritional intake of 24 42 household members at different levels (Rozaki, 2021).

25 26 43 Prevention of malnutrition can be started from 1000 days of life by the fulfillment of 27 28 44 optimal nutrition (Nyarko et al., 2023). The World Health Organization recommends that 29 45 infants should be exclusively breastfed for the first six months of life and an appropriate 30 31 46 complementary feeding with a diverse diet starting from six months. Complementary feeding 32 33 47 practice should meet the minimum dietary diversity.

Animal Source Foods (ASFs) is one of 34 35 48 the food groups on eight type of food group that can be met from various food sources including 36 49 eggs, poultry, meat, fish, and milk (WHO and UNICEF, 2021). ASFs are a source of high- 39 52 58 Based on research conducted in Iran and China, it is known that because of economic 53 59 problems during the pandemic, household tend to buy food at affordable prices. There has been 55 60 a shift to increased consumption of carbohydrate foods and decreased consumption of ASFs. 56 57 61 ASFs tend to be more expensive than other food groups (Nikooyeh et al., 2022; Shen and 58 59 62 Zhong, 2023).

60

1 2 3 63 Given the importance of consuming ASFs in complementary feeding to prevent 4 5 64 malnutrition during COVID-19 pandemic, this study aims to determine the economic impact 6 7 65 of COVID-19 pandemic on ASFs consumption and ASFs consumption related factors on 8 66 complementary feeding in Indonesia. 9 10 67 11 12 68 Materials and Methods 13 14 69 Study Design and Participants 15 70 This study was a cross-sectional study using convenience sampling during the COVID- 16 17 71 19 pandemic in Indonesia.

Data was obtained through an online survey due to the government's 18 19 72 physical limitations strategy to prevent disease transmission, which includes limiting access to 20 73 essential public places such as healthcare centers, workplaces, and markets. This research was 22 74 part of the Indonesian Complementary Feeding Quality (ICFQR) Study which was conducted 23 24 75 for 6 weeks (April-May) 2022. We performed a self-administered online questionnaire using 25 26 76 the Google Forms tool. Participants were mothers of healthy children aged 6 to 23 months live 27 77 in Indonesia who had been introduced to solid foods to their child.

Participants were limited to 28 29 78 those having a computer or smartphone and internet connection for practical reasons. All 30 31 79 criteria were verified by the answers given to the corresponding survey questions. 32 33 80 The population was children aged 6–23 months, living in Indonesia. Sample size was 34 81 determined by using a single population proportion formula. The prevalence (P) of 36 82 complementary feeding practices was taken as 13% (Widyaningrum et al., 2021), with 95% of 37 38 83 confidence level and 5% margin of error (d), then minimum sample was 174.

However, to 39 40 84 anticipate the missing data, we added 20% as our required sample size estimation, so the 41 42 85 minimum sample size was 209. The survey was completed by 574 mothers of children aged 6- 43 44 86 23 months. 45 87 The questionnaire online links distributed through social media to several target groups 46 47 88 in Indonesia, such as Instagram, Whatsapp, Line, Facebook, and Twitter. Data were collected 48 49 89 from local communities such as Indonesian Breastfeeding Mothers' Association for easily 50 90 reach respondents quickly and efficiently.

In addition, we used all community member from 52 91 each province to have more representative sample of Indonesian children. 53 54 92 Data Collection 55 56 93 The questionnaire was developed Alma Ata University's research members, which 57 94 included a dietitian with experience in infant nutrition research (YP) and two researchers 58 59 95 (HKR, HDH). The tool was modified in terms of vocabulary formulation, vocabulary removal, 60

1 2 3 96 and adding new vocabulary. The Cronbach's alpha of the study sample was 0.81, indicating a 4 5 97 high level of consistency and can be depended on in the field due to the reliability of its results.

6 7 98 The questionnaire contained three parts: socio-demographic characteristics, data related to the 8 99 impact of the COVID-19 pandemic on household economic aspects, and data related to 9 10 100 complementary feeding. Socio-demographic data include place of residence (Java or outside 11 12 101 Java); maternal age (18-25 years, 26-35 years, or 36-40 years); mother's education (basic, 13 14 102 secondary, or high); mother's occupation (housewife, government employees, or private 15 103 employees); father's occupation (no occupation, government employees, or private 16 17 104 employees); household income level (low < IDR 1.500.000, middle IDR 1.500.000-2.500.000, 18 19 105 or high IDR >2.500.000); family size (large 7-10 people, middle 4-6 people, or small 2-3 20 106 people); child's age (6-11 months, 12-17 months, or 18-23 months); and the sex of the child 22 107 (male or female).

23 24 108 Data related to the impact of the COVID-19 pandemic on household economic aspect 25 26 109 include the impact on household income (decreased income, no change income, or increased 27 110 income), the impact on household food purchases (impacted or not impacted), the impact on 28 29 111 mother's employment status (impacted or not impacted), and the impact on father's employment 30 31 112 status (impacted or not impacted). Data related to ASFs consumption were asked in 32 33 113 complementary feeding section.

ASFs consumption in complementary feeding is defined as 34 114 children 6-23 months who have consumed each of the food groups 4, 5, or 6 on the previous 35 36 115 day based on recommendations from IYCF 2021 (WHO and UNICEF, 2021). Food group 4 is 37 38 116 diary group, including milk from animals such as fresh, canned, or powdered milk; yogurt 39 117 drink; yogurt, other than yogurt drinks; and hard or soft cheese. Food group 5 is flesh food 41 118 group, including organ meats such as liver, kidney, heart; processed meats such as sausages, 42 43 119 canned meats; other meats such as beef, pork, lamb, goat, chicken, duck; and fresh or dried fish 44 45 120 or shellfish.

Food group 6 is eggs, including chicken, eggs, and duck eggs. 46 121 As a secondary outcome of interest, we analyzed the Minimum Dietary Diversity (MDD) 47 48 122 of complementary feeding. Based on the recommendations from IYCF 2021, minimum food 49 50 123 group consumed in complementary feeding is five groups on eight food group in total. The 51 52 124 eight food groups including breast milk; grains, roots, and tubers; legumes, nuts, and seeds; 53 125 dairy products; flesh food; eggs; vitamin A-rich fruits and vegetables; and other fruits and 54 55 126 vegetables.

1 2 3 130 association between each food group on ASFs and economic impact of COVID-19 pandemic. 4 5 131 Bivariate analysis was conducted using Pearson's Chi Square test ($p<0.05$). Multivariate 6 7 132 analyses were analyzed using multiple logistic regression tests to know the factor associated 8 133 with ASFs consumption. We adjusted for all socio-demographic confounders in the fully 9 10 134 adjusted models. Data analysis was done using IBM SPSS Statistics for Mac version 26.0 11 12 135 (IBM Corp, Armonk, New York, USA).

13 14 136 Ethical Consideration 15 137 Ethical approval (with the number KE/ AA/ VI/ 10832/ EC/ 2022) was obtained from the 16 17 138 ethics committee of the Faculty of Health Sciences, Universitas Alma Ata which complied with 18 19 139 the Helsinki Declaration. Information about the background, purpose, and scope of the 20 140 questions was informed at the beginning of the study. Participants had received a written 22 141 explanation regarding this research before filling out informed consent. Informed consent from 23 24 142 participants was obtained on the online form. The participants were also informed that all data 25 26 143 collected would be used for research purposes to be published.

27 144 Results 28 29 145 A total of 574 mothers of children aged 6-23 months participated in this study. Most of 30 31 146 the mothers live in Java (70.21%), 26-35 years old (61.15%), had secondary education 32 33 147 (62.89%), and more than half were housewife (60.97%). Nearly half of household had high 34 148 income level (48.08%). Most fathers work in private employees (70.73%) and have family 35 36 149 categorized as middle size (66.38%). Half of the mothers had daughters (50%) and half sons 37 38 150 (50%), with most children aged 6-11 months (40.94%) and 12-17 months (41.12%).

The 39 40 151 COVID-19 pandemic has caused most families to experience a decrease in household income 41 42 152 (63.59%). In addition, the outbreak also had a major impact on the household's ability to 43 44 153 provide food (73.52%), mother's employment status (55.57%), and father's employment status 45 46 154 (76.48%) (Table 1). 47 48 155 Table 1. Respondent's Characteristics (N=574) 49 Variable Frequency (%) 50 51 Child characteristic 52 Child's age 53 6-11 months 235 (40.94) 54 12-17 months 236 (41.12) 55 18-23 months 103 (17.94) 56 Sex of child 57 Female 287 (50.00) 59 Male 287 (50.00) 60 Mother and household characteristic

Place of residence No (<5 food groups) 77 (13.41) COVID-19 pandemic impacts on household ability to provide food Impacted 422 (73.52) Not impacted 152 (26.48) COVID-19 pandemic impacts on mother's employment status Impacted 255 (44.43) Not impacted 319 (55.57) COVID-19 pandemic impacts on father's employment status Impacted 439 (76.48) Not impacted 135 (23.52) 54 157 Figure 1 showed that most of the children met the MDD (86.6%) and consumed any 56 158 type of ASFs in complementary feeding (92.2%).

The most ASFs given to complementary 57 58 159 foods were eggs (65.9%) and dairy (61.7%). While other ASFs consumed was processed meat 59 60 160 (54.9%), fish or seafood (53%), meat (43.9%), and poultry (34.7%). Only 26.8% children

1 2 3 161 consumed organ meat. Children who consume ASFs during previous day tend to meet the 4 5 162 minimum dietary diversity recommendations (MDD). Based on the data, it is known that 92.6% 6 7 163 of children who consume ASFs have met the MDD, compared to children who do not consume 8 164 ASF, only 6.6%.

9 10 165 The results regarding the association of economic impact of COVID-19 pandemic on each 11 12 166 type of ASF consumption on complementary feeding are described in Table 2. Economic 13 14 167 impact of COVID-19 pandemic (household income change, ability to provide food, mother 15 168 employment status, and father employment status) had significant association with 16 17 169 consumption of ASFs in overall and all type of food in food group 5 (flesh food). Meanwhile, 18 19 170 food group 4 (dairy) and 6 (eggs) did not have a significant relationship with all economic 20 171 impact of COVID-19 pandemic.

22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60

1 2 3 172 Table 2. Economic impact of COVID-19 pandemic on each type of ASF consumption on complementary feedinga

4 Food group 4 _Food group 5 _Food group 6

5 ASFs _ consumption consumption consumption

COVID-19 pandemic 6 _ consumption Dairy products Fish/ seafood Organ meat Meat Poultry Processed meat Eggs

7 impacts n (%)b p value n (%)b p _n (%)b p _n (%)b p _n (%)b p _n (%)b p _n (%)b p

value value value value value value value

9 Increased income 13 10 11 (2.3) 12 No change income 174 13 (30.3) 14 Decreased income 342 15 (59.6) _ 0.013* 13 (2.3) 0.189 148 (25.8) 267 (46.5) _ 0.763 5 (0.9) 0.312 84 (14.6) 215 (37.5) _ 0.020* 4 (0.7) 0.184 39 (6.8) 111 (19.3) _ 0.011* 7 (1.2) 0.547 71 (12.4) 174 (30.3) _ 0.016* 8 (1.4) 0.601 51 (8.9) 146 (25.4) _ 0.020* 10 (1.7) 0.184 99 (17.2) 206 (35.9) _ 0.011* 9 (1.6) 0.547 125 (21.8) 244 (42.5) _ 0.679 0.242

16 Impacts on household ability to provide food

17 Not impacted 133 18 19 (23.2) 20 Impacted 396 21 (69.0) _ 0.015* 109 (19.0) 319 (55.6) _ 0.346 56 (9.8) 248 (43.2) _ <0.001** 19 (3.3) 135 (23.5) _ <0.001** 39 (6.8) 213 (37.1) _ <0.001** 28 (4.9) 177 (30.8) _ <0.001** 70 (12.2) 245 (42.7) _ <0.001** 90 (15.7) 288 (76.2) _ 0.055

22 Impacts on mother's employment status

23 Not impacted 286 24 (49.8) 25 Impacted 243 26 27 (42.3) _0.015* 222 (38.7) 206 (35.9) _0.346 149 (26.0) 155 (27.0) _<0.001** 67 (11.7) 87 (15.2) _<0.001** 118 (20.6) 134 (23.3) _<0.001** 85 (14.8) 120 (20.9) _<0.001** 156 (27.2) 159 (27.7) _<0.001** 198 (34.5) 180 (31.4) _0.332

28 Impacts on father's employment status

29 Not impacted 410 30 (71.4) 31 Impacted 119 32 (20.7) _0.047* 103 (17.9) 325 (56.6) _0.597 57 (9.9) 247 (43.0) _0.004** 30 (5.2) 124 (21.6) _0.016* 42 (7.3) 210 (36.6) _<0.001** 35 (6.1) 170 (29.6) _0.004** 64 (11.1) 251 (43.7) _0.028* 81 (14.1) 297 (51.7) _0.102

33 173 a Total sample size was 574, b the number of children who consumed each food group type on previous day, *Statistically significant at p-value <0.05, ** Statistically significant at p-value < 0.01 35 36 37 38 39 40 41 42 43

1 2 3 174 4 5 6 7 8 9 10 11 12 13 14 15 16 _ 100 90 80 70 60 50 40 30 20 10 _ 61.7 53 _ 26.8 _ 34.7 _ 54.9 _ 65.9 _ 92.2 _ 86.6

17 _ 0 Dairy Fish or Organ Poultry Processed Egg ASFs MDD _ _18 _ _ _19 175 seafood meat meat 20 _ _21 _176 _Figure 1.

Percentage children that consumed ASFs on complementary feeding _ _22 23 _177 _ _ _24 _178 _In the multivariate analysis (Table 3), showed an association between the consumption of _ _25 _ _ _ _26 _179 _ASF on complementary feeding with child's age (p=0.010; OR=1.26; 95% CI=1.22-2.22), _ _27 28 _180 _MDD (p=0.010; OR=1.26; 95% CI=1.22-2.22), and household income level (p=0.010; _ _29 181 OR=1.26; 95% CI=1.22-2.22). Meanwhile, there were no association between ASFs 30 31 182 consumption with all the COVID-19 pandemic impact on economic aspects. 32 33 183 34 184 Table 3.

Multivariate analysis with logistic regression on ASFs consumption 35

36 Variable _ ASFs Consumption _ COR (95% CI) AORa (95% CI)

37 No, n(%) Yes, n(%) 38 Child’s age 39 6-11 months (ref) 27 (11.5) 208 (88.5) 40 12-17 months 16 (6.8) 220 (93.2) 1.40 (0.10-4.91) 1.23 (0.65-3.61) 41 18-23 months 2 (1.9) 101 (98.1) 1.27 (1.03-2.21)* 1.13 (1.04-3.26)* 43 Sex of child 44 Male (ref) 22 (7.7) 265 (92.3) 45 Female 23 (8.0) 264 (92) 1.05 (0.57-1.92) 46 Place of residence 47 Java (ref) 22 (12.9) 149 (87.1) 48 Outside Java 23 (5.7) 380 (94.3) 2.44 (1.32-4.51)* 1.01 (0.39-2.60) 49 Family size 50 Large (ref) 5 (11.1) 40 (88.9) 51 Middle 25 (6.6) 356 (93.4) 1.56 (0.72-1.92) 52 Small 15 (10.1) 133 (89.9) 1.62 (0.61-2.23) 53 Mother’s age 54 18-25 years (ref) 16 (8.9) 163 (91.1) 55 26-35 years 25 (7.1) 326 (92.9) 1.30 (0.43-3.93) 56 36-40 years 4 (9.1) 40 (90.9) 1.01 (0.32-3.21) 57 Mother’s education level 58 Low (ref) 1 (8.3) 11 (91.7) 59 Middle 28 (7.8) 333 (92.2) 1.02 (0.71-7.84)* 1.12 (0.54-6.77)

1 2 3 High 16 (8.0) 185 (92.0) 1.03 (0.54-1.95)* 1.29 (0.83-1.98) 4 Mother’s occupation 5 Housewife (ref) 20 (5.7) 330 (94.3) 6 Government employees 12 (14.6) 70 (85.4) 1.87 (0.71-6.04) 7 Private employees 2 (1.4) 140 (98.6) 1.59 (0.55-1.94) 8 9 Father’s occupation 10 No occupation (ref) 3 (100) 0 (0.0) 11 Government employees 15 (9.0) 150 (91.0) 1.22 (0.53-4.93) 12 Private employees 12 (30.0) 394 (70.0) 1.55 (0.52-2.21) 13 Household income level 14 Low (ref) 14 (19.7) 57 (80.3) 15 Middle 7 (5.5) 121 (94.5) 1.16 (0.36-1.43)* 1.08 (0.22-1.23) 16 High 24 (12.6) 351 (87.4) 1.26 (1.22-2.22)* 1.14 (1.09-2.10)* 17 Minimum Dietary Diversity (MDD) 18 No (ref) 38 (49.4) 39 (50.6) 19 Yes 7 (1.4) 490 (98.6) 1.90 (1.86-2.66)* 2.17 (1.56-5.44)* 20 COVID-19 pandemic impacts on household income 21 Decreased income (ref) 23 (6.3) 342 (93.7) 22 No change income 18 (9.4) 174 (90.6) 1.97 (1.28-3.01)* 1.67 (0.30-1.96) 23 Increased income 4 (23.5) 13 (76.5) 4.57 (1.38-6.15)* 1.88 (0.54-2.06) 24 COVID-19 pandemic impacts on household ability to provide food 25 Impacted (ref) 26 (6.2) 396 (93.8) 26 Not impacted 19 (12.5) 133 (87.5) 1.46 (1.24-1.85)* 1.15 (0.38-3.51) 27 COVID-19 pandemic impacts on mother's employment status 29 Impacted (ref) 12 (4.7) 243 (95.3) 30 Not impacted 33 (10.3) 286 (89.7) 2.43 (1.21-2.84)* 0.67 (0.26-1.73) 31 COVID-19 pandemic impacts on father's employment status 32 Impacted (ref) 29 (6.6) 410 (93.4) 33 Not impacted 16 (11.9) 119 (88.1) 1.53 (1.27-2.00)* 1.24 (0.36-4.17) 34 185 aDerived by using multiple logistic regression *Statistically significant at p-value <0.05 35 186 36 37 187 Discussion 38 188 COVID-19 pandemic has made most people in Indonesia experience problems in the 39 40 189 economic aspects which can lead to a decrease in household income levels.

It is widely reported 41 42 190 that the pandemic condition will affect the food security of the family (Kakaei et al., 2022). 43 44 191 Household who has a high level of food security will affect the quality of the food given to 45 192 children, especially on complementary feeding (Nurhayati et al., 2020). A decrease in 46 47 193 household income will have a major impact on purchasing power, in addition to the price of 48 49 194 the main food ingredients, ASFs, which is relatively more expensive than other food groups 50 195 (Ahmed et al., 2022).

Our study evaluated the effects of the COVID-19 pandemic especially 51 52 196 related to economic impact with the ASFs consumption on complementary feeding. To the best 53 54 197 of our knowledge, this is the first study using a representative sample of children Indonesia. 55 56 198 Our study showed an overall high ASFs consumption in the study sample, though there was a 57 199 reduction in consumption in some low-level economic household due to pandemic situation 58 59 60

1 2 3 200 related to household income change, impact on ability to provide food, impact on mother and 4 5 201 father employment status.

6 7 202 Among all the ASFs type, flesh food including fish/seafood, organ meat, meat, poultry, 8 203 and processed meat had a significant relationship with all economic impact of COVID-19 9 10 204 pandemic in this study. Flesh food is containing a higher in iron zinc, choline, vitamin B12, 11 12 205 and vitamin B6 than other type of ASFs, also have high nutrient density and bioavailability 13 14 206 food source that children need (Hawthorne et al., 2022). Household that had no economic 15 207 impact or higher income level during pandemic tended to have high socioeconomic levels. This 16 17 208 circumstance would increase their ability to give flesh food to their children.

In general, the 18 19 209 flesh food price is quite expensive and has also increased due to food supply chain problem 20 210 during pandemic, especially ASFs which required a long production process (Rahimi et al., 22 211 2022). 23 24 212 The study finding indicated that eggs had no significant relationship with economic 25 26 213 impact during pandemic. High food prices caused economic impacted household had limited 27 214 access to ASFs. Meanwhile, eggs are still reasonably priced in comparison to other ASFs 28 29 215 sources, making them affordable for all household income levels.

Based on Indonesian Central 30 31 216 Bureau of Statistics the price of egg per kilograms was thrice the price of flesh food for example 32 33 217 meat (Indonesian Central Bureau of Statistics, 2022). Eggs contain amino acids, protein, 34 218 selenium, vitamin A, choline, vitamin B12, and other important nutrients which contain more 35 36 219 than other types of ASFs (Puglisi and Fernandez, 2022). Consumption of egg can improve 37 38 220 growth, nutritional biomarkers, and gut microbiota (Suta et al., 2023). Eggs are a nonperishable 39 221 food item that is easy to store, making them easily accessible.

In addition, as an alternative to 41 222 ASFs, the processing methods of eggs are quite easy and varied (boiled, fried, scrambled, and 42 43 223 was frequently eaten mixed with other food, particularly porridge). It is more preferred by 44 45 224 mothers when cooking, as well as the taste and texture of the eggs is accepted by most children 46 51 52 228 reported that dairy consumption was significantly associated with economic impact of COVID- 53 229 19 pandemic. Dairy products are being promoted and advertised more often which are believed 54 55 230 to strengthen the body's immunity during pandemic (Chen et al., 2024). Dairy product is rich 56

1 2 3 234 not differentiate between each food type in the dairy group.

Milk powder or formula milk were 4 5 235 included in dairy group in this study. Among 61,7% children who consumed dairy group, 6 7 236 mostly 69,8% were reported formula-feeding children. This might due limited access to 8 237 lactation support services because of physical restriction during pandemic. In general, formula 9 10 238 milk is chosen by mothers with all economic level who have problem with breastfeeding, such 11 12 239 as insufficient human breast milk production issue or difficulties with breastfeed while infected 13 14 240 with the Covid-19 virus (Fry et al., 2021). 15 241 Based on this study, the odds of ASFs consumption on complementary feeding were 17 242 increased 1.26 times if household have high income level.

These results are similar with 19 243 research conducted in Ethiopia on complementary feeding practice which found that ASFs 20 21 244 consumption increased by 20% in household with high economic status (Gebretsadik et al., 22 23 245 2022). During the pandemic, there is an increase of food price in market. All household adapt 24 25 246 to meet their daily food intake. Among all food group, healthy food generally has a higher 26 247 price. This condition was related to consumer demand for healthy foods because of panic 27 28 248 buying behavior that occurs in some people due to increased awareness of people related to 29 30 249 health during pandemic (Chua et al., 2021; Nurhayati et al.,

2023). As a result of the high food 31 250 prices, there is a shift in food choice, especially household with low- and middle-income 33 251 economic status. People tend to choose foods with low-priced sources of calories and generally 34 35 252 nonperishable ingredients such as starchy food (Janssen et al., 2021). ASFs is one of healthy 36 37 253 food source, high in protein and rich in amino acids, which are needed to increase immunity 38 254 during a pandemic.

However, people will tend to reduce the portion or even have no ASFs due 39 40 255 to economic reasons (Jafri et al., 2021). The quality of the food purchased can be very different, 41 42 256 usually worse, when household income decreases (Nikooyeh et al., 2022). However, household 43 44 257 can continue to give their children ASFs in the appropriate portion, but as a consequence the 45 258 proportion of other household expenses will be reduced (Borger et al., 2021).

46 47 259 Other factor related to ASFs consumption in this study was child age. Higher odds of 48 49 260 ASFs consumption were found on older child aged 18-23 months. Similarly study in Ethiopia, 50 261 ASFs consumption increased with age category (Gebretsadik et al., 2022). The need for 52 262 calories and feeding skills may increase as

children become older. In addition to eating more 53 54 263 frequently as they become older, children are exposed to a wider variety of foods (Miller et al., 55 56 264 2023). 57 265 Children who consume ASFs were 2.17 time had higher odd to meet MDD.

ASFs are the 58 59 266 most expensive food group compared to other food group in dietary diversity component, 60

1 2 3 267 especially during the pandemic. Children are more likely to fulfill other food group in the MDD 4 5 268 excluding the ASFs, because it is easier for households to access. Furthermore, ASFs 6 7 269 consumption will increase the odd to achieve MDD (Gibson et al., 2020). 8 270 Our study has some limitations that need to be considered. This study's convenience 9 10 271 sampling, which might have been indicative of the broader population.

The study's 11 12 272 generalizability is impacted by selection bias stemming from the recruitment of respondents 13 14 273 via social media and community groups. We used self-administered online questionnaires due 15 274 to physical restriction during pandemic, so only respondent those who have access to the 16 17 275 internet included in this study. 18 19 276 20 277 Conclusion 22 278 The findings of this study reveal that most children consumed ASF in complementary 23 24 279 feeding (92.2%).

All type of food group 5 or flesh food including fish/seafood, organ meat, 25 26 280 meat, poultry, and processed meat were associated with all economic impact of COVID-19 27 281 pandemic, but not with dairy product and egg consumption. Determinant factor of ASFs 28 29 282 consumption in complementary feeding were older age children, meet minimum dietary 30 31 283 diversity, and from high income level household. 32 33 284 The possibility that the COVID-19 pandemic or similar phenomena could occur again 34 285 in the future cannot be ignored.

If such conditions happen, we already know that consumption 35 36 286 of food groups such as flesh food can be decreased by the economic impacts. Since ASFs is a 37 38 287 highly nutritious food group that is beneficial for children's growth and development, we need 39 288 to take preventive steps to prevent a decrease in consumption of this food group and maintain 41 289 the quality of complementary feeding. Household income loss is a key factor in ASFs 42 43 290 consumption. To increase the consumption of ASFs on complementary feeding, other policies 44 45 291 targeting improvements in food security should be considered.

The government may take into 46 292 account short-term emergency purchasing subsidies, macro-control of the ASFs market, and 47 48 293 prevent unreasonable high price fluctuation. 49 50 294 The study's findings revealed that even in economic situations impacted by pandemic, 51 52 295 there were ASFs groups whose consumption remains high, such as eggs and dairy products. 53 296 This result can be the additional information, particularly for the government that ASFs can be 54 55 297 consumed by children with various economic backgrounds.

This knowledge can be used as the 56

1 2 3 301 References 7 304 West Arsi Zone, Oromia, Ethiopia", Nursing Research and Practice, 2022, pp. 1–14. 8 305 https://doi.org/10.1155/2022/9387031 9 10 306 Borger, C., Paolicelli, C., Ritchie, L., Whaley, S.E., DeMatteis, J., Sun, B., Zimmerman, T.P., 11 307 Reat, A., Dixit-Joshi, S. (2021), "Shifts in Sources of Food but Stable Nutritional 12 308 Outcomes among Children in the Early Months of the COVID-19 Pandemic", Int. J. 13 309 Environ. Res. Public Health, 18, 12626. https://doi.org/10.3390/ijerph182312626 14 310 Chen, J., Yang, C.-C., Lin, Y.

(2024), "Effects of the COVID-19 Pandemic on Dairy 15 311 Consumption Trends: An Empirical Investigation of Accounting Data in China", Foods 16 312 Vol. 13, 741. https://doi.org/10.3390/foods13050741 18 313 Chua, G., Yuen, K.F., Wang, X., Wong, Y.D. (2021), "The Determinants of Panic Buying 19 314 during COVID-19", Int. J. Environ. Res. Public. Health, Vol. 18, 3247. 20 315 https://doi.org/10.3390/ijerph18063247 21 316 Faber, M., Malan, L., Kruger, H.S., Asare, H., Visser, M., Mukwevho, T., Ricci, C., Smuts, 23 318 Dietary Diversity", Nutrient,s Vol.14, 3396. https://doi.org/10.3390/nu14163396 24 25 319 Fry, H.L., Levin, O., Kholina, K., Bianco, J.L., Gallant, J., Chan, K., Whitfield, K.C.

(2021), 26 320 "Infant feeding experiences and concerns among caregivers early in the COVID-19 27 321 State of Emergency in Nova Scotia, Canada", Maternal & Child Nutrition, Vol.17, 28 322 e13154. https://doi.org/10.1111/mcn.13154 29 323 Gebretsadik, G.G., Adhanu, A.K., Mulugeta, A. (2022), "Magnitude and determinants of 30 324 animal source food consumption among children aged 6–23 months in Ethiopia: 31 325 secondary analysis of the 2016 Ethiopian demographic and health survey", BMC Public 33 326 Health, Vol. 22, 453. https://doi.org/10.1186/s12889-022-12807-8 34 327 Gibson, E., Stacey, N., Sunderland, T.C.H., Adhuri, D.S. (2020), "Dietary diversity and fish 35 328 consumption of mothers and their children in fisher households in Komodo District, 36 329 eastern Indonesia", PLoS ONE, Vol. 15, e0230777.

37 330 https://doi.org/10.1371/journal.pone.0230777 38 331 Hawthorne, K.M., Castle, J., Donovan, S.M. (2022), "Meat Helps Make Every Bite Count: An 39 332 Ideal First Food for Infants", Nutr Today, 57, 8–13. 41 333 https://doi.org/10.1097/NT.0000000000000523 42 334 Indonesian Central Bureau of Statistics. (2022), Weekly Retail Price Movement of Selected 43 335 Staple Goods in Provincial Capitals in Indonesia. Indonesian Central Bureau of 44 45 336 Statistics, Jakarta. 46 337 Jafri, A., Mathe, N., Aglago, E.K., Konyole, S.O., Ouedraogo, M., Audain, K., Zongo, U., 47 338 Laar, A.K., Johnson, J., Sanou, D.

(2021), "Food availability, accessibility and dietary 48 339 practices during the COVID-19 pandemic: a multi-country survey", Public Health Nutr, 49 340 Vol. 24, 1798–1805. https://doi.org/10.1017/S1368980021000987 50 51 52 53 _341 _Janssen, M., Chang,

B.P.I., Hristov, H., Pravst, I., Profeta, A., Millard, J. (2021), "Changes in _ _ _342 _Food Consumption During the COVID-19 Pandemic: Analysis of Consumer Survey _ _ _343 _Data From the First Lockdown Period in Denmark, Germany, and Slovenia", Front. _ _54 _344 _Nutr, Vol.8, 635859. https://doi.org/10.3389/fnut.2021.635859 _ _55 _345 _Kakaei, H., Nourmoradi, H., Bakhtiyari, S., Jalilian, M., Mirzaei, A. (2022) Effect of COVID- _ _56 _346 _19 on food security, hunger, and food crisis, in: COVID-19 and the Sustainable _ _57 _347 _Development Goals. Elsevier, pp. 3–29. https://doi.org/10.1016/B978-0-323-91307- _ _58 348 2.00005-5 59 _ _60

1 2 3 349 Khaliq, A., Nambiar, S., Miller, Y., Wraith, D. (2023), "Adherence to complementary feeding 4 350 indicators and their associations with coexisting forms of malnutrition in children aged 6 351 between 6 to 23.9

months of age", J Public Health (Berl.) 7 352 https://doi.org/10.1007/s10389-023-02054-5 8 353 Kittisakmontri, K., Lanigan, J., Wells, J.C.K., Manowong, S., Kaewarree, S., Fewtrell, M. 9 354 (2022), "Quantity and Source of Protein during Complementary Feeding and Infant 10 355 Growth: Evidence from a Population Facing Double Burden of Malnutrition", 11 356 Nutrients, 14, 3948. https://doi.org/10.3390/nu14193948 12 357 Martorell, R. (2017), "Improved nutrition in the first 1000 days and adult human capital and 14 358 health", Am. J. Hum. Biol, Vol.29, e22952. https://doi.org/10.1002/ajhb.22952 15 359 Miller, V., Webb, P., Cudhea, F., Zhang, J., Reedy, J., Shi, P., Erndt-Marino, J.,

Coates, J., 16 360 Micha, R., Mozaffarian, D., et al. (2023), "Children's and adolescents' rising animal- 17 361 source food intakes in 1990–2018 were impacted by age, region, parental education and 18 362 urbanicity", Nat Food, 4, 305–319. https://doi.org/10.1038/s43016-023-00731-y 19 363 National Institute of Health Research & Development, (2018). Report of the 2018 Basic Health 20 364 Research (Riskesdas) 22 365 Nikooyeh, B., Rabiei, S., Amini, M., Ghodsi, D., Rasekhi, H., Doustmohammadian, A., 23 366 Abdollahi, Z., Minaie, M., Sadeghi, F., Neyestani, T.R. (2022), "COVID-19 epidemic 24 367 lockdown-induced changes of cereals and animal protein foods consumption of Iran 25 368 population: the first nationwide survey", J. Health Popul. Nutr, Vol. 41, 31. 26 369 https://doi.org/10.1186/s41043-022-00310-0 27 370 Ntambara, J., Chu, M. (2021), "The risk to child nutrition during and after COVID-19 28 29 371 pandemic: what to expect and how to respond", Public Health Nutr, Vol. 24, 3530– 30 372 3536. https://doi.org/10.1017/S1368980021001610 31 373 No?tasari, T., Rahmawati, N.I., Nurhayati, E., Fatimah, F., Siswati, T., Paramashanti, B.A.

32 374 (2023) "Household socioeconomic factors and minimum dietary diversity among 33 375 infants and young children in kebumen district of indonesia", Indonesian Journal of 34 376 Nutrition and Dietetics, Vol.11(2): 94-103. 35 377 Nurhayati, E., Paramashanti, B.A., Astiti, D., Aji, A.S. (2020) "Dietary diversity, vitamin D 37 378 intake and childhood stunting: a case-control study in Bantul, Indonesia", Malays. J. 38 379 Nutr, Vol. 26, 273–287. https://doi.org/10.31246/mjn-2020-0021 39 380 Nurhayati, E., Hapsari, E.D., Rosyidah, R., Helmyati, S. (2023) "Educational models of infant 40 381 and young child feeding among prenatal and postnatal women during the COVID-19 41 382 pandemic (January 2020–January 2023): A scoping review".

Nutrition, Vol.115: 42 383 112150. 43 384 Nyarko, M.J., Van Rooyen, D., Ten Ham-Baloyi,

W. (2023) "Preventing malnutrition within 45 385 the first 1000 days of life in under-resourced communities: An integrative literature 46 386 review", J Child Health Care 136749352311664. 47 387 https://doi.org/10.1177/13674935231166427 48 388 Pokharel, A., Webb, P., Miller, L.C., Zaharia, S., Shrestha, R., Davis, D., Trevino, J.A., Baral, 49 389 K.P., Paudel, K., Ghosh, S.

(2023), "Relationship between Animal Sourced Food 50 390 Consumption and Early Childhood Development Outcomes", Nutrients, Vol.15, 315. 51 52 391 https://doi.org/10.3390/nu15020315 53 392 Puglisi, M.J., Fernandez, M.L. (2022) "The Health Benefits of Egg Protein", Nutrients, Vol.14, 54 393 2904. https://doi.org/10.3390/nu14142904 55 394 Rahimi, P., Islam, M.S., Duarte, P.M., Tazerji, S.S., Sobur, M.A., El Zowalaty, M.E., Ashour, 56 395 H.M., Rahman, M.T. (2022), "Impact of the COVID-19 pandemic on food production 57 396 and animal health", Trends Food Sci. Technol, Vol.121, 105–113. 58 397 https://doi.org/10.1016/j.tifs.2021.12.003 60

1 2 4 399 in: Advances in Food Security and Sustainability.

Elsevier, pp. 119–168. 5 6 400 https://doi.org/10.1016/bs.af2s.2021.07.002 7 401 Shen, Q., Zhong, T. (2023), "Did Household Income Loss Have an Immediate Impact on 8 402 Animal-Source Foods Consumption during the Early Stage of the COVID-19 9 403 Pandemic?", Foods, Vol.12, 1424. https://doi.org/10.3390/foods12071424 10 404 Suta, S., Surawit, A., Mongkolsucharitkul, P., Pinsawas, B., Manosan, T., Ophakas, S., 11 405 Pongkunakorn, T., Pumeiam, S., Sranacharoenpong, K., Sutheeworapong, S., 12 406 Poungsombat, P., Khoomrung, S., Akarasereenont, P., Thaipisuttikul, I., Suktitipat, B.,

14 407 Mayurasakorn, K. (2023), "Prolonged Egg Supplement Advances Growing Child's 15 408 Growth and Gut Microbiota", Nutrients, 15, 1143. https://doi.org/10.3390/nu15051143 16 409 WHO, UNICEF. (2021), Indicators for assessing infant and young child feeding practices 17 410 Widyaningrum, R., Safitri, R.A., Ramadhani, K., Suryani, D., Syarief, F. (2021) 18 411 "Complementary Feeding Practices During COVID-19 Outbreak in Daerah Istimewa 19 412 Yogyakarta, Indonesia, and Its Related Factor", Asia Pac J Public Health, 33, 150–153. 20 413 https://doi.org/10.1177/1010539520976518 22 414 Wood, J.D.,

Giromini, C., Givens, D.I. (2024), "Animal-derived foods: consumption, 23 415 composition and effects on health and the environment: an overview", Front. Anim. Sci, 24 416 5, 1332694. https://doi.org/10.3389/fanim.2024.1332694 25 417 26 418 27 419 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60

1 2 3 Table 1. Respondent’s Characteristics (N=574) 4 5 Variable Frequency (%) 6 Child characteristic 7 Child’s age 8 6-11 months 235 (40.94) 10 12-17 months 236 (41.12) 11 18-23 months 103 (17.94) 12 Sex of child 13 Female 287 (50.00) 14 Male 287 (50.00) 15 Mother and household characteristic 16 17 Place of residence 18 Outside Java 171 (29.79) 19 Java 403 (70.21) 20 Family size 21 Large 45 (7.84) 22 Middle 381 (66.38) 23 Small 148 (25.78) 25 Mother’s age 26 18-25 years 179 (31.18) 27 26-35 years 351 (61.15) 28 36-40 years 44 (7.67) 29 Mother’s education level 30 Low 12 (2.09) 31 Middle 361 (62.89) 34 Mother’s occupation 35 No occupation/ housewife 350 (60.97) 36 Government employees 82 (14.30) 37 Private employees 142 (24.73) 38 Father’s occupation 39 40 No occupation 3 (0.53) 41 Government employees 165 (28.74) 42 Private employees 406 (70.73) 43 Household income level 44 Low 71 (12.37) 45 Middle 128 (22.30) 46 High 375 (65.3) 48 Minimum Dietary Diversity (MDD) 49 No (<5 food groups) 77 (13.41) 50 Yes (>=5 food groups) 497 (86.59) 51 COVID-19 pandemic impacts on household income 52 Decreased income 365 (63.59) 53 No change income 192 (33.45) 54 Increased income 17 (2.96) 56 COVID-19 pandemic impacts on household ability to provide food 57 58 59 60 http://mc.manuscriptcentral.com/nfs

1 2 3 Impacted 422 (73.52) 4 Not impacted 152 (26.48) 6 COVID-19 pandemic impacts on mother's employment status Not impacted 135 (23.52) 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 http://mc.manuscriptcentral.com/nfs

1 2 3 1 Table 2.

Economic impact of COVID-19 pandemic on each type of ASF consumption on complementary feedinga

4 Food group 4 _Food group 5 _Food group 6

5 ASFs _ consumption consumption consumption

COVID-19 pandemic 6 _ consumption Dairy products Fish/ seafood Organ meat Meat Poultry Processed meat Eggs

7 impacts n (%)b p value n (%)b p _n (%)b p _n (%)b p _n (%)b p _n (%)b p _n (%)b p

value value value value value value value

9 Increased income 13 10 11 (2.3) 12 No change income 174 13 (30.3) 14 Decreased income 342 15 (59.6) _ 0.013* 13 (2.3) 0.189 148 (25.8) 267 (46.5) _ 0.763 5 (0.9) 0.312 84 (14.6) 215 (37.5) _ 0.020* 4 (0.7) 0.184 39 (6.8) 111 (19.3) _ 0.011* 7 (1.2) 0.547 71 (12.4) 174 (30.3) _ 0.016* 8 (1.4) 0.601 51 (8.9) 146 (25.4) _ 0.020* 10 (1.7) 0.184 99 (17.2) 206 (35.9) _ 0.011* 9 (1.6) 0.547 125 (21.8) 244 (42.5) _ 0.679 0.242

16 Impacts on household ability to provide food

17 Not impacted 133 18 19 (23.2) 20 Impacted 396 21 (69.0) _ 0.015* 109 (19.0) 319 (55.6) _ 0.346 56 (9.8) 248 (43.2) _ <0.001** 19 (3.3) 135 (23.5) _ <0.001** 39 (6.8) 213 (37.1) _ <0.001** 28 (4.9) 177 (30.8) _ <0.001** 70 (12.2) 245 (42.7) _ <0.001** 90 (15.7) 288 (76.2) _ 0.055

22 Impacts on mother's employment status

23 Not impacted 286 24 (49.8) 25 Impacted 243 26 27 (42.3) _0.015* 222 (38.7) 206 (35.9) _0.346 149 (26.0) 155 (27.0) _<0.001** 67 (11.7) 87 (15.2) _<0.001** 118 (20.6) 134 (23.3) _<0.001** 85 (14.8) 120 (20.9) _<0.001** 156 (27.2) 159 (27.7) _<0.001** 198 (34.5) 180 (31.4) _0.332

28 Impacts on father's employment status

29 Not impacted 410 30 (71.4) 31 Impacted 119 32 (20.7) _0.047* 103 (17.9) 325 (56.6) _0.597 57 (9.9) 247 (43.0) _0.004** 30 (5.2) 124 (21.6) _0.016* 42 (7.3) 210 (36.6) _<0.001** 35 (6.1) 170 (29.6) _0.004** 64 (11.1) 251 (43.7) _0.028* 81 (14.1) 297 (51.7) _0.102

33 2 a Total sample size was 574, b the number of children who consumed each food group type on previous day, *Statistically significant at p-value <0.05, ** Statistically significant at p-value < 0.01 35 36 37 38 39 40 41 42 43

1 2 3 Table 3.

Multivariate analysis with logistic regression on ASFs consumption 4

5 Variable _ ASFs Consumption _ COR (95% CI) AORa (95% CI)

6 No, n(%) Yes, n(%) 7 Child’s age 8 6-11 months (ref) 27 (11.5) 208 (88.5) 9 12-17 months 16 (6.8) 220 (93.2) 1.40 (0.10-4.91) 1.23 (0.65-3.61) 10 18-23 months 2 (1.9) 101 (98.1) 1.27 (1.03-2.21)* 1.13 (1.04-3.26)* 11 Sex of child 12 Male (ref) 22 (7.7) 265 (92.3) 13 Female 23 (8.0) 264 (92) 1.05 (0.57-1.92) 14 15 Place of residence 16 Java (ref) 22 (12.9) 149 (87.1) 17 Outside Java 23 (5.7) 380 (94.3) 2.44 (1.32-4.51)* 1.01 (0.39-2.60) 18 Family size 19 Large (ref) 5 (11.1) 40 (88.9) 20 Middle 25 (6.6) 356 (93.4) 1.56 (0.72-1.92) 21 Small 15 (10.1) 133 (89.9) 1.62 (0.61-2.23) 22 Mother’s age 23 18-25 years (ref) 16 (8.9) 163 (91.1) 24 26-35 years 25 (7.1) 326 (92.9) 1.30 (0.43-3.93) 25 36-40 years 4 (9.1) 40 (90.9) 1.01 (0.32-3.21) 26 Mother’s education level 27 Low (ref) 1 (8.3) 11 (91.7) 28 Middle 28 (7.8) 333 (92.2) 1.02 (0.71-7.84)* 1.12 (0.54-6.77) 29 High 16 (8.0) 185 (92.0) 1.03 (0.54-1.95)* 1.29 (0.83-1.98) 30 Mother’s occupation 31 Housewife (ref) 20 (5.7) 330 (94.3) 32 Government employees 12 (14.6) 70 (85.4) 1.87 (0.71-6.04) 33 Private employees 2 (1.4) 140 (98.6) 1.59 (0.55-1.94) 35 Father’s occupation 36 No occupation (ref) 3 (100) 0 (0.0) 37 Government employees 15 (9.0) 150 (91.0) 1.22 (0.53-4.93) 38 Private employees 12 (30.0) 394 (70.0) 1.55 (0.52-2.21) 39 Household income level 40 Low (ref) 14 (19.7) 57 (80.3) 41 Middle 7 (5.5) 121 (94.5) 1.16 (0.36-1.43)* 1.08 (0.22-1.23) 42 High 24 (12.6) 351 (87.4) 1.26 (1.22-2.22)* 1.14 (1.09-2.10)* 43 Minimum Dietary Diversity (MDD) 44 No (ref) 38 (49.4) 39 (50.6) 45 Yes 7 (1.4) 490 (98.6) 1.90 (1.86-2.66)* 2.17 (1.56-5.44)* 46 COVID-19 pandemic impacts on household income 47 Decreased income (ref) 23 (6.3) 342 (93.7) 48 No change income 18 (9.4) 174 (90.6) 1.97 (1.28-3.01)* 1.67 (0.30-1.96) 49 Increased income 4 (23.5) 13 (76.5) 4.57 (1.38-6.15)* 1.88 (0.54-2.06) 50 COVID-19 pandemic impacts on household ability to provide food 51 Impacted (ref) 26 (6.2) 396 (93.8) 52 Not impacted 19 (12.5) 133 (87.5) 1.46 (1.24-1.85)* 1.15 (0.38-3.51) 54 COVID-19 pandemic impacts on mother's employment status 55 Impacted (ref) 12 (4.7) 243 (95.3) 56 Not impacted 33 (10.3) 286 (89.7) 2.43 (1.21-2.84)* 0.67 (0.26-1.73) 57 58 59 60 http://mc.manuscriptcentral.com/nfs

1 2 3 COVID-19 pandemic impacts on father's employment status 4 Impacted (ref) 29 (6.6) 410 (93.4) 5 Not impacted 16 (11.9) 119 (88.1) 1.53 (1.27-2.00)* 1.24 (0.36-4.17) 6 aDerived by using multiple logistic regression *Statistically significant at p-value <0.05 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 http://mc.manuscriptcentral.com/nfs

1 2

12 MDD 86.6

13 14 15 16 100 17 90 18 80 19 _ 65.9 _ 92.2 _ 86.6

20 70 21 60 22 50 23 40 24 30 25 20 26 27 10 28 0 _61.7 _ 53 26.8 _ 34.7 _ 54.9

29 Dairy Fish or 30 seafood 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 _Organ meat Poultry Processed meat _Egg ASFs MDD

INTERNET SOURCES:

<1% - https://journals.sagepub.com/doi/full/10.1177/13674935231166427
<1% - https://pubmed.ncbi.nlm.nih.gov/34268692/
<1% - https://www.ibm.com/training/course/statistical-analysis-using-ibm-spss-statistics-v26-0K51BG
<1% - https://pubmed.ncbi.nlm.nih.gov/33181370/
<1% - https://pubmed.ncbi.nlm.nih.gov/34652228/
<1% - https://www.bi.go.id/id/publikasi/kajian/Documents/The_Impact_of_COVID-19_Lockdowns_on_Household_Income_Consumption_and_Expectation_Evidence_from_High_Frequency_Data_in_Indonesia.pdf
<1% - https://www.researchgate.net/publication/343222400_ECONOMIC_IMPACT_OF_COVID-19_PANDEMIC
<1% - https://www.humaneleadershipinstitute.org/wp-content/uploads/Your-Life-in-Weeks-w-Quarters.pdf
<1% - https://pmc.ncbi.nlm.nih.gov/articles/PMC8394957/
<1% - https://www.ingentaconnect.com/content/mcb/017/2024/00000054/00000007/art00011
<1% - https://globalizationandhealth.biomedcentral.com/articles/10.1186/s12992-021-00711-6
<1% - https://nopren.ucsf.edu/nopren-special-collections
<1% - https://www.mdpi.com/1660-4601/18/23/12626
<1% - https://www.mdpi.com/2304-8158/13/5/741/notes
<1% - https://europepmc.org/article/MED/33619906
<1% - https://scholar.google.com/citations?user=XJoAAJcAAAAJ&hl=en
<1% - https://psycnet.apa.org/record/2018-41560-001
<1% - https://www.semanticscholar.org/paper/A-review-of-the-prevalence%2C-trends%2C-and-of-forms-of-Khaliq-Wraith/e31ce1919dfe3c804fc30654dd1b0513498137a4
<1% - https://www.mdpi.com/2072-6643/14/19/3948/notes
<1% - https://research.wur.nl/en/publications/childrens-and-adolescents-rising-animal-source-food-intakes-in-19
<1% - https://pmc.ncbi.nlm.nih.gov/articles/PMC6304165/

<1% - https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9004518/
<1% - https://obsesi.or.id/index.php/obsesi/article/view/5222
<1% - https://figshare.com/articles/journal_contribution/Supplemental_Material_-_Preventing_malnutrition_within_the_first_1000_days_of_life_in_under-resourced_communities_An_integrative_literature_review/22550771/1
<1% - https://www.researchgate.net/profile/Robin-Shrestha
<1% - https://www.mdpi.com/2072-6643/14/14/2904/notes
<1% - https://europepmc.org/article/MED/34898853
<1% - https://centaur.reading.ac.uk/116035/1/Animal-derived%20foods%20consumption%2C%20composition%20and%20effects%20on%20health%20etc.%20Wood%20et%20al.%202024.pdf