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RESEARCH ARTICLE

Toddler Nutritional Profile of Women with Covid-19

Nur Hikmah Yanti[1], Budu[2*], Mardiana Ahmad[3], Ema Al Asiry[4], Jumrah Sudirman[5]

[1,3,5] Department Of Midwifery, Graduate School, Hasanuddin University, Makassar, South Sulawesi, Indonesia.
[2] Department of Eye Health Sciences, Faculty of Medicine, Hasanuddin University, Makassar, South Sulawesi, Indonesia.
[2] Department of Medical Education, Faculty of Medicine, Hasanuddin University, Makassar, South Sulawesi, Indonesia.
[4] Department of Pediatrics, Faculty of Medicine, Hasanuddin University, Makassar, South Sulawesi, Indonesia.

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***Corresponding Author:**

budu062011@yahoo.com

ABSTRACT

Pregnancy is a critical period of human growth and development when the fetus in the womb begins to grow and develop. During pregnancy, there is a decrease in immunity so it is susceptible to viral infections and can affect the mother's immune system and maternal nutrition which can have an effect on the unborn child. Toddlerhood is a very vulnerable period. Toddlers are susceptible to infectious diseases that can affect their nutritional status. It can toddler The purpose of this research is to compare the nutritional condition of children born to COVID-19-infected and non-infected mothers. In this investigation, a case-control design was used. The study consisted of 148 samples, 74 of which were from mothers who were not infected with COVID-19. The nutritional status of toddlers was obtained by measuring body weight and height then determining the z-score. Data analysis using Chi-square test, unpaired t-test, and Whitney-Mann test using SPss Vers. 25. With a p-value of 0.558> 0.05, indicating no significance, the average Z-Score based on weight/age of pregnant women infected with COVID-19 was -1.149, whereas those not infected had a score of -1.052. When comparing pregnant women infected with COVID-19 to those who were not, the mean Z-Score value based on Height/Age is -1.58, This disparity, however, does not reach statistical significance (p-Value = 0.928 > 0.05). The difference between pregnant women infected with COVID-19 and those who were not infected in terms of Z-Score based on weight/height -0.42.

INTRODUCTION

In 2019, Coronavirus Disease was caused by Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV-2), a respiratory distress. COVID-19 was first announced by WHO on January 30, 2020, as a pandemic outbreak. The spread of COVID-19 was very fast, there were 7,734 cases within two weeks of the spread in China. On March 30, 2020, WHO confirmed a total of 632,146 cases with 30,050 deaths from 203 countries (Nurdianto 2021). COVID-19 made several public services closed, one of which was Health services (Masa et al. 2021). The COVID-19 pandemic has had negative impact, especially on health services, especially MCH services (Maternal and Child Health) (Nurfitriyani and Puspitasari 2022).

During the pre-pandemic period, maternal mortality was still a big challenge in Indonesia, especially during the COVID-19 pandemic it could increase due to the presence of a fast-spreading virus (Yulia et al. 2021). There were 118 cases of COVID-19 in pregnant women in 50 hospitals in Wuhan between December 8, 2019, and March 20, 2020. COVID-19 has made setbacks in various fields including priority fields (Rencana 2020). The nutritional condition of children, particularly those at risk of stunting and malnutrition, is at risk because of the COVID-19 pandemic. A child's height might be affected by starvation for a long time (Umar, Kebidanan Graha Ananda Palu, and Penulis 2021). As a result of the COVID-19 pandemic, the government made a decision to limit activities outside, this

made it difficult to get access to health services, especially family planning services, so that pregnancies also increased. The impact of increasing pregnancy rates can increase the risk of pregnancy. One of the triggering factors involves not getting enough to eat when pregnant. In addition, a lack of nutritional intake during pregnancy can lead to low-quality births. If nutritional deficiencies occur during the first 1,000 days of life, the nutritional status of the child may be compromised (Marni and Ratnasari 2021).

Pregnancy is a critical period of human development that is short or called a window of opportunity (Hety, Susanti, and Anggreni 2021). In pregnant women there is a partial decrease in immunity due to physiological changes during pregnancy, making it very susceptible to viral infectious diseases. During pregnancy, the immune system goes through several modifications, making them very susceptible to viral infections (Casman 2020). In addition, it is very possible to quickly contract the COVID-19 virus (Rozycki and Kotecha 2020). During pregnancy there is a downregulation of proliferation and lymphocyte activity which makes pregnant women vulnerable to COVID-19 infection, COVID-19 can disrupt the balance of the immune system during pregnancy in the feto maternatl interface (Susilawati 2021). Decreased immunity during pregnancy can make pregnant women very vulnerable to COVID-19, besides that the cardiovascular system and the system of pregnant women have the potential to cause complications if attacked by the virus. In pregnant women, immunity affects the fetus, the fetus can be accepted by the body if there is a balance between pro and anti-inflammatory (Istiana and Kusumawati 2022). Gynecological health, and nutritional intake during pregnancy are very important. Good quality nutrition and nutritional intake during pregnancy are essential for optimal growth, development and health (Anggraini et al. 2021).

Concerns about the COVID-19 pandemic's effects on children's and pregnant women's diets (Aziza and Mil 2021). Children's nutritional status is very important to improve and maintain. The income levels of parents are one component that influences the nutritional condition of their children (Umar, Kebidanan Graha Ananda Palu, and Penulis 2021). Direct causal factors of nutritional status are intake, disease and infection while indirect causal factors are breastfeeding, family food availability, parenting patterns, sanitation and personal hygiene, socioeconomic conditions and health behaviors (Harjatmo et al. 2018). Children who have normal nutritional status have age-appropriate development while children with nutritional problems experience developmental slowdowns (Davidson, Khomsan, and Riyadi 2020). The nutritional status of toddlers should be of concern to the community because if there is malnutrition in the toddler period, causes irreversible damage (Rahmadaniah 2019). Pregnant women, newborns, infants and toddlers are vulnerable to various diseases (Putri and Ismiyatun 2020). There are some cases of infants under one year old being infected with COVID-19 after birth (Rozycki and Kotecha 2020). In previous studies, the effect of COVID-19 on pregnancy was 12.4% or a total of 22 cases with complications in pregnancy such as hyperemesis gravdarum, abortion, premature imminence, TM II bleeding and KEK (Istiana and Kusumawati 2022). Other research has shown that the rate of stunting in toddlers as a result of the COVID-19 pandemic is affected by parenting, employment status, parental income, health services and consumption patterns (Saminan et al. 2021). Babies born prematurely, underweight, or with stunting are more likely to come from low-income families, according to some research (Mustajab and Indrawati Aristiyani 2023).

With a frequency of 7.3% in 2018, 5.9% among overweight toddlers, and 21.9% among stunted toddlers, according to the World Health Organization. In Indonesia, under-fives were 13.8% undernourished, 3.9% malnourished, 79.2% well-nourished and 3.1% overnourished (Ndraha, Tindaon, and Napitupulu 2023). Stunting reduction of 17% by 2024 is the aim set by the Medium-Term Development Plan. In 2023, the Indonesian Health Survey found that 21.5% of the population was stunted, 8.5% were wasting, 15.9% were underweight, and 4.2% were overweight. In 2021, 312 pregnant women were found to have contracted the COVID-19 virus, according to the South Sulawesi Provincial Health Office. According to the Makassar City Health Office, 294 pregnant women were infected with the COVID-19 virus in 2021. From the Dadi Regional Special Hospital in Makassar City, 215 individuals were recorded in 2021. Given this, the researchers decided to look at how COVID-19 infection in mothers may affect their children's nutritional status.

METHODS AND MATERIALS

An experimental design known as a case-control study was used. Data on toddlers born to COVID-19 pregnant women in 2021 were obtained retrospectively through hospital medical records which

were used as secondary data. Primary data was obtained by anthropometric measurements directly taken to toddlers either through home visits or integrated service post. Sampling was carried out using the purposive sampling method with the criteria of toddlers born to pregnant women at the Makassar City Dadi Regional Special Hospital, in 2021, mothers with at least junior high school education, and mothers aged 20 years and over. Using the Slovin formula, we were able to determine the study's sample size n = $\frac{233}{1 + 233(0,05)^2}$so that a sample of 148 people was obtained, which was then divided into a case group of 74 people and a control group of 74 people.

Tools and material

The tools used scales and height meters. The research instrument used anthropometric recording sheets of body weight and height which were then calculated by Z-Score. Ethical clearance was granted for this work by the Hasanuddin University Faculty of Public Health's committee (with number. 3225/UN4.14.1/TP.01.02/2024).

Data analysis

The chi-square test is used to determine whether the two groups of researchers are statistically similar. The average difference in nutritional status of children between those infected with COVID-19 and those not infected will be tested using a non-independent sample T test if the data is normally distributed, and a Man-Withney test if it is not regularly distributed.

RESULTS

Table 1: Maternal characteristics by age, education and occupation

	CONTROL		**CASE**		**Total**	***p*-Value**
	n	**%**	**n**	**%**		
Age Group						
20-30	46	31,1%	54	36,5%	100	0,221
31-40	24	16,2%	19	12,8%	43	
>40	4	2,7%	1	0,7%	5	
Total	74	50 %	74	50 %	148	
Education						
SMP	13	8,8 %	12	8,1 %	25	0,945
SMA	50	33,8%	53	35,8%	103	
Diploma	2	1,4 %	2	1,4 %	4	
Sarjana	9	6,1 %	7	4,7 %	16	
Total	74	50 %	74	50%	148	
Work						
IRT	62	41,9%	65	43,9%	127	0,644
Kary. Swasta	7	4,7 %	7	4,7 %	14	
Honorer	1	0,7 %	1	0,7 %	2	
Peg. Kontrak	1	0,7 %	0	0 %	1	
PNS	3	2 %	1	0,7 %	4	
Total	74	50 %	74	50%	148	

Chi-Square

Table 1 displays the characteristics of mothers according to age. In the 20-30 age group, there were 54 participants (36.5%) from COVID-19 infected pregnancies and 46 participants (31.1%) from non-infected pregnancies. In the 40+ age group, there was 1 participant (0.7%) from COVID-19 infected pregnancies and 4 participants (2.7%) from non-infected pregnancies, but the chi-square test p-value was 0.221>0.05, ruling out any statistically significant difference. From a level of education perspective, the highest proportion of pregnant women infected with COVID-19 had completed high school, at 53 individuals (35.8%), compared to 50 pregnant women who were not infected with the virus (33.8%). On the other hand, the lowest proportion of pregnant women infected with COVID-19 had completed diploma education, at 2 individuals (1.4%), compared to 2 pregnant women who were not infected with the virus (1.4%). Note that there is no statistically significant difference between the two groups (p=0.945> 0.05). According to occupational characteristics, the maximum number of housewives among pregnant women infected with COVID-19 was 65 individuals (43.9%), while the lowest number was 62 individuals (41.9%). Among contract workers, the smallest number of

affected pregnant women was 0 (or 0.0%) while the smallest number of uninfected pregnant women was 1 (or 0.7%).

Table 2: Characteristics of toddlers by age and gender

	CONTROL		**CASE**			
	n	**%**	**n**	**%**	**Total**	***p*-Value**
Age (Month)						
26-30	15	10,1%	14	9,5%	29	0,555
31-40	39	26,4%	45	30,4%	84	
>40	20	13,5%	15	10,1%	35	
Total	74	50%	74	50%	148	
Gender						
Male	36	24,3%	38	25,7%	74	0,869
Female	38	25,7%	36	24,3%	74	
Total	74	50%	74	50%	148	

Chi-Square

Table 2 displays the characteristics of the toddlers. Between 31 and 40 months of pregnancy, 45 people (30.4%) from COVID-19-infected women and 39 people (26.4%) from non-infected pregnant women make up the greatest age group. At the 26-30 month age bracket, there is no statistically significant difference between the two groups; nevertheless, 14 people (9.5%) from COVID-19-infected pregnant women and 15 persons (10.1%) from non-infected pregnant women make up this group (p\.555> 0.05). Of the total, 38 traits were distinct to males among pregnant women infected with COVID-19 and 36 traits were special to pregnant women without the virus; these women accounted for 25.7% and 24.3% of the total, respectively. When the p-value for the comparison between the two groups of pregnant women who tested negative for COVID-19 (24.3% of the total) and those who tested positive (25.7% of the total) was 0.869 > 0.05, no statistically significant difference was found.

Table 3: **Characteristics of toddlers by weight/age, height/age, and weight/height**

	CONTROL		**CASE**		**Total**	***p*-Value**
	N	**%**	**N**	**%**		
Weight/Age						
Severely Underweight	2	1,4%	4	2,7%	6	0,711
Underweight	6	4,1%	8	5,4%	14	
Normal	64	43,2%	61	41,2%	125	
Risk of Overweight	2	1,4%	1	0,7%	3	
Total	74	50%	74	50%	148	
Height/Age						
Severley Stunted	6	4,1%	10	6,8%	16	0,429
Stunted	15	10,1%	12	8,1%	27	
Normal	53	35,8%	51	34,5%	104	
High	0	0%	1	0,7%	1	
Total	74	50%	74	50%	148	
Weight/Height						
Severley Wasted	0	0%	0	0%	0	0,219
Wasted	1	0,7%	2	1,4%	3	
Normal	63	42,6%	69	46,6%	132	
Possible risk of overweight	8	5,4%	3	2,0%	11	
Overweight	1	0,7%	0	0%	1	
Obese	1	0,7%	0	0%	1	
Total	74	50%	74	50%	148	

Chi-Square

Table 3 shows that when looking at toddlers based on body weight/age, the highest number of pregnant women in the normal category (61 people, or 41.2% of the total) and the lowest number of pregnant women at the risk of being overweight (one person, or 1.4% of the total) are pregnant women infected with COVID-19, while the number of pregnant women in the non-infected group is two people or 2.7% of the total. The typical category of pregnant women infected with COVID-19

included 51 individuals (34.5%), whereas the non-infected group had 53 individuals (35.8%), according to height/age. One pregnant woman (0.7%) fell into the high category of COVID-19 infections, whereas zero pregnant women (0.0%) did not. The largest percentage of pregnant women who reported having excellent nutrition based on body weight/height was 46.6% among those who tested positive for COVID-19, whereas the lowest percentage was 42.6% among those who tested negative. There was a 0% prevalence of malnutrition among pregnant women infected with COVID-19, and no such prevalence among pregnant women who were not infected with the virus.

Table 4: Nutritional status of toddlers with mothers infected with COVID-19 and those not infected with COVID-19 based on Z-score of Weight/Age, Height/Age and Weight/Height

Toddlers born during the COVID-19 pandemic	Indeks Antropometri Z-Score		
	n	Mean Z -Score±SD	p-Value
Weight/Age			
COVID-19	74	-1,149±1,130	0,558[a]
Non COVID-19	74	-1,052±0,853	
Height/Age			
COVID-19	74	-1,53±1,504	0,928[b]
Non COVID-19	74	-1,58±1,053	
Weight/Height			
COVID-19	74	-0,42±0,798	0,134[b]
Non COVID-19	74	-0.17± 1,019	

[a]Uji t tidak berpasangan dan [b]Uji Mann Whitney

Toddlers' nutritional status based on weight/age from pregnant women infected with COVID-19 and those from pregnant women not infected with the virus did not vary significantly ($p = 0.558 > 0.05$), as shown in Table 4. Comparison of the nutritional health of toddlers based on height/age of pregnant mothers with and without COVID-19 was shown to be statistically insignificant ($p = 0.928$, $p > 0.05$). Toddlers' nutritional health was compared between pregnant mothers infected with COVID-19 and those who were not; a p-value of $0.134 > 0.05$ was determined, indicating that there was no statistically significant difference between the two groups.

DISCUSSION

Toddlerhood is a period that is vulnerable to infectious diseases. Toddlers are prone to infectious diseases because their immune system is immature. Infectious diseases can lead to decreased appetite and limitations in consuming food. The result of a decrease in appetite can result in weight loss so that nutritional status can be disturbed (Cono, Nahak, and Gatum 2021). In this study, there were no mothers with education status below junior high school and the average age of mothers was 20-30 years, indicating that maternal education and age were not a confounding factor (Setia et al. 2021). Working mothers have less time to take care of their children at home compared to non-working mothers, non-working mothers can pay more attention and provide assistance at home for their children's nutritional intake (Prima Nanda Fauziah et al. 2023). Characteristics of toddlers, the age of toddlers is are age that is vulnerable to nutritional problems in the research of Nursita Istiqamah et al. there is no effect of gender on the nutritional status of children under five (Istiqomah, Nurul Widyawati, and Kurnianingsih 2024).

The Coronavirus 2 virus, causes the deadly COVID-19 pandemic, patients infected with COVID-19 have several symptoms related to the respiratory system such as flu, and the spread is through the air (Efriza 2021). The human respiratory system functions to provide oxygen consistently so that all body functions work properly, including digesting food, moving limbs and even thinking. One of the respiratory organs is the pharynx. The pharynx is related to the digestive system. The digestive system functions to process food into nutrients needed by the body. Under the pharynx, there is an

esophagus for food and airways for breathing (S. Handayani 2021). The respiratory system and digestive system work together to maintain the body's balance and immune system, the intestinal lymphoid tissue in the digestive system, and the bronchial lymphoid tissue in the respiratory system (Prima Nanda Fauziah, et al, 2023). The nutritional status of the mother during pregnancy can affect fetal growth. If a mother maintains a healthy diet while she is pregnant, her unborn child will have a better chance of growing and developing normally (Anjani, Nurhayati, and Immawati 2024). Nutrition is linked to the digestive system. Impaired digestion can cause nutrients to not be absorbed properly. Disrupted breathing can cause digestion to be disrupted so that nutrition does not become good which causes disruption to the immune system. UNICEF as a UN international agency for humanitarian funds for children considers Indonesia for the impact of the COVID-19 pandemic on the nutritional status of children, especially on the problem of stunting, The COVID-19 epidemic is expected to have a negative impact on children's nutritional condition, according to UNICEF. An individual's nutritional state provides a window into their maturation and progress throughout time. Poor nutrition in children has an impact on their physical, mental, and cognitive development (Catur Utami, Nur Azizah, and Nur Azizah 2023). Nutritious food intake is very important to boost the child's immunity to fight COVID-19 (Wondal et al. 2023).

Children born to mothers infected with the COVID-19 virus during pregnancy are more likely to have below-normal Z-scores compared to children born to mothers who do not have the virus during pregnancy. One indicator of child malnutrition is underweight nutritional status. The direct causative factors are lack of food intake and recurrent illness. A child who is underweight can trigger cognitive impairment (Kurniawan, Maulina, and Fernandes 2022). Height below the normal z-score is called stunting. Stunting is a failure to thrive in children commonly referred to as growth faltering, caused by inadequate nutrition from pregnancy to 24 months of age (Mustika and Syamsul 2018). Additionally, variables such as toddlers' food consumption, infections, mothers' inadequate nutrition, heredity, food availability, socioeconomic status, education level, and maternal understanding may all contribute to stunting (Anjani, Nurhayati, and Immawati 2024). The consequences of stunting can lead to substandard physical and mental maturity A low weight/height z-score is commonly referred to as wasting. Wasting can be caused by inadequate nutrition, poor maternal knowledge, and low birth weight (Addawiah, Hasanah, and Deli 2020). From these data, the nutritional status of children below normal z-Score who are infected with COVID-19 is always greater than that of pregnant women who are not infected with COVID-19. The nutritional status of children is needed from the womb so that it can support their nutritional status, growth, and development after birth. Malnutrition in toddlers can cause failure of child development, stunted growth, risk of getting infectious diseases and reduced children's intelligence (Melalui et al. 2022).

Nutritional status based on weight/age and height/age is lower in children whose mothers were infected with COVID-19 during pregnancy, according to normal Z-score data. Pregnant women infected with COVID-19 had a higher Z-Score based on weight/height than pregnant women uninfected with the virus; however, there is only a five-person difference between the three groups. A normal Z-Score is an indicator value that the child's nutritional status is normal. Normal child nutrition is supported by good maternal nutritional status during pregnancy the study mentioned that normal weight gain during pregnancy leads to good nutritional status (Dwi Alfiyatul Ma'rifah et al. 2024). Results showed that compared to pregnant women infected with COVID-19, those who were not infected had Z-Score data above normal based on Weight/Age to a stronger degree. Fewer pregnant women who do not have the COVID-19 virus than pregnant women who do have the virus are based on height and age. On the basis of body mass index (BMI), pregnant women uninfected with the COVID-19 virus are larger than uninfected pregnant women. The negative effects of childhood obesity and overnutrition include an increased risk of chronic illnesses such as heart disease, diabetes, high blood pressure, hormone imbalances, bone problems, sleep apnea, and insomnia, among many others. In addition, overnutrition is also a cause of obesity. In addition, excess nutrition is also an obstacle to psychosocial development (Rossa Rahmadia and Mardiyah 2022). Factors in the occurrence of overnutrition can be caused by a lack of maternal knowledge, in general, a mother's thinking is that the fatter a child looks better, besides giving MP-ASI too early, giving formula milk before 6 months, processed foods that are all instant and soft drinks that are high in sugar can trigger overweight (Hidayah et al. 2021). No influence on the nutritional status of toddlers from COVID-19-infected or non-infected pregnant mothers was found (Table 3, p-value 0.711> 0.05) when comparing

the two groups. Based on height/age p-value 0.429 > 0.05, there is no significant effect. Based on Weight/Height p-value 0.219>0.05 there is no significance.

With a p-value of 0.558 > 0.05, the average z-score value of the two groups (infected and uninfected pregnant women) is not different, indicating that there is no difference between the two groups. Because the p-value for the height/age ratio is 0.928 > 0.05, we may conclude that the two groups' nutritional conditions are similar. According to the body weight/height p-value (0.134> 0.05), there is no discernible difference between the two sets of data. It is consistent with previous research by Serli Pasongli (2023) that pregnant women's anthropometric indices are not associated with their prenatal period health (p=0.812>0.05, meaning no significance). Although there are a few undernourished and very small toddlers in the Kwalitas Health Center's work area, the majority of toddlers have adequate nutritional status, according to a journal article titled Overview of the nutritional health of toddlers during the COVID-19 epidemic (R. Handayani 2022). Researchers found that toddlers' nutritional status (wasting, stunting, undernutrition, and overnutrition) improved during the COVID-19 pandemic compared to pre-pandemic levels. This improvement may be attributable to parents spending more quality time with their children (Husnul, Sukmawati, and Pratiwi 2023). This is also in line with the same title conducted the Banggai district, the results of the study decreased the various nutritional problems of children under five in Banggai, namely the problem of underweight, stunting, wasting, and obesity (Hafid and Kurniasari 2023).

CONCLUSION

A comparison of children born to mothers infected with the COVID-19 virus and those born to mothers who did not indicate any statistically significant differences in their nutritional condition. There is no correlation between improvements in the nutritional health of children from infected mothers and other variables, such as exclusive breastfeeding and supplemental feeding, since these factors all influence toddlers' nutritional status.

Conflict of interest:

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