# THE PREVALENCE OF CHILD STUNTING BEFORE AND DURING THE COVID-19 PANDEMIC ERA IN GENDING DISTRICT

**Jose Giovanny[1], Nirwana M Safitri[2], Salvador B H W D Borromeu[3], Sagung P Maharani[4], Nindya A B Putri[5], Christian J S Putra[6], Yudistira[7], Theresia A Hanitami[8], Bella A Andreani[9], Julio C A D Fatima[10], Yosephine V Surya[11], Shallen A Wijaya[12], Lukas S Rihadi[13], Inge Wattimena[14], Florentina Sustini[15], Steven Wijono[16], Dewa A L Dewi[17], Yudhiakuari Sincihu[18], Annisah Machmudah[19], Miza Nisrinah[20], Dwi Puspitasari[21]**

**Correspondent Email : milanirwana@gmail.com**

https://doi.org/10.33508/jwmj.v5i4.3852

## ABSTRACT

**Introduction:** In Indonesia, the first COVID-19 cases were announced on March 2, 2020. The first two cases were found in Jakarta, and the number continues to grow over time. *Stunting* is a condition in which children experience growth disorders so that the child's height does not match their age. The COVID-19 pandemic increases the risk of acute nutritional problems (undernutrition and malnutrition) in vulnerable groups. Even chronic nutrition problems (*Stunting*) can increase if the COVID-19 lockdown is set for long. However, data from the SSGI in 2019, 2020, and 2021 show a decline in the prevalence of *Stunting* from year to year.
**Purpose:** This study was conducted to determine a difference in child *Stunting* prevalence before and during the COVID-19 pandemic in the Gending District.
**Methods:** This research is an observational analytic study with a cross-sectional study. The population in this study was a child with an age range of 2-5 years before and during the COVID-19 pandemic at the Gending Public Health Center.
**Result:** From 317 total samples, 50 stunted children were found in the period before the pandemic and 25 stunted children during the pandemic. The prevalence of child *Stunting* before and during the COVID-19 pandemic decreased by 28% to 16.1%. Based on the Pearson Chi-Square Test analysis test, the prevalence of *Stunting* was significantly (p= 0.031) different before and during the COVID-19 pandemic.
**Conclusion:** There are differences in child *Stunting* prevalence before and during the COVID-19 pandemic.

**Keyword:** Pandemic, COVID-19, *Stunting*

[1-12]*Faculty of Medicine, Widya Mandala Surabaya Catholic University.*
[13-18]*Public Health Science Department, Faculty of Medicine, Widya Mandala Catholic Surabaya University*
[19-21]*Gending Public Health Center, Veteran Jaya Street No.175*

## INTRODUCTION

COVID-19 is an infection caused by the SARS-CoV-2 virus, a single-strain RNA virus. This viral infection first appeared in Wuhan, Hubei Province, China, on December 31, 2019, with symptoms such as pneumonia[1]. In Indonesia, the first case of COVID-19 was announced on March 2, 2020. The first two cases were found in Jakarta, and the number continues to grow over time[2]. According to data from the SATGAS COVID-19, there has been an increase in the number and percentage of active cases at the National level from April 2021 until it peaked in January 2021, with the daily number of new cases reaching 14,000 new cases and the second peak occurring in July 2021 with the number of active cases. 574.135 daily cases reached 51.000 new cases, with the death rate reaching 2000 cases per day[3–6].

*Stunting* is a condition in which children experience growth disorders, so their height does not match their age due to chronic malnutrition and repeated infections, especially in the first 1000 days of life. Based on the Regulation of the Minister of Health of the Republic of Indonesia *Stunting* or short stature is a nutritional status that is calculated based on the height for age score less than -2SD (standard deviation)[7].

According to WHO, globally, it is estimated that as many as 162 million children under five years of age were estimated to be stunted. Indonesia is in the category of severe *Stunting* problems[8]. The Global Nutrition Report 2016 found that the prevalence of child *Stunting* in Indonesia was ranked 108 out of 132 countries with the second-highest prevalence of *Stunting* after Cambodia in the Southeast Asian Region[9]. Riset Kesehatan Dasar (RISKESDAS) in 2018 showed a decrease in the prevalence of *Stunting* under five in Indonesia by 6.4% from 2013 (37.2%) to 2018 (30.8%)[10,11]. Data from the Indonesian Nutritional Status Study (SSGI) in 2019, predictions for 2020 and 2021 are 27.7%, 26.9%, and 24.4%, indicating a decline in the prevalence of *Stunting* from year to year. The prevalence of under-fives experiencing *Stunting* in East Java is 23.5%, with the prevalence of child *Stunting* in Gresik Regency still being 23% in 2021. According to the age group, the highest prevalence of child *Stunting* in Indonesia is at the age of 24-59 months or aged two years to five years when compared to ages 0-23 months[12].

With the COVID-19 pandemic, the emergency response status and the overall social distancing policy will significantly impact community operations and the economic welfare of the majority of people who work in the informal sector. It is feared that this condition will affect people's access and purchasing power to the supply of nutritious food. If this is not anticipated, food and nutrition insecurity will occur, especially in areas identified as vulnerable. Poor dietary intake of food and nutrition increases the risk of acute nutritional problems (undernutrition and malnutrition) in vulnerable groups. Even chronic nutritional problems (*Stunting*) can increase if the COVID-19 lockdown is established for a long[13]. Thus, the present study was designed to determine the differences in child *Stunting* prevalence before and during the COVID-19 pandemic era at the Gending Public Health Center, Gresik Regency, Gending District working area in February 2019-February 2021.

## METHOD

### Study Design

This research is an observational analytical study with a cross-sectional study using secondary data.

### Study Population

The population in this study was children under five years who were weighed and recorded at the Gending Public Health Center in February 2020 and February 2021. This study used medical record data for all children aged 2-5 years

before the COVID-19 pandemic (February 2019 - February 2020 period) and during the COVID-19 pandemic (February 2020 - February 2021 period) at the Gending Public Health Center. The sample retrieval technique Slovin's large formula of the 317 population, and the minimum number obtained for the sample is 177 samples.

**Data Analysis**

The data obtained from the results of this study then used Chi-Square Test to identify the significance of the differences in the prevalence of *Stunting* in the period before and during the pandemic. The dependent variable (before and during pandemic periods) and the independent variable (the prevalence of *Stunting* and not *Stunting*).

**Ethical Eligibility**

This study used medical record data of children under five years, obtained from the Gending Public Health Centre with ethical approval by the Health Research Ethics Commission of the Faculty of Medicine Widya Mandala Catholic University Surabaya.

## RESULTS

**Distribution of Subjects Based on Characteristic Data**

The primary characteristics of the research subjects below show data on age, sex, weight, Z-score W/U, height, Z-score H/U, and Z-score W/H (Table 5.1). The analysis include 317 children, 75 children were not stunted, and 242 were stunted. The average age of *Stunting* children was 25.33±13.96 months, with the sex of most children being boys. *Stunting* children's height was 76.81±10.68 cm with a Z-Score - H/U -3.02 ± 1.05 SD, which showed that the average *Stunting* child in this study was included in the severe stunted category.

Table 1. Characteristics of research subjects (n=317)

| Variable | n(%) or mean ± SD | | Total |
|---|---|---|---|
| | *Stunting* | Not *Stunting* | |
| Age (month) | 25,33 ± 13,96 | 25,92 ± 15,92 | 25,92 ± 15,92 |
| Gender | | | |
| Boy | 43 (28%) | 113 (72%) | 156 (100%) |
| Girl | 32 (19%) | 129 (81%) | 161 (100%) |
| Weight | 10, ± 2,45 | 11,84 ± 3,85 | 11,52 ± 3,61 |
| Z Score weight for age | -1,08 ± 1,05 | -0,10 ± 1,23 | -0,33 ± 1,26 |
| Height | 76,81 ± 10,68 | 85,22 ± 14,08 | 83,23 ± 13,81 |
| Z Score Height for Age | -3,02 ± 1,05 | -0,19 ± 1,22 | -0,86 ± 1,68 |
| Z Score weight for height | -0,85 ± 1,83 | -0,01 ± 1,56 | 0,19 ± 1,67 |

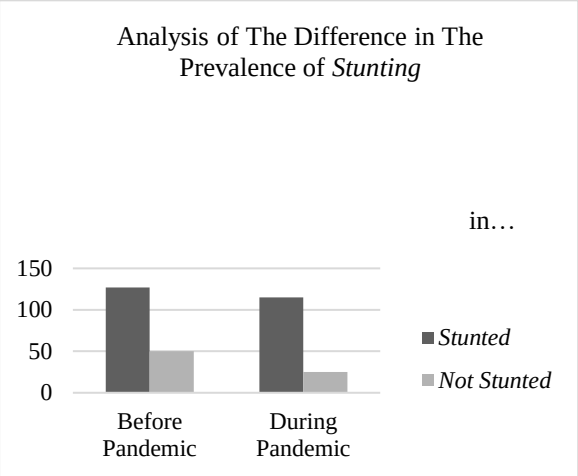
**The Prevalence of Child *Stunting* in the Period Before the Pandemic and During the Pandemic**

The prevalence of *Stunting* in the pre-pandemic period was 50 samples compared to those who were not stunted, which was 127 samples from the total number of samples, namely 177 samples. During the pandemic period, the number of *Stunting* was found to be 25 samples, and 115 samples were not stunted from the total sample, namely 140 samples. The number of *non-Stunting* events in the pre-pandemic period was more than during the pandemic, which was 127 compared to 115 samples. The prevalence of *Stunting* before the pandemic was more than in the period during the pandemic, which was 50 compared to 25 samples.

Table 2. Table of analysis of the difference in the prevalence of *Stunting* in the period before the pandemic and during the pandemic

| Variable | | *Stunting* n(%) | | Total n(%) | p* |
|---|---|---|---|---|---|
| | | Yes | No | | |
| Period | Before pandemic | 50 (28,2 %) | 127 (71,8 %) | 177 (100 %) | 0,031 |
| | During pandemic | 25 (17,8 %) | 115 (82,2 %) | 140 (100 %) | |

* Analyzed with Pearson Chi Square ($X^2$ = 4,673, df=1, α=0,05) **OR =0,552** (95%, (CI= 0,321-0,950) )




Graphic 1. Analysis of the difference in the prevalence of *Stunting* in the period before the pandemic and during the pandemic

The Pearson Chi-Square Test value above shows that the significance value of the p-value is 0.031 and the Chi-Square value is 4.673, it can be concluded that there is a difference in the prevalence of *Stunting* before the COVID-19 pandemic and during the COVID-19 pandemic in Gending District.

From the odds ratio calculated here, it is the odds from the period before the pandemic compared to during the pandemic for the incidence of stunting. The odds ratio value is 0.552, meaning that the period before the pandemic has a tendency for stunting to occur by 0.552, which is smaller than the period during the pandemic. The conclusion that can be drawn is that the period before the pandemic had a smaller chance of stunting compared to the period during the pandemic.

## DISSCUSION

### Distribution of Subjects Based on Data Characteristics

Based on the research subject data characteristics, *Stunting* was more common in boys with 43 children (28%) than in girls with 32 children (19%). These findings are consistent with a systematic review and meta-analysis of gender differences in nutritional problems. Of the 38 studies analyzed, 32 stated that *Stunting* was more common in boys with a 29% higher chance than girls[12,14]. Most authors attribute these sex differences in nutritional status to biological differences in morbidity between boys and girls in the early stages of life. Boys generally have a higher birth weight than girls and grow faster during infancy, resulting in more significant energy requirements[15]. Common disorders in childhood such as respiratory infections, diarrhea, malaria, and premature birth are more common in boys than girls. All of these disorders are not only a cause of mortality but also weight loss, growth disorders, or malnutrition in children[14].

Based on the research subject data characteristics, children with *Stunting* have a lower body weight with an average of 10.49 kg and Z-score W/U -1.08 compared to children without *Stunting* with an average weight of 11.84 kg and Z-score W/U. -0.10. The results of our research subjects following the research conducted by Myatt M et al. in Wales, England, in 2018 with the standard definition applied Z-score W/U (*Underweight*) < -2.0 and H/U (*Stunting*) < -2 states that *Stunting* and *Underweight* are conditions that are positively related to each other. *Stunting* children were simultaneously *Underweight* because *Stunting* and underweight were described as having "multiple anthropometric deficits" associated with malnutrition interventions. Therefore, the feeding program must cover cases of *Stunting* and increase the reporting of *Stunting* prevalence[16]. According to Shrestha ML et al. in Nepal in 2021, *Stunting* is a form of malnutrition that interferes with optimal child development, causing lower body weight. Nutrition is critical in supporting children's physical and cognitive development[17].

Based on the Z-score data for weight/height (W/H), the Z-score was

lower in stunted children than in those who were not. Similar results in a systematic review of the relationship between *Wasting* and *Stunting* in children show a solid connection between *Wasting* and *Stunting*. *Wasting* can lead to *Stunting*, supported by evidence showing that when body weight is adequate, treatment of the underlying morbidity is required before linear growth can occur. Research conducted by Dewey et al. also showed that children with *Wasting* only showed height growth after their weight/height (W/H) returned[18].

*Stunting* occurs in response to several acute and chronic factors, including micro and macronutrient deficiencies, infectious diseases, inadequate feeding practices, and exposure to environmental pathogens. On the other hand, *Wasting* is considered a short-term response to food shortages or contagious diseases, which may or may not cause *Stunting*, depending on whether the child can recover from the lag by catching up with growth[19]. These findings highlight the importance of integrated medical and nutritional care in children with *Wasting* received treatment to ensure the effects of *Wasting* on linear growth are reduced. *Stunting* can also cause *Wasting* to a lesser extent, although further research is still needed to understand the underlying mechanisms[18].

**Analysis of *Stunting* Prevalence in the Period Before the Pandemic and During the Pandemic**

A significant difference was found (p=0.031) in the prevalence of *Stunting* before the pandemic compared to during the pandemic. The prevalence of *Stunting* before the pandemic was 50 people (28.2% of all children weighed before the pandemic). In comparison, the prevalence of *Stunting* during the pandemic was 25 people (16.1% of all children considered during the pandemic). The prevalence of *Stunting* has decreased during the pandemic compared to before the COVID-19 pandemic.

These results follow a statement from the Ministry of Health in collaboration with the Central Bureau of Statistics, which stated that based on the 2021 SSGI, the national *Stunting* rate decreased by 1.6% per year. In 2019, the *Stunting* rate was 27.7%, and in 2021, the *Stunting* rate was 24.4%[12].

The results also follow research conducted by Rachmi et al. in 2015, which stated that the prevalence of *Stunting* in Indonesia had decreased every year because *Stunting* is the focus of the Indonesian government every year. Various strategies to reduce the prevalence of *Stunting* continue to be carried out through multiple programs. In addition, the government also routinely improves health, hygiene, and sanitation services, including access to clean water[20,21,22].

## CONCLUSION

From the results of the study, it can be concluded that there are differences in the prevalence of *Stunting* before the COVID-19 pandemic and during the COVID-19 pandemic and there is a decrease in the prevalence of *Stunting* before the COVID-19 pandemic and during the COVID-19 pandemic in Gending District.

## REFERENCES

1. PDPI. *Pneumonia Covid-19 Diagnosis Dan Penatalaksanaan Di Indonesia*. (2020).
2. PDPI, PERKI, PAPDI, PERDATIN & IDAI. *Pedoman Tatalaksana Covid-19 Edisi 4*. (2022).
3. Covid-19, S. T. P. Analisis Data Covid-19 Indonesia Update Per 14 Maret 2021. (2021).
4. Covid-19, S. T. P. Analisis Data Covid-19 Indonesia Update Per 30 Januari 2021. (2022).
5. Satuan Tugas Penanganan Covid-19. Analisis Data Covid-19 Indonesia Update Per 18 Juli 2021. (2021).
6. Covid-19, S. T. P. Analisis Data Covid-19 Indonesia Update Per 29 Agustus 2021. (2021).

7. Pusat Data dan Informasi Kementrian Kesehatan RI. *Buletein Jendela Data dan Informasi Kesehatan, Situasi Balita Pendek (Stunting) di Indonesia*. (2020).
8. Badan Pusat Statistik. *Laporan Pelaksanaan Integrasi SUSENAS Maret 2019 dan SSGBI Tahun 2019*. (2019).
9. WHO. Global Nutrition Targets 2025, Stunting Policy Brief. (2020).
10. Indonesia, S. W. P. R. Strategi Nasional Percepatan Pencegahan Stunting. (2018).
11. Aditianti, Sudikno, Irlina Raswanti, Doddy Izwardy, S. E. I. Prevalensi Dan Faktor Risiko Stunting Pada Balita 24-59 Bulan Di Indonesia: Analisis Data Riset Kesehatan Dasar 2018. *The Journal of Nutrition and Food Research* **43**, 51–64 (2020).
12. INDONESIA, K. K. R. *Buku Saku Hasil Studi Status Gizi Indonesia (SSGI) Tingkat Nasional, Provinsi, dan Kabupaten/Kota Tahun 2021*. (2021).
13. INDONESIA, K. K. R. Pedoman Pelayanan Gizi Pada Masa Tanggap Darurat COVID-19. (2020).
14. Thurstans, S. *et al.* Boys are More Likely to be Undernourished than Girls: A Systematic Review and Meta-analysis of Sex Differences in Undernutrition. *BMJ Glob Health* **5**, (2020).
15. Bork KA, D. A. Boys, are More Stunted than Girls from Early Infancy to 3 Years of Age in Rural Senegal. *J Nutr*. 147(5):940–7. (2017).
16. Myatt M, Khara T, Schoenbuchner S, Pietzsch S, Dolan C, Lelijveld N, et al. Children who are both wasted and stunted are also underweight and have a high risk of death: A descriptive epidemiology of multiple anthropometric deficits using data from 51 countries. *Arch Public Heal* 76(1):1–11. (2018).
17. Shrestha ML, Perry KE, Thapa B, Adhikari RP, W. A. Malnutrition matters: Association of Stunting and underweight with early childhood development indicators in Nepal. *Matern Child Nutr*. 18(2):1–9. (2021).
18. Thurstans S, Sessions N, Dolan C, Sadler K, Cichon B, Isanaka S, et al. The Relationship Between Wasting and Stunting in Young Children: A Systematic Review. *Matern Child Nutr*. 18(1). (2022).
19. Richard SA, Black RE, Gilman RH, Guerrant RL, Kang G, Lanata CF, et al. Wasting is Associated with Stunting in Early Childhood. *J Nutr*. 142(7):1291–6. (2012).
20. Rachmi CN, Agho KE, Li M, B. LA. Stunting, underweight and overweight in children aged 2.0-4.9 years in Indonesia: Prevalence trends and associated risk factors. *PLoS One* 11(5):1–17. (2016).
21. Snak, R., Angelina, Z. & Dewi, D. A. L. The Relationship Between The Nutritional Status Of Pregnant Women And Stunting In Children Aged 6-36 Months At Batuputih Public Health Center Tts Regency Ntt Province. *Journal Of Widya Medika Junior* **5**, 86–91 (2023).
22. Hartantio, F. W., Prabantoro, B. T. R. & Wijono, S. The Correlation Between Low Birth Weight And Stunting In 2-5 Years Old Children. *Journal Of Widya Medika Junior* **5**, 38–43 (2023).