Annual Prevalence Model of Stunting in Toddlers in Jember Regency, Indonesia

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KEYWORDS
Stunting, Toddler, Prevalence Model, Harmonization.

ABSTRACT:
Introduction: In Jember Regency-Indonesia, the accelerated program for reducing stunting prevalence has been implemented convergently on a multisectoral basis, but no predictive evaluation has been carried out to estimate the success of the program for the coming years.
Objectives: This study aimed to build an annual prevalence model of stunting in toddlers based on the last five years of data.
Methods: This research was a descriptive study based on a report on the acceleration program to reduce stunting prevalence in Jember Regency. The data was analyzed serially to obtain a trend line for stunting prevalence in the last five years, including a linear equation to predict stunting prevalence in the following years.
Results: The results showed that the trend of stunting prevalence in Jember Regency from 2019 to 2023 was decreasing with the linear equation of y = -1.2987x + 14.053. Based on this equation, if there are no changes in implementation, the reduction in stunting prevalence to reach the new target can be realized by the end of 2025.
Conclusions: It is concluded that the reduction in stunting prevalence in Jember Regency is progressing slowly, so it requires harmonization of related multisector collaborative work, and one of the main models of choice is the action research cycle.

1. Introduction

Stunting is a serious health problem in Indonesia, especially among people toodler (Maliga et al., 2022). Based on data recently, stunting prevalence rates in various provinces are still high, although there has been a decline small from year to year (Lanasa et al., 2023). In 2022, the prevalence of stunting will reach 21.6% and only falls to 21.5% in 2023, indicating an insignificant decline of 0.1%. The government targets to reduce the prevalence of stunting to below 14% in 2024, but big challenges still lie ahead (Firdaus,et.al.2024). The frequency of

stunting incidents based on age, the most stunted people were aged 24-59 months were 60 people (47.7%), male gender was 80 people (63.4%), short height was 108 people (85, 8%) (Hatijar, 2023). Stunting can occur if it is not balanced with catch-up growth (catching up) results in decreased growth, The problem of stunting is a public health problem associated with increased risk of morbidity, mortality and obstacles to growth, both motoric and mental (Kinanti, 2020).
However, to achieve the government's target in 2024, it is necessary a more aggressive and coordinated approach. Public education, increasing access to health services, and improved nutrition are key to overcoming this problem and ensuring a better future for future generations (Andi & Dety, 2023). There is positive spatial autocorrelation and there is spatial correlation which means prevalence stunting in one district city area is related to the surrounding area (Shinta & Riny, 2023). Intervention is needed for stunted babies up to 2 years of age catching up in the next period of child development (Thahir et al., 2023). Sensitive nutrition interventions is an action to reduce indirect nutritional problems, such as environmental factors (Nurjazuli et al., 2023).

Until now, stunting is still a world problem [1,2] including Indonesia, and Jember Regency is one of the areas burdened by stunting with a prevalence of 7.0377% in 2023 [3]. Stunting is a complex nutritional problem that is multifactorial, so it often burdens the government because it can have various impacts. In the short term, various health problems and obstacles to growth and development can occur, which in turn can have long-term impacts, namely obstacles to creating a high-quality future generation for the nation [4]. According to UNICEF (2013), the cause of stunting caused by various factors. Family factors and household (maternal factors, home environment), mother's behavior in providing food inadequate breastfeeding companion (MP), breastfeeding and infection. (Arinda, et al., 2021) Contextual factors which contribute to the incidence of stunting are politics, economics, health services, education, social culture, agricultural systems and food, environment and water sanitation (Ratnawatri, 2020). Stunted children has an average Intelligence Quotient (IQ) score eleven points lower than the average score IQ in normal children. Growth and development disorders in children due to malnutrition if not getting early intervention will continue until adulthood (Estherina, 2021).

It can be seen that in Jember Regency, stunting is a general problem, so to overcome it requires an ideal handling model, which involves many sectors, including health, education, agriculture, economics, social and so on. Ideally, this stunting handling model involves the above multi-sectors in an integrated and harmoniously coordinated manner. In other research, it was found that in Jember Regency there is also a PMT-P Program implementation program from the Indonesian Ministry of Health, which aligns activities to reduce stunting rates with midwives, cadres and target mothers of toddlers, forming a community of mothers of toddlers as a forum for sharing about the implementation of food addition (Irnia et al., 2024).
Since 2021, Indonesia has implemented a multi-sector intervention model in the context of handling stunting, known as the Convergence for the Acceleration of Stunting Reduction [5]. In this regard, Jember Regency has implemented this program. As the program progresses, recording and reporting has been carried out on the success of reducing stunting prevalence every year [3], but no predictive evaluation has been carried out in order to estimate the success of reducing stunting prevalence in the future.
Based on the problem description above, it is necessary to carry out an analysis to predict the prevalence of stunting in the future as a measure of the success of the cross-sector convergence program that has been implemented in Jember Regency so far. Thus, it is necessary to carry

out a study aimed to build an annual prevalence model of stunting in toddlers based on the last five years of data.

2. Literature Review

Stunting is one of the focuses of the Indonesian government in developing a national strategy for preventing stunting. Stunting is a condition of low height in children caused by malnutrition and lasts for a long time. This causes the child's height to be lower than their age. In Indonesia, reducing the prevalence of stunting is being pursued in line with global targets, namely the target of the World Health Assembly (WHA) which aims to reduce the prevalence of stunting by 40% in 2025. In line with that, the target of the Sustainable Development Goals (SDGs) is to achieve the elimination of all forms of malnutrition by 2030. To achieve this goal, efforts need to be made to accelerate the reduction in current stunting conditions so that the prevalence of stunting in toddlers can decrease to 19.4% in 2024 (Husaini et al., 2024). Based on data from the Ministry of Health, the stunting rate has decreased from 24.4% in 2021 to 21.6% in 2022. The government, through the Coordinating Minister for Human Development and Culture (Menko PMK), has targeted a 3% decrease in stunting rates each year. However, in reality, the stunting problem is still the focus of the Indonesian government. Many factors cause stunting problems (Briliannita et al., 2022). Stunting can be caused by multidimensional factors, not only due to malnutrition experienced during pregnancy, it can also happened when the child is under the age of five (Nasution & Ikhwani, 2024). A study found that the mediating effect of Infant and Young Child Feeding was influenced by phenotype, changes in species composition that reflected microbiome development, the relative richness of more prominent B. longum. That the B. longum strain present when intermediation begins is the most comparative with subspecies infantis oligosaccharide depleting ability, which decreases as the infant ages and varies between maternal and infant phenotypes (Gough et al., 2024). Need of wellbeing protections, dark ethnicity, moo financial conditions, and destitute lodging conditions are to fault recognized as the foremost noteworthy connect of child mortality. There are sub-geographic varieties in children mortality extended from 6% to 35ross the nation. Population-level impacts of distal characteristics Child mortality and hindering rates surpass other chance variables (Wand et al., 2024).

Wellbeing status within the to begin with thousand days of life, to be specific during pregnancy and when the primary infant is lively, is principal since the results are lasting and cannot be repaired. Pregnant women and youthful children who are missing got to keep in mind that their nutritional admissions will impact dietary issues or wholesome status which is able at that point influence their advance within the future. Ideal levels of wholesome status will be accomplished on the off chance that sound needs are met, but on the other hand, lopsided nourishment can cause various diseases, counting deterrents. It is exceptionally vital to check children's development and advancement to identify development and improvement disarranges from an early age, by making weight estimation the foremost suitable way to evaluate the wholesome status of pregnant ladies and youthful children each month so that children's development and advancement can be decided. One device for measuring dietary status is to utilize an application, and mechanical propels are as of now advancing quickly (Hijrawati et al., 2021).

Maternal wholesome status amid pregnancy and the supplements to which newborn children are uncovered through breastmilk and complementary nourishments impact newborn child safe framework improvement. Micronutrients, counting press, zinc, vitamins A, C, D, and E apply critical impacts on resistant framework improvement amid the neonatal period. An master

board assembly was gathered to supply bits of knowledge on methodologies to anticipate and moderate micronutrients lacks (MNDs) which affect the creating resistant framework. This survey article gives evidence-based relationship between the part of sustenance and insusceptibility, and gives proposals on the current and future patterns to prevent and treat MNDs (Pai et al., 2018). Moving forward the quality of sustenance evaluations can supplement existing endeavors to decrease the antagonistic impacts of climate alter on children's dietary well-being (Yeboah et al., 2024).

The discoveries from this consider show an affiliationbbetween frailty, intestinal sickness, and hindering. In expansion, comes about from the current ponder uncovered that the topographical variables werebfactually noteworthy determinants of childhood jungle fever, weakness, and hindering, and have a coordinate and backhanded impact on childhoodbweakness, intestinal sickness, and hindering. The assessed circuitous way for the impact of geophysical components on childhood weakness, jungle fever, andbhindering, as intervened by family variables was factually critical and positive (Gaston et al., 2024). Care office settings in combination with Social and Behavioral Alter Communication in to begin with life are related with decreased weight and underweight as well as changes in infant and youthful child nourishment among children beneath 2 a long time of age (Soofi et al., 2024). Variables altogether related to the hindering of children beneath two a long time with working moms were home, maternal age, conjugal status, maternal instruction, riches status, children's age, sexual orientation, and EIBF. The approach program to diminish hindering in children ought to center on scaling up nourishment and activity on coordinate causal variables and basic causes and different coming about results (Supadmi et al., 2024). Considering the moderately tall rate of hindering among children, the significance of feasible back is imperative family units living in destitution and the require for fitting approach activity expanding complementary components (Oyenubi & Rossouw, 2024).

Long-term malnutrition and repeated infections are the two primary drivers of inability to flourish in kids younger than five, Stunting in toddlers can be avoided by empowering families through family-centered nursing and so strengthening family independence (Nurjanah et al., 2024). Factors influencing the severity of stunting in children who are severely stunted is an infection with *A. lumbricoides* and in short children a protozoan infection, and although not statistically significant, the presence of a deworming program Thus, this program can be a strategy for preventing helminthiasis in severely stunted children (Adrizain et al., 2024). The 1 possible exception for this is in the assessment of children with moderate or severe acute malnutrition, where the recent growth pattern substantially improved the prediction of persistence or recovery (Wright et al., 2024).

Contrasts in racial qualities basically diminish children's hindrances and underweight. The negative affect of racial contrasts on children's hindrances and body weight is more or less articulated in children beneath 5 a long time of age. At that point the development of work, per capita nourishment utilization, and money related contemplations as imperative channels through which racial contrasts can diminish disable and underweight (Koomson et al., 2024).

3. Methods

This study was carried out in Jember Regency, Indonesia in December 2023. This activity was implemented in the form of a descriptive survey study, research that does not require a hypothesis, but is limited to describing certain variable [6], which in this case is the incidence of stunting in toddlers. The population of this study was all toddlers in Jember Regency according to the last five-year program period, namely 2019 to 2023. The population size for

each year sequentially starting from 2019 was 176,779; 175,023; 174,616; 173,043 and 158,942 toddlers. All members of the population were involved as research subjects because this study was census research. Thus, there was no need to calculate the sample size, or in other words, the researcher implemented total population sampling in each year.

Table 1. Stunting Prevalence in Jember Regency (2019 to 2023)

Year	Total of children	Children with stunting	Prevalence (%)
2019	176.779	19.097	11.1929
2020	175.023	21,530	12.5887
2021	174.616	21.530	12.0516
2022	173.043	12.754	7.9126
2023	158.942	9.837	7.0377

The variable measured was the incidence of stunting in toddlers. Data about this variable was obtained from secondary data, namely the Program Report of Convergence for the Acceleration of Stunting Reduction in Jember Regency. For each year, researchers carefully re-examined the data in the program's reports, namely height or length for age, to ensure the accuracy of determining the incidence of stunting in each toddler. In order to improve data quality, the collected data was checked by the Jember District Health Service Verification Team.

As a descriptive survey study, researchers used descriptive statistical methods in four steps, namely: 1) calculating the prevalence of stunting in toddlers for each year sequentially and presenting it in a table; 2) visualizing the stunting prevalence table as a curve (line chart) to display annual trends; 3) converting the curve line to a linear line; 4) converting the linear line to a linear equation so that the estimated prevalence of stunting in the coming years can be calculated.

This research did not require ethical approval because the researchers used secondary data in the form of official reports from government institutions, but ethical principles were still upheld, such as the legality of research, confidentiality of subject identities and other important information.

4. Results and Discussion

Referring to the research objectives, the results of this study focus on modeling the **"prevalence of stunting in toddlers"** based on **"annual prevalence"** in the last five years. In accordance with the previously planned method, in the **first step** the prevalence of stunting in toddlers in Jember Regency was calculated, as shown in Table 1. It can be seen that changes in stunting prevalence did not occur linearly, in the sense that apart from a decrease, there was still one increase in 2020.

In the **second step**, the prevalence of stunting had been visualized in a curve (line diagram) as shown in Figure 1. Visually, it can be seen that the increase in stunting prevalence in 2020 was followed by a continuous decline, with a rapid decline in 2022, but this decline slowed down again until the end of 2023.

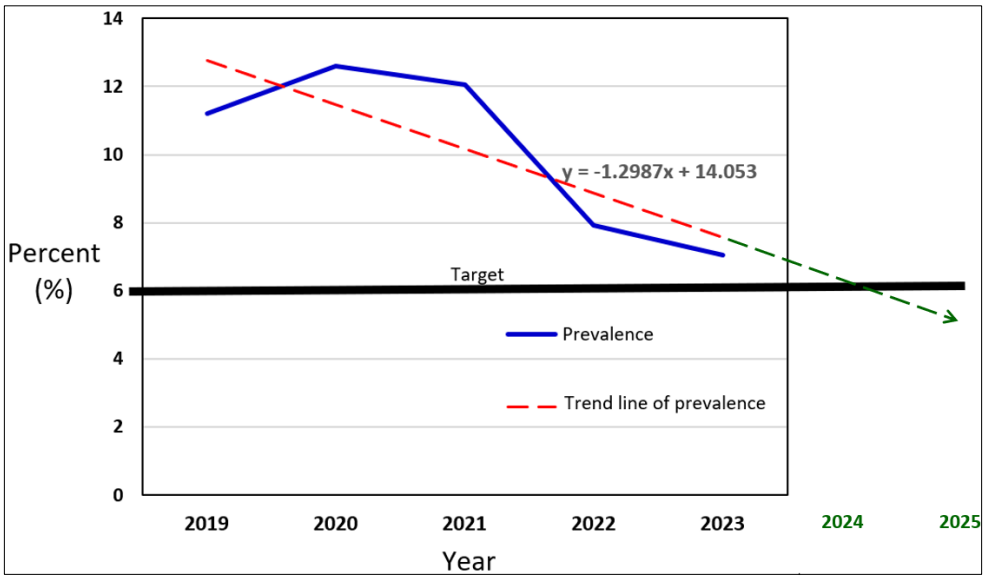

Figure 1. Trends in Stunting Prevalence in Jember Regency (2019 to 2023)

In the **third step**, the curve line had been converted into a linear line so that it appears that in 2019 to 2023 there had been a moderate decline in the prevalence of stunting in toddlers. However, at the end of 2023, the prevalence had not reached the expected target of 6% (Figure 1).

In the **fourth step**, the linear line had been converted into a linear equation, namely **"y = -1.2987x + 14.053"**, which can be used to estimate the prevalence of stunting until the end of 2024, 2025 and so on. Thus, to predict the prevalence of stunting at the end of 2024 (6th year) it was -1.2987 x 6 + 14,053 = 6.2608% (not yet reaching the national target of less than 6%). Meanwhile, the predicted prevalence of stunting in 2025 was -1.2987 x 7 + 14,053 = 4.9621%; can reach the national target of below 6% (Figure 1).

The results of the research showed that in Jember Regency, there was a trend of decreasing stunting prevalence among toddlers in the period 2019 to 2023. In fact, this shows good progress, but this reduction in prevalence has not yet reached the national stunting reduction target, which is less than 6%. Even the prediction calculation for the end of 2024 has still not reached the target, because it is estimated to still be at 6.2608%. Only at the end of 2025, it is estimated that the target for reducing the prevalence of stunting will be achieved with an estimate of 4.9621%.

The facts above show that the Convergence for the Acceleration of Stunting Reduction program has actually succeeded in reducing the prevalence of stunting in Jember Regency, but this reduction has been relatively slow, so it will take a long time to achieve the expected target. In other words, the Convergence for the Acceleration of Stunting Reduction in Jember Regency has not been able to realize optimal performance. It is generally understood that the Convergence for the Acceleration of Stunting Reduction is a program involving multi-sectors, each of which has different characteristics and areas of focus. Of course, these differences create obstacles to unifying collaborative action in controlling stunting.

Thus, key factors must be found to build effective collaborative action. To realize effective organizational performance, the main keyword is needed, namely harmonious conditions. With these harmonious conditions, each sector can articulate its contribution to the maximum so that strong synergy will be realized to achieve organizational goals more quickly. In other words, to achieve acceleration in achieving goals, the main keyword is needed, namely harmonization

of all parties involved [7]. Good coordination between agencies can reduce the prevalence of stunting. This success was achieved through cross collaboration sectoral, education based approach, health system strengthening, and engagement local community (Cita et al., 2024).
Referring to the main keywords above, harmonization of all sectors involved in implementing the Convergence for the Acceleration of Stunting Reduction must be carried out immediately. In the first step, it is necessary to re-identify the level of involvement of each sector. In this case, it must be ensured that all sectors have the same sense of belonging, in the sense that no sector feels more important than another sector, and vice versa. If all sectors have a high sense of belonging to this program, they will obtain strong initial capital to build harmonious collaboration. A wide variety of contributing factors are, to varying degrees, interrelated with stunting, demonstrating the importance of considering how these predictors interact with nutrition. Integrated health promotion, prevention and intervention by health service providers, the community including health Cadres are needed to prevent new stunting children in Indonesia (Henny, 2020).
Harmonious multisectoral collaboration requires an action model that can be a common reference from planning, implementation, monitoring, to ongoing evaluation. Currently, there are many action models that can be used, and one model that can guide collaborative work action on an ongoing basis is the Action Research Model which can be implemented in multi-cycles according to needs. Each cycle consists of four steps, namely planning, acting, observing, and reflecting [8,9]. In this way, the action research cycle can be chosen as a harmonized model for the implementation of the Convergence for the Acceleration of Stunting Reduction in order to accelerate the reduction in stunting prevalence in Jember Regency. If this program runs well and shows positive achievements, it can become a reference for other areas that have problems related to stunting prevalence.

5. Conclusion

This study produces an annual prevalence model of stunting in toddlers, which can be used to estimate the prevalence of stunting in subsequent years. Empirically, there has been a decrease in the prevalence of stunting, but progress is slow and requires harmonization of multi-sector collaborative work to accelerate the achievement of stunting reduction targets in Jember Regency.

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