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Community Based Stunting Prevention: Learning from Blue Collar Workers' Children in Indonesia

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Abstract

Background: Stunting remains a major public health challenge in Indonesia, with a 21.5% prevalence in 2023, impacting children's development and the nation's human capital. This study aims to provide additional findings on nutritional status of Indonesia under five children in Cianjur and Klaten.
Methods: This study conducts a secondary data analysis of survey data among healthy under five children of blue collar workers in 2 areas (Cianjur and Klaten) in Indonesia with a cross-sectional design and combines with existing nutrition status in Indonesia. Various statistical analysis methods were performed accordingly to obtain insights in refining and scaling up stunting prevention strategies.
Results: Overall, 236 under five children of blue collar workers were enrolled in this study. We observed that Cianjur has higher under nutritional status overall than Klaten. The Cianjur region have higher underweight status (10.8%), higher stunting status (20.4%), and higher wasting status (4.3%) compared to Klaten (7.7%, 16.8%, and 2.1%, respectively). In comparison with the prevalences of under nutrition coming from latest national survey, Cianjur found to be has lower underweight status (7.0%), lower stunting status (11.4%) and lower wasting status (3.4%) than Klaten (18.6%, 24.5%, and 7.5%, respectively). There is no significant difference stunting proportion between the two areas. Findings from this survey may reflect the impact of initiatives done by local government in reducing the impact of undernutrition (including stunting) among blue collar workers' children. -
Conclusion: This study highlights the positive impact of Indonesia's stunting prevention programs. Further research is needed to strengthen evidence and refine strategies for better child nutrition and health.
Keywords: anthropometrics, children, nutrition; stunting, underweight, blue collar worker

Abstrak

Latar belakang: *Stunting masih menjadi tantangan kesehatan masyarakat utama di Indonesia, dengan prevalensi 21,5% pada tahun 2023, yang memengaruhi perkembangan anak dan sumber daya manusia negara. Penelitian ini bertujuan untuk memberikan temuan tambahan tentang status gizi anak-anak Indonesia di bawah lima tahun di Cianjur dan Klaten.*
Metode: *Penelitian ini melakukan analisis data sekunder dari data survei pada anak-anak sehat di bawah usia lima tahun dari pekerja kerah biru di 2 daerah (Cianjur dan Klaten) di Indonesia dengan desain cross-sectional dan dikombinasikan dengan status gizi yang ada di Indonesia. Berbagai metode analisis statistik diterapkan sesuai untuk memperoleh wawasan dalam menyempurnakan dan meningkatkan strategi pencegahan stunting.*
Hasil: *Secara keseluruhan, 236 anak di bawah lima tahun dari pekerja kerah biru ikut serta dalam penelitian ini. Kami mengamati bahwa Cianjur memiliki status gizi kurang yang lebih tinggi secara keseluruhan daripada Klaten. Wilayah Cianjur memiliki status gizi kurang yang lebih tinggi (10,8%), status stunting yang lebih tinggi (20,4%), dan status wasting yang lebih tinggi (4,3%) dibandingkan dengan Klaten (masing-masing 7,7%, 16,8%, dan 2,1%). Dibandingkan dengan prevalensi gizi kurang yang berasal dari survei nasional terbaru, Cianjur ditemukan memiliki status gizi kurang yang lebih rendah (7,0%), status stunting yang lebih rendah (11,4%) dan status wasting yang lebih rendah (3,4%) daripada Klaten (masing-masing 18,6%, 24,5%, dan 7,5%). Tidak ada perbedaan proporsi stunting yang signifikan antara kedua wilayah tersebut. Temuan dari survei ini dapat mencerminkan dampak inisiatif yang dilakukan oleh pemerintah daerah dalam mengurangi dampak gizi kurang (termasuk stunting) di antara anak-anak pekerja kerah biru.*
Kesimpulan: *Penelitian ini menyoroti dampak positif dari program pencegahan stunting di Indonesia. Penelitian lebih lanjut diperlukan untuk memperkuat bukti dan menyempurnakan strategi demi meningkatkan gizi serta kesehatan anak.*
Kata kunci: *antropometri, anak-anak, gizi, stunting, gizi kurang, pekerja kerah biru*

Introduction

Stunting is a significant global public health concern, affecting populations in Indonesia.[1] According to data from the 2023 Indonesia Health Survey (*Survei Kesehatan Indonesia* or SKI 2023), the prevalence of stunting is 21.5%, which is considered in high category.[2] The World Health Organization (WHO) defines stunting as a height-for-age that is more than two standard deviations below the median of the WHO child growth standards.[4] Stunting not only impairs physical growth but also has long-term effects on cognitive development and mental health.[5] The developmental delays associated with stunting can significantly affect quality of life in adulthood, potentially leading to lower educational attainment and reduced earning capacity.[6] It highlights that stunting remains a significant global burden, including in Indonesia.

The causes of stunting are complex and multidimensional, involving a combination of nutritional, health, educational, and social environmental factors.[7] Nutritional deficiencies during the critical first 1,000 days of life—from conception to a child's second birthday—have the most profound impact on growth and development.[8] This period is vital for rapid brain and body growth, and inadequate nutrition or poor maternal health during pregnancy and early childhood can result in stunting.[9] Beyond nutrition, factors such as repeated infections, limited access to healthcare, poor maternal education, and inadequate sanitation can further exacerbate the risk of stunting.[10] These influences can lead to irreversible consequences, not only impairing physical growth but also negatively affecting cognitive and psychological development, with long-term impacts on educational achievement, economic productivity, and overall quality of life.[11] This underscores the critical importance of effective stunting management for children.

The Indonesian National Strategy to Accelerate Stunting Prevention aims to accelerate the reduction of child stunting to 14% by 2024. This target is aligned with SDG 2 – to "End all forms of malnutrition, including achieving targets on stunting and wasting in children under 5 years of age" by 2030, also the National Medium-term Development Plan (*Rencana Pembangunan Jangka Panjang Menengah Nasional* or RPJMN) 2020-2024. Government commitment to accelerate stunting prevention has been reflected through Presidential Decree No. 72/2021 on the Acceleration of Stunting Reduction, released in August 2021, also compelled district governments to include nutrition programming in their development plans.[12,13] In addition, the local government has also implemented the Family Assistance Team (TPK) program to address stunting growth and strengthen antenatal care.[14] In collaboration with WHO, UNICEF, and the Millennium Challenge Account Indonesia (MCA-Indonesia), Indonesia is implementing training programs on Infant and Young Child Feeding as part of the Community-Based Health and Nutrition Project (PKGBM) to reduce the prevalence of stunting nationwide.[15,16] However, the stunting program still faces many challenges in reducing the prevalence of stunting.[17] This emphasizes the critical need for effective programs aimed at addressing stunting in Indonesia.

This study aims to provide additional findings on nutritional status of Indonesian blue collar workers' children under five in Cianjur and Klaten. Apart from that, further insight was obtained by looking at the latest national survey data in the 2023 Indonesia Health Survey on the nutritional status of Indonesia under five children, and implemented programs by government in combating stunting in Klaten and Cianjur region in Indonesia. The findings of this study are expected to provide valuable insights for policymakers and stakeholders in refining and scaling up stunting elimination and prevention strategies to ensure better health outcomes for Indonesian children.

Materials and Methods

This is a cross-sectional study assessing the height and weight of healthy Indonesia blue collar workers' children aged 1-5 years at a single time point, utilizing secondary data from a survey conducted in Cianjur and Klaten city. Children outside the age range of 1-5 years were excluded. Additionally, those who refuse to have their nutritional status measured were also excluded from the study. This study also explored existing data from recent national survey and nutrition enhancement initiatives aimed at reducing and eliminating stunting in Klaten and Cianjur.

The study procedures followed an approved protocol authorized by the Universitas Muhammadiyah Purwokerto Institutional Review Board (KEPK/UMP/101/X/2024).

This study utilizes secondary data from a survey of a program (that is aming to increase awareness on stunting, including its screening and diagnosis) that has been implemented between May and July 2024. The survey collected the demographic and anthropometric data of all participants during their visits in factories located at Cianjur and Klaten. The assessments were conducted at a single time point across both locations.

These data were subsequently collected, analyzed, and further classified according to WHO growth and nutritional status criteria. The existing nutrition status enhancement initiatives to reduce and eliminate the stunting issue in Indonesia were collected and traced from the local government website (humas.jatengprov.go.id, prokopim.klaten.go.id, and sehatnegeriku.kemkes.go.id).

World Health Organization classification

WHO has established a comprehensive classification system to assess the nutritional status of children based on key anthropometric indices: Z-score weight-for-age, Z-score height-for-age, and Z-score weight-for-height [3]. WHO growth standards define Z-score weight-for-age <-2SD as underweight, Z-score height-for-age <-2SD as stunting, and Z-score weight-for-height <-2SD as wasting. This study focused on the prevalence of these category.These classifications provide globally recognized benchmarks for monitoring children's growth, guiding interventions, and tracking progress in child health and nutrition programs

Statistical analyses

Data analysis was performed using IBM Statistical Package for Social Science (SPSS) for Windows version 26.0 (SPSS Inc, Chicago, IL, USA). A normality test was performed to determine whether the data were normally distributed. The normally distributed continues variables described with mean ± standard deviation and non normally continues distributed variables described with median (interquartile range). To compare statistically significant differences between 2 area, for normally distributed continues data Independent Samples T-Test was used and for non normally distributed continues data Man Whitney U was used. A Chi-Square Test was performed for comparisons of categorical variables. Statistical significance as determined by *P* value of <0.05.

Results

Characteristics of study subjects

Characteristics of study participants are shown in Table 1 study location recruited in this study. The two regions did not differ significantly with regard to gender, age, and anthropometric data. In the Klaten and Cianjur regions, the majority of participants were male (54.5% and 51.6%, respectively). The Cianjur region had a higher average age (37.9 months) compared to Klaten (36.6 months). Blue collar workers' under five children in Klaten dan Cianjur region had not much different average height with 91.6 cm and 91.4 cm. Those in Klaten had slightly higher median weight (13 kg) compared to those in Cianjur (12.5 kg). All children from both regions had the same median BMI (15.1 kg/m^2).

Table 1. Characteristic of study participants

Characteristics	Klaten n=143	Cianjur n=93	p-value
Male, n (%)	78 (54.5)	48 (51.6)	0.758
Age (months)*	36.6±12.7	37.9±14.1	0.447
Height (cm)*	91.6±9.1	91.4±9.6	0.928
Weight (kg)**	13 (11-14.8)	12.5 (11.1-14.5)	0.624
BMI (kg/m^2)**	15.1 (14.3-16.2)	15.1 (14.3-15.9)	0.588

Abbreviations: BMI, body mass index

*Data are presented as Mean ± SD; *p*-value was calculated by T-test Independent

** Data are presented as Median (Interquartil Range/IQR); *p*-value was calculated by Non Parametric Test

The nutritional status categories based on World Health Organization (WHO) divided by study location

The nutritional status based on World Health Organization categories in study subjects divided by study location are summarized in Table 2. We observed that those in Cianjur had a higher overall prevalence of under nutritional status than those in Klaten. The children in Cianjur region had higher underweight status (10.8%), higher stunting status (20.4%), and higher wasting status (4.3%) compared to those in Klaten (7.7%, 16.8%, and 2.1%, respectively). Even though stunting prevalence in Klaten was lower than Cianjur, proportion of severely stunting status in Klaten (4.9%) was higher than Cianjur (2.2%). The children from two regions did not differ significantly with regard to weight-for-age, height-for-age, and height-for-age

Discussion

From the survey, it was found that blue collar workers 'under five children in Cianjur (20.4%) had higher rates of stunting compared to Klaten (16.8%). This finding cannot be considered similar with recent national survey (the Indonesian Health Survey 2023/SKI 2023) where the stunting rate in Klaten (24.5%) was higher than Cianjur (11.4%). This different rate may be due to the target of the survey are not specifically blue-collar workers' under five children and the number of samples in the survey is much smaller (SKI 2023 sample in Klaten is above 2000 toddlers and SKI 2023 sample in Cianjur is more than 1800 toddlers).[2]

The high stunting rate among Indonesia underfive children in 2013,[18] which falls into the category of public health problems, and the long-term impacts of stunting, have made the government focus on creating health policies to reduce stunting. Hence, it is important to understand the stunting trend in these two cities since 2013 to 2023. In Klaten, the stunting rate has decreased from 31.2% in 2013[19] to 29.6% in 2018[20] to 15.8% in 2021[21] then increased to 18.2% in 2022[22] and 24.5% in 2023[2]. Meanwhile, in Cianjur, the stunting rate ecreased significantly from 41.7% in 2013[23] to 33.5% in 2018[20] and 33.7% in 2021[21] to 13.6% in 2022[22] and 11.4% in 2023[2].The different trend between two cities is an interesting aspect to be looked at in relation to stunting reduction programs that have been carried out in these two cities (Figure 1).

The high stunting rate in Cianjur (41.72%) in 2013 has made Cianjur one of the highest among areas in Indonesia. Programs are implemented as an effort to reduce stunting such as "Jufe" or Friday Drinking FE (iron), Gebrak Roasting or Joint Movement with Foster Parents of Stunting Children, and Permata Kamila, which provides local additional food to pregnant women with chronic energy deficiency (CED) and young children. The Permata Kamila program, in addition to providing food, also provides nutrition education and counseling. This program plays an important role in ensuring the success of stunting interventions with 4,371 children with nutritional problems successfully achieving normal nutritional status. These programs appear to be able to produce the expected results, as seen from the stunting trend which has decreased

Table 2. Nutritional status categories based on WHO divided by study location

Nutritional status categories	**Klaten** n (%)	**Cianjur** n (%)	***p*-value**
Weight-for-age			
Underweight	11 (7.7)	10 (10.8)	0.567
Not Underweight	132 (92.3)	83 (89.2)	
Height-for-age			
Stunting	24 (16.8)	19 (20.4)	0.592
Not Stunting	119 (83.2)	74 (79.6)	
Weight-for-height			
Wasting	3 (2.1)	4 (4.3)	0.560
Not Wasting	140 (97.9)	89 (95.7)	

p-value was calculated by Chi-square

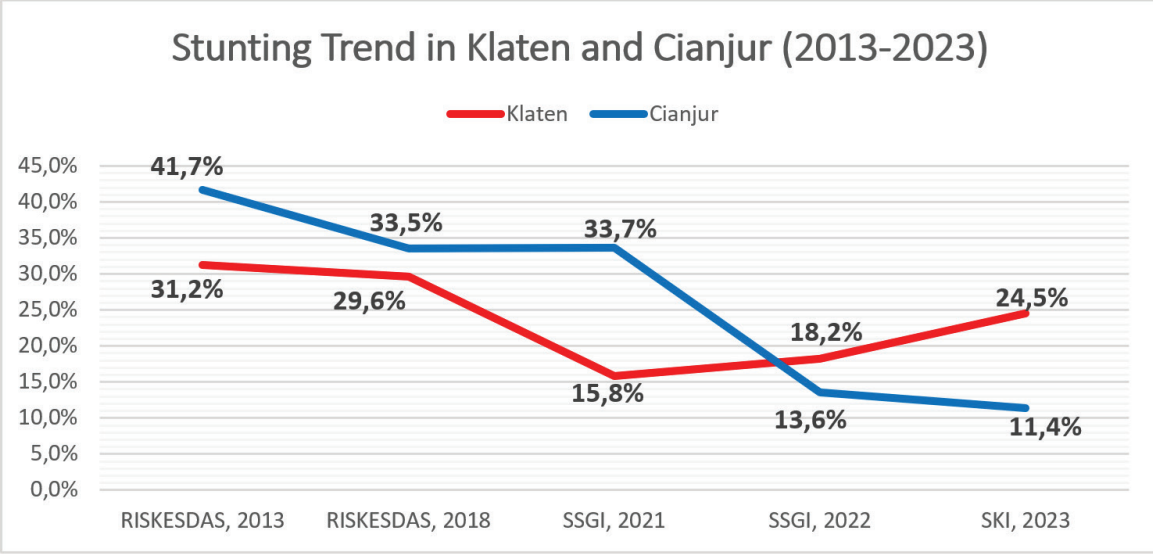

Figure 1. The different trend between two cities in relation to stunting reduction.

from 41.72% in 2013 to 11.4% in 2023.[24] The Family Assistance Team (TPK) program has been implemented since 2020, with approximately 1,908 TPKs established in Cianjur to address stunting growth.[25] Other notable initiatives by the Cianjur government include *Kecimpring*, *Bina Balita Sehat*, and *Cau Panjang* which have positioned Cianjur as one of the leading districts in stunting reduction.[26]

In 2013, the stunting rate in Klaten was at 31.2% in 2013[19] and dropped to 29.62% in 2018[20]. Despite the decreased of stunting rate in Klaten, the Ministry of National Development Planning/National Development Planning Agency (Bappenas), stated in the Regulation of the Minister of National Development Planning/Head of the National Development Planning Agency of the Republic of Indonesia Number 15 in 2018 concerning the Update of the 2019 Government Work Plan, determined that Klaten is included in the 100 districts/cities that are the focus of reducing stunting in 2018.[27]

The Klaten government has implemented various programs to address this issue.[28] The flagship program for reducing stunting in Central Java is Central Java Together Looking for Pregnant Women (*Jateng Gayeng Ngincer Wong Meteng*/5Ng) which has succeeded in reducing the stunting rate in Central Java from 36.7% to 20.9% in 2021 since 2013. 5Ng helps reduce maternal and child mortality rates and ensures their nutritional needs.[29] This program is implemented in various regions in Central Java including Klaten which created the Juwita 1,000 Harta innovation. This innovation has been carried out since 2013 which seeks to reduce low birth weight babies, and monitor pregnant women until the first 1000 days of life through screening, provision of Fe tablets, and education on infant feeding and exclusive breastfeeding. The stunting rate fell from 13.38% to 6.3% according to data from the regional government.[17] The Klaten Health Office has also intensified its antenatal care program to reduce the likelihood of chronic energy deficiency in pregnant women, which can have long-term effects on children.[31] Enhancing nutritional knowledge among pregnant and breastfeeding mothers through family education programs is crucial because it directly impacts maternal and child health outcomes.[32,33]Another notable effort is the "My Plate Nutrition Creations" (*Kreasi Isi Piringku*) competition, designed to increase mother's knowledge in preventing stunting throught nutritious and economical food intake.[34]

Similar patterns of undernutrition have been reported in previous research in low- and middle-income countries, where inadequate nutrient intake, recurrent infections, and poor maternal nutrition have been linked to high rates of stunting and underweight status.[35] Socio-economic factors in West Java (including Cianjur) and Central Java (including Klaten) impact the incidence of

stunting. Families with lower economic status are highly susceptible to food insecurity, leading to inadequate daily food intake for children. Additionally, limited access to health facilities and poor hygiene can hinder children's growth and development.[36] Addressing these nutritional challenges requires a multifaceted approach, and focusing on early childhood nutrition could help reduce the prevalence of undernutrition and its long-term health impacts.

Despite at the government's efforts since 2013 to reduce stunting rates with various programs in Cianjur and Klaten, the stunting prevalence in Indonesia still considered a medium to high public health problem based on WHO standart, thus require targeted interventions. As there is limited information that can be obtained on the result of monitoring and evaluation of those programs in public domain, the programs carried out in two cities can be assumed to have same goals with different numbers of programs. In Cianjur the programs might be suitable so that its impact in relation to reduction of stunting is significant, as they providing food in The Permata Kamila program. This approach addresses changes in food consumption as children grow older, such as snack consumption which can reduce appetite for nutritious food and lead to a decline in nutritional status.[36] Whereas in Klaten, further consideration on the implemented program may be needed, with a purpose of adjusment of future programs to regional conditions and and having a more significant impact on reduction of stunting rates, especially in 2022-2023 where the stunting rate is seen to increase.

In reducing stunting rates in Indonesia, various programs implemented in the Puskesmas and Posyandu levels where many cadres also act as midwives' partners in screening and monitoring child growth and development. While cadres play an essentials role in the early identification of stunting, there is still uncertainty regarding their understanding of stunting diagnosis. Therefore, it is essential to equip cadres, midwives, and other front-line health care workers with proper knowledge of stunting.[37]

This study has some limitations. The survey did not account for several confounding factors in this study, including socioeconomic status, parental education, and certain clinical conditions known to affect nutritional status, such as Down syndrome, Turner syndrome, and extreme prematurity and other metabolic disorders. Future longitudinal studies with larger samples among blue collar workers' under five children are essential to establish causal relationships and identify the factors influencing nutritional status in their children. Such studies would provide more robust evidence and insights, enabling health policymakers and stakeholders to refine and optimize stunting prevention strategies to achieve even greater improvements in blue collar workers'children nutrition and health outcomes.

Conclusions

From the survey, it is found that there was no significant difference on stunting proportion between children of blue collar workers in Cianjur and Klaten. Those in Klaten had lower stunting proportion compared to those in Cianjur. Conversely, the findings from the 2023 National Surveys, the underfive children in Cianjur had lower stunting proportion than those in Klaten. Further deep dive on stunting elimination and prevention programs and the improved nutritional status of children under five of blue-collar workers in the two areas studied may give us insight on their potential beneficial impacts. This underscores the critical role that comprehensive and sustained stunting prevention initiatives play in enhancing child health and development in Indonesia. However, it is essential to acknowledge the limitations of secondary data and further elaborated and prospective studies are needed to fully understand the long-term impact and effectiveness of these programs.

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