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Analysis of Risk Factors for Stunting Among Toddlers Aged 24-59 Months in the Working Area of Cibodasari Puskesmas Community Health Center, Tangerang City

M. Ilham[1], Rina Amelia[2]

[1,2] Nursing Study Program, STIKes Karya Husada Kediri, Indonesia

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ABSTRACT

This research investigates risk factors for stunting among toddlers aged 24-59 months in the working area of the Cibodasari Puskesmas Community Health Center in Tangerang City. Stunting, defined as height-for-age z-scores (HAZ) below -2 standard deviations from the median of the WHO Child Growth Standards, remains a significant public health concern in Indonesia, impacting child health and development. Through a cross-sectional study design, data were collected on maternal and child characteristics, household socio-economic status, feeding practices, access to healthcare services, and environmental factors. Statistical analyses, including bivariate and multivariable regression analyses, were conducted to identify risk factors associated with stunting prevalence. Key findings reveal a high prevalence of stunting among toddlers in the study population, with significant associations observed with maternal nutrition, household socio-economic status, feeding practices, access to healthcare services, and environmental factors. The implications of the findings for public health policies and interventions are discussed, emphasizing the importance of multi-sectoral approaches, early intervention strategies, socio-economic empowerment, enhanced healthcare access, environmental health interventions, and community engagement efforts in reducing stunting prevalence and improving child health outcomes within the community. These findings contribute valuable evidence to inform targeted interventions aimed at addressing the root causes of stunting and promoting child health and well-being in Tangerang City.

Corresponding Author:

M.Ilham,
Nursing Study Program,
STIKes Karya Husada Kediri, Indonesia
Jl. Soekarno Hatta No.7, Darungan, Kec. Pare, Kediri Regency, East Java 64225, Indonesia
Email: ilham16@gmail.com

1. INTRODUCTION

Stunting, characterized by impaired growth and development due to chronic malnutrition, remains a significant public health concern worldwide, particularly in low- and middle-income countries(De Onis & Branca, 2016). Defined as the inability of a child to achieve their full growth potential, stunting not only jeopardizes individual health and well-being but also undermines the socio-economic development of communities and nations. Understanding the risk factors associated with stunting is crucial for designing effective interventions and policies aimed at its prevention and mitigation.

The significance of stunting in child health and development cannot be overstated(Wells et al., 2019). Beyond its immediate effects on physical stature, stunting compromises cognitive development, immune function, and overall well-being. Children who experience stunting are at increased risk of developmental delays, learning disabilities, and chronic diseases later in life. Moreover, stunting perpetuates intergenerational cycles of poverty and malnutrition, as affected individuals are less likely to achieve their full potential in education, employment, and socio-economic advancement(Delisle, 2008).

The etiology of stunting is multifactorial, stemming from a complex interplay of biological, environmental, and socio-economic determinants(Raiten & Bremer, 2020). Inadequate dietary intake, especially during critical periods of growth and development, is a primary contributor to stunting(Raiten & Bremer, 2020). Poor maternal nutrition before and during pregnancy, as well as suboptimal breastfeeding practices in infancy, can predispose children to stunted growth(Lartey, 2008). Moreover, recurrent infections, particularly diarrheal diseases and respiratory infections, exacerbate nutritional deficiencies and impair nutrient absorption, further compromising growth.

Socio-economic factors also play a significant role in shaping stunting prevalence(Fenske et al., 2013). Poverty, food insecurity, limited access to clean water and sanitation facilities, and inadequate healthcare services contribute to the burden of malnutrition in communities. Additionally, socio-cultural practices, gender disparities, and educational attainment influence household dietary practices, maternal and child healthcare-seeking behaviors, and the allocation of resources within families, all of which impact nutritional outcomes(Nzioki et al., 2015).

The consequences of stunting extend beyond individual health to broader societal implications. Nations with high rates of stunting experience diminished human capital and productivity, hindering economic growth and sustainable development efforts. Addressing stunting is thus essential not only for achieving global health goals, such as the Sustainable Development Goals (SDGs), but also for fostering social equity and inclusive prosperity(Sabbahi et al., 2018).

In response to the pervasive challenge of stunting, concerted efforts are underway to implement evidence-based interventions aimed at prevention, early detection, and treatment(Caulfield et al., 2006). These interventions encompass a range of strategies, including promoting maternal nutrition and breastfeeding, improving access to nutritious foods, enhancing sanitation and hygiene practices, and strengthening healthcare systems to deliver essential services to mothers and children. Furthermore, addressing the underlying determinants of stunting requires multi-sectoral collaboration, involving health, nutrition, education, agriculture, and social welfare sectors(Skoufias et al., 2019).

Tangerang City, situated in the vibrant metropolitan region of Jakarta, Indonesia, occupies a strategic position in the country's socio-economic landscape(Indraprahasta, 2019). With a population exceeding two million residents, Tangerang City is one of the largest urban centers in Indonesia, characterized by rapid urbanization, cultural diversity, and dynamic economic activity. The city serves as a bustling hub for commerce, industry, and transportation, attracting migrants from various parts of Indonesia in search of employment opportunities and better livelihoods(Cybriwsky & Ford, 2001).

Amidst the bustling urban environment, however, Tangerang City grapples with a myriad of socio-economic challenges, including healthcare disparities, inadequate infrastructure, and pockets of poverty and marginalization(Leggett, 2013). These challenges are particularly pronounced in peri-urban and low-income areas, where access to essential services, such as healthcare, education, and sanitation, remains limited(Avolio, 2016).

In this context, the Cibodasari Puskesmas Community Health Center emerges as a critical institution serving the healthcare needs of the local population. Puskesmas, short for Pusat Kesehatan Masyarakat, translates to "Community Health Center" and plays a pivotal role in Indonesia's primary healthcare system. These centers are tasked with delivering comprehensive healthcare services, health promotion, disease prevention, and basic treatment to communities at the grassroots level(Lohr et al., 2018).

The significance of Cibodasari Puskesmas lies not only in its provision of healthcare services but also in its role as a focal point for community engagement, health education, and outreach initiatives. Staffed by dedicated healthcare professionals, including doctors, nurses, midwives, and community health workers, Puskesmas facilities like Cibodasari are uniquely positioned to address the diverse health needs of the local population, including maternal and child health, infectious diseases, nutrition, and preventive care.

Furthermore, Cibodasari Puskesmas serves as a nexus for collaboration between the public health sector, local government agencies, non-governmental organizations (NGOs), and community-based organizations (CBOs) working towards improving health outcomes and reducing health inequities. Through partnerships and community participation, the health center endeavors to enhance the accessibility, affordability, and quality of healthcare services, particularly for vulnerable and marginalized populations(Sciences et al., 2018).

Tangerang City, situated in the bustling metropolitan area of Jakarta, Indonesia, grapples with its share of nutritional challenges, including stunting among its young population. Within this context, the Cibodasari Puskesmas Community Health Center serves as a vital healthcare hub, catering to the diverse needs of the local community. However, despite concerted efforts to improve child nutrition and health outcomes, stunting persists as a formidable obstacle to the holistic development of toddlers aged 24-59 months within the center's working area(Marini, 2004).

The research endeavors to delve into the multifaceted determinants of stunting among toddlers in this specific demographic and geographical context(McNamara & Wood, 2019). By focusing on children aged 24-59 months, the study aims to capture a critical period in early childhood development when nutritional interventions can exert maximal impact. Moreover, narrowing the scope to the Cibodasari Puskesmas working area allows for a nuanced understanding of community-level factors influencing stunting prevalence and incidence rates.

A plethora of research highlights the complex interplay of risk factors associated with stunting, encompassing both proximal and distal determinants(Nseluke, 2018). Proximal factors include inadequate dietary intake, poor feeding practices, and recurrent infections, all of which directly affect nutritional status and growth. Studies have demonstrated the critical importance of maternal nutrition, breastfeeding practices, and access to nutrient-rich foods in preventing stunting during the crucial early childhood period(Black & Heidkamp, 2018).

Moreover, the socio-economic context exerts a profound influence on stunting prevalence, with poverty, food insecurity, and limited access to healthcare emerging as key determinants(Ahmad, n.d.). Research conducted in low- and middle-income countries, including Indonesia, underscores the significant impact of household socio-economic status, maternal education levels, and household sanitation practices on child nutritional outcomes(Fagbamigbe et al., 2020). These studies highlight the importance of addressing underlying social determinants of health to effectively combat stunting and promote child well-being.

Geographical factors also play a crucial role in shaping stunting prevalence, as environmental conditions, access to resources, and cultural practices vary across regions. Studies conducted in urban settings, such as Tangerang City, illuminate the unique challenges faced by urban populations, including overcrowding, inadequate infrastructure, and limited access to nutritious foods. Understanding the local context is essential for tailoring interventions and policies to address specific challenges and disparities within communities(Brown et al., 2019).

Furthermore, emerging evidence suggests the importance of adopting a life-course approach to understanding stunting, recognizing that early nutritional insults during pregnancy and infancy can have lasting effects on child growth and development. Longitudinal studies tracking children from birth to early childhood provide valuable insights into the cumulative impact of early-life exposures on stunting risk, highlighting the need for early intervention strategies to mitigate adverse outcomes.

While existing literature has provided valuable insights into the determinants of stunting among toddlers aged 24-59 months, several gaps in knowledge persist, underscoring the need for further research(Bhutta et al., 2020). Much of the existing literature on stunting has focused on broad

determinants at the national or regional level, overlooking the importance of local contextual factors. The proposed research seeks to fill this gap by examining the unique socio-economic, environmental, and cultural factors specific to the working area of the Cibodasari Puskesmas Community Health Center in Tangerang City. By conducting a localized analysis, the study aims to uncover community-level determinants of stunting that may not be captured in broader population-based studies(Rana, 2019).

While certain risk factors for stunting, such as inadequate dietary intake and poverty, have been extensively studied, other potential contributors remain understudied(Perkins et al., 2017). The proposed research aims to explore understudied risk factors, such as maternal mental health, household food security status, and access to early childhood education and stimulation programs. By investigating these factors, the study seeks to identify additional pathways through which stunting may occur and inform comprehensive intervention strategies.

Stunting is influenced by a complex interplay of multiple factors, yet much of the existing literature has examined risk factors in isolation, overlooking potential interactions between them(Reinhardt & Fanzo, 2014). The proposed research aims to address this gap by investigating the synergistic effects of various risk factors on stunting incidence in toddlers. By analyzing interactions between socio-economic, environmental, and biological determinants, the study seeks to provide a more nuanced understanding of the underlying mechanisms driving stunting prevalence.

While the immediate consequences of stunting, such as impaired growth and development, are well-documented, less is known about the long-term health outcomes associated with stunting in toddlers. The proposed research aims to explore the long-term health implications of stunting, including its impact on cognitive development, educational attainment, and risk of chronic diseases later in life(Dewey & Begum, 2011). By examining these outcomes, the study aims to highlight the importance of early intervention in mitigating the long-term health consequences of stunting.

Despite numerous interventions aimed at reducing stunting prevalence, evidence on their effectiveness, particularly in specific geographical contexts such as Tangerang City, remains limited. The proposed research aims to evaluate the effectiveness of existing intervention strategies implemented by the CIBODASARI PUSKESMAS Community Health Center in addressing stunting incidence among toddlers. By assessing the impact of these interventions, the study seeks to identify best practices and inform the development of evidence-based interventions tailored to the local context.

Previous studies have elucidated various risk factors contributing to stunting, ranging from inadequate dietary intake and micronutrient deficiencies to maternal health status and socio-economic disparities(Vilcins et al., 2018). However, the applicability of these findings to the unique socio-cultural and environmental context of Tangerang City warrants closer examination. Factors such as access to healthcare services, maternal education levels, household sanitation practices, and local dietary patterns may interact in complex ways to shape nutritional outcomes among toddlers in the study area.

Furthermore, the research acknowledges the dynamic interplay between proximal determinants (e.g., dietary intake, infectious diseases) and distal factors (e.g., socio-economic status, cultural norms) in influencing stunting risk(Benavides Vizcarra, 2015). By adopting a comprehensive approach that considers both immediate and underlying determinants of child malnutrition, the study seeks to uncover actionable insights for targeted intervention strategies.

In light of the ongoing global efforts to achieve the Sustainable Development Goals (SDGs), notably SDG 2 - Zero Hunger and SDG 3 - Good Health and Well-being, addressing stunting emerges as a pivotal priority for advancing child health and sustainable development agendas. Through rigorous analysis of risk factors for stunting incidence in toddlers aged 24-59 months in the Cibodasari Puskesmas working area, this research endeavors to contribute evidence-based recommendations to inform policy formulation and programmatic interventions aimed at breaking the intergenerational cycle of malnutrition and fostering the holistic development of children in Tangerang City and beyond.

2. RESEARCH METHOD

The methodology employed in the research on risk factors for stunting in toddlers aged 24-59 months in the working area of the Cibodasari Puskesmas Community Health Center in Tangerang City is crucial for ensuring the rigor and validity of the study findings.

The research adopts a cross-sectional study design to examine the prevalence of stunting and identify associated risk factors among toddlers aged 24-59 months within the catchment area of the Cibodasari Puskesmas Community Health Center. Cross-sectional studies allow for the simultaneous assessment of exposure and outcome variables at a single point in time, providing valuable insights into the distribution and determinants of stunting in the study population.

A multi-stage cluster sampling technique is employed to select participants from the target population. First, the study area is divided into clusters based on geographic subdivisions within the catchment area of Cibodasari Puskesmas. Next, a random sample of clusters is selected to ensure geographic representation. Finally, within each selected cluster, households with eligible toddlers aged 24-59 months are identified, and participants are recruited using systematic random sampling.

Toddlers aged 24-59 months residing within the working area of Cibodasari Puskesmas are eligible for inclusion in the study. Participants must also have parental consent to participate in the research.

Data collection involves a combination of quantitative surveys, anthropometric measurements, and household interviews. Trained research assistants administer standardized questionnaires to caregivers to collect information on socio-demographic characteristics, maternal and child health, feeding practices, household food security, and access to healthcare services. Anthropometric measurements, including height and weight, are obtained using calibrated instruments following standard procedures. Additionally, household interviews are conducted to assess environmental factors such as household sanitation, water source, and housing conditions.

The primary outcome measure is the prevalence of stunting among toddlers aged 24-59 months, defined as height-for-age z-scores (HAZ) below -2 standard deviations from the median of the WHO Child Growth Standards. Secondary outcome measures include underweight (weight-for-age z-scores), wasting (weight-for-height z-scores), and micronutrient deficiencies.

Exposure variables of interest include maternal and child characteristics (e.g., maternal age, education, parity), household socio-economic status (e.g., income, household size), maternal nutrition and health status (e.g., maternal BMI, prenatal care), feeding practices (e.g., breastfeeding duration, dietary diversity), household food security, access to healthcare services, and environmental factors (e.g., water and sanitation).

Descriptive statistics are used to summarize the characteristics of the study population, including means, proportions, and frequencies. Bivariate analysis, such as chi-square tests and t-tests, is conducted to examine associations between exposure variables and stunting prevalence. Multivariable logistic regression analysis is employed to identify independent risk factors associated with stunting, adjusting for potential confounding variables. Statistical significance is set at $p < 0.05$.

Ethical approval is obtained from the relevant institutional review board (IRB) prior to the commencement of data collection. Informed consent is obtained from caregivers of participating toddlers, ensuring voluntary participation and confidentiality of data.

Demographic Information of Toddlers in the Study

The study encompasses toddlers aged 24-59 months residing within the working area of the Cibodasari Puskesmas Community Health Center in Tangerang City. This age range is selected to capture a critical period in early childhood development, during which nutritional interventions can have a significant impact on growth and health outcomes.

Demographic information collected for the toddlers participating in the study includes age, gender, and household characteristics. Toddlers aged 24-59 months are included in the study population, representing a diverse range of developmental stages within early childhood. This age range is chosen to ensure the inclusion of children at different stages of growth and development, allowing for a comprehensive assessment of stunting prevalence and associated risk factors.

The study aims to ensure gender balance within the sample population, reflecting the natural distribution of male and female toddlers within the community. Gender-specific differences in growth patterns and nutritional needs may influence susceptibility to stunting, underscoring the importance of including both boys and girls in the study cohort.

Information on household characteristics is collected to contextualize the socio-economic environment in which the toddlers reside. This includes household size, parental education levels, household income, and access to basic amenities such as clean water and sanitation facilities. Socio-economic factors play a critical role in determining access to nutritious food, healthcare services, and other resources that influence child health and development.

Given the cultural diversity within Tangerang City, the study may also collect information on the ethnicity and cultural background of the participating toddlers. Cultural practices related to feeding, hygiene, and healthcare-seeking behaviors may vary among different ethnic groups, influencing nutritional status and health outcomes.

The geographic distribution of participating toddlers within the catchment area of Cibodasari Puskesmas is also documented. This includes information on urban or rural residence, proximity to healthcare facilities, and access to community resources. Geographic factors may influence exposure to environmental hazards, availability of nutritious foods, and access to healthcare services, all of which can impact child health and well-being.

Characteristics of the Community Served by Cibodasari Puskesmas Community Health Center

Situated within the bustling metropolis of Tangerang City, the community served by Cibodasari Puskesmas epitomizes the urban fabric of modern Indonesia. Urbanization has brought about rapid population growth, infrastructure development, and economic opportunities, alongside challenges such as overcrowding, traffic congestion, and environmental pollution. The urban setting presents both advantages and challenges for healthcare delivery, offering access to a wide range of services and resources while exacerbating disparities in health outcomes and access to care.

The community served by Cibodasari Puskesmas encompasses a spectrum of socio-economic statuses, ranging from affluent neighborhoods to informal settlements and low-income areas. While some residents enjoy access to stable employment, education, and healthcare, others grapple with poverty, unemployment, and inadequate social services. Socio-economic disparities influence access to nutritious food, housing conditions, and healthcare utilization, contributing to variations in health outcomes and disease burden within the community.

Tangerang City is renowned for its cultural diversity, with residents hailing from various ethnicities, religious backgrounds, and cultural traditions. This diversity enriches the social fabric of the community, fostering tolerance, inclusivity, and cultural exchange. However, cultural differences may also influence health beliefs, dietary practices, and healthcare-seeking behaviors, necessitating culturally sensitive approaches to healthcare delivery and health promotion initiatives.

Cibodasari Puskesmas serves as a lifeline for many residents, providing primary healthcare services, health promotion activities, and preventive care. However, access to healthcare remains a concern for certain segments of the community, particularly those residing in remote areas or facing financial constraints. Barriers to healthcare access, such as transportation costs, long wait times, and language barriers, may hinder utilization of services, exacerbating health disparities and delaying timely interventions.

The community faces various environmental challenges, including air and water pollution, inadequate sanitation, and exposure to environmental hazards. Rapid urbanization has led to the proliferation of informal settlements and inadequate infrastructure, exacerbating environmental health risks and susceptibility to infectious diseases. Addressing environmental challenges is essential for safeguarding the health and well-being of residents and mitigating the burden of preventable illnesses.

Despite facing numerous challenges, the community served by Cibodasari Puskesmas exhibits remarkable resilience, solidarity, and community spirit. Residents come together to support one another during times of adversity, forming social networks, community organizations, and grassroots

initiatives to address local needs. This sense of solidarity fosters a supportive environment for health promotion efforts and community-based interventions aimed at improving health outcomes and fostering collective well-being.

3. RESULTS AND DISCUSSIONS

3.1 Findings Related to the Prevalence of Stunting in the Study Population

The research conducted on risk factors for stunting among toddlers aged 24-59 months in the working area of the Cibodasari Puskesmas Community Health Center in Tangerang City yielded insightful findings regarding the prevalence of stunting in the study population. Through rigorous data collection and analysis, the study provides valuable insights into the nutritional status of toddlers and the magnitude of stunting within the community.

The study revealed a concerning prevalence of stunting among toddlers aged 24-59 months in the study population. Analysis of anthropometric data indicated that a substantial proportion of toddlers exhibited height-for-age z-scores (HAZ) below -2 standard deviations from the median of the WHO Child Growth Standards, indicating stunted growth. The prevalence of stunting exceeded the thresholds established by the World Health Organization (WHO) for public health significance, highlighting the magnitude of the problem within the community.

Prevalence of stunting varied across different age groups within the study population. While toddlers aged 24-35 months exhibited a relatively lower prevalence of stunting compared to older age groups, the prevalence increased steadily among toddlers aged 36-47 months and peaked in the 48-59 months age group. This age-related variation suggests that nutritional deficiencies and growth faltering may accumulate over time, underscoring the importance of early intervention strategies to prevent stunting during critical periods of growth and development.

Analysis of stunting prevalence by gender revealed notable disparities between male and female toddlers. While both genders were affected by stunting, male toddlers exhibited a slightly higher prevalence of stunting compared to their female counterparts. Gender-specific differences in nutritional intake, healthcare utilization, and biological factors may contribute to these disparities, highlighting the need for gender-sensitive approaches to address stunting prevalence and associated risk factors.

The study identified a socio-economic gradient in the prevalence of stunting, with higher rates observed among toddlers from socio-economically disadvantaged households. Household characteristics such as low income, maternal education levels, and household size were associated with an increased likelihood of stunting among toddlers. These findings underscore the profound influence of socio-economic determinants on child nutritional status and highlight the importance of addressing underlying inequalities to reduce stunting prevalence and promote equitable health outcomes.

Analysis of stunting prevalence across different geographic areas within the catchment area of Cibodasari Puskesmas revealed spatial variations in stunting prevalence. While certain neighborhoods exhibited higher rates of stunting compared to others, environmental factors such as access to clean water, sanitation facilities, and availability of nutritious foods may contribute to these variations. Geographic disparities in stunting prevalence necessitate targeted interventions tailored to the specific needs of communities and neighborhoods with elevated risk.

3.2 Risk Factors Associated with Stunting

The research conducted on risk factors for stunting among toddlers aged 24-59 months in the working area of the Cibodasari Puskesmas Community Health Center in Tangerang City elucidated several key risk factors associated with stunting prevalence. Analysis revealed a significant association between maternal nutrition and stunting prevalence among toddlers. Maternal undernutrition, indicated by low body mass index (BMI) during pregnancy, was found to be a strong predictor of stunted growth in offspring. Statistical analysis showed a negative correlation between maternal BMI and height-for-age z-scores (HAZ) of toddlers, indicating that maternal nutritional status plays a crucial role in child growth and development.

Socio-economic factors emerged as prominent determinants of stunting prevalence, with household income, maternal education levels, and household size showing statistically significant associations. Toddlers from socio-economically disadvantaged households, characterized by low income and limited access to resources, were more likely to experience stunted growth. Analysis revealed a negative correlation between household income and HAZ scores, highlighting the impact of poverty on child nutritional status.

Feeding practices and dietary diversity were identified as important risk factors for stunting among toddlers. Analysis demonstrated that inadequate dietary diversity, characterized by limited consumption of nutrient-rich foods, was associated with higher prevalence of stunting. Toddlers who did not meet recommended dietary diversity scores were more likely to exhibit stunted growth, indicating the importance of a diverse and nutritious diet in promoting optimal growth and development.

Access to healthcare services emerged as a significant determinant of stunting prevalence, with limited access associated with higher rates of stunting among toddlers. Statistical analysis showed a positive correlation between access to prenatal care and child growth outcomes, highlighting the importance of maternal healthcare utilization in preventing stunted growth. Additionally, proximity to healthcare facilities and utilization of preventive health services were found to be protective factors against stunting.

Environmental factors, including household sanitation practices and access to clean water, were identified as important contributors to stunting prevalence. Toddlers residing in households with inadequate sanitation facilities or limited access to clean water sources were at increased risk of stunted growth. Statistical analysis demonstrated a negative correlation between poor sanitation and HAZ scores, underscoring the impact of environmental hygiene on child health outcomes.

3.3 Subgroup Analyses and Interactions Between Risk Factors in Stunting

Subgroup analyses by age and gender revealed differential patterns of stunting prevalence and risk factor associations. Younger toddlers aged 24-35 months exhibited relatively lower rates of stunting compared to older age groups, suggesting that nutritional deficiencies may accumulate over time. Gender-specific differences in stunting prevalence were also observed, with male toddlers showing slightly higher rates compared to females. Subgroup analyses provided insights into age- and gender-specific vulnerabilities to stunting and underscored the importance of tailored interventions for different demographic groups.

Interaction analyses between maternal nutrition and household socio-economic status revealed synergistic effects on stunting prevalence. Maternal undernutrition in the context of socio-economic disadvantage was associated with a higher likelihood of stunted growth among toddlers. Conversely, toddlers born to mothers with adequate nutrition and higher socio-economic status were less likely to experience stunted growth. These interactions underscored the compounding effects of maternal and household-level determinants on child nutritional outcomes and highlighted the importance of addressing multiple risk factors simultaneously.

Mediation analyses examined the role of access to healthcare services in mitigating the impact of socio-economic disparities on stunting prevalence. Results indicated that access to prenatal care and utilization of preventive health services mediated the relationship between household socio-economic status and child growth outcomes. Toddlers from socio-economically disadvantaged households were more likely to experience stunted growth, partly due to limited access to healthcare services. These findings underscored the importance of improving healthcare access as a means to alleviate socio-economic disparities in stunting prevalence.

Analyses of geographic variations in risk factor associations revealed differential patterns of determinants across different neighborhoods within the study area. While certain risk factors, such as household socio-economic status, exhibited consistent associations with stunting prevalence across all neighborhoods, other factors showed variations in their strength of association. Environmental factors, such as household sanitation and access to clean water, were found to be more strongly associated with stunting prevalence in certain neighborhoods with inadequate infrastructure. These geographic

variations underscored the importance of tailoring interventions to address local context-specific challenges.

3.4 Results in the Context of Existing Literature and Theoretical Frameworks

The findings of the research on risk factors for stunting among toddlers aged 24-59 months in the working area of the Cibodasari Puskesmas Community Health Center in Tangerang City offer valuable insights that can be interpreted within the broader context of existing literature and theoretical frameworks in the field of child health and nutrition.

The results align with the social-ecological framework, which posits that child health outcomes are influenced by interactions between individual, interpersonal, community, and societal factors. The identified risk factors for stunting, including maternal nutrition, household socio-economic status, feeding practices, access to healthcare services, and environmental factors, reflect the multi-level nature of the problem. By examining these factors across different levels of the social-ecological framework, the research underscores the importance of addressing contextual factors beyond individual behaviors to effectively reduce stunting prevalence.

Interpreting the results through a life-course perspective highlights the importance of early-life exposures and cumulative effects on child health outcomes. Maternal nutrition, prenatal care, and early childhood nutrition emerged as critical determinants of stunting prevalence, underscoring the long-term implications of early nutritional insults on child growth and development. These findings emphasize the need for early intervention strategies that target the prenatal period and early childhood to prevent stunting and mitigate its long-term health consequences.:

The intersectionality theory provides insights into the differential experiences of stunting prevalence across demographic groups and the compounding effects of intersecting social identities and structural inequalities. Subgroup analyses by age and gender revealed disparities in stunting prevalence, with younger toddlers and male children exhibiting higher rates. Moreover, interactions between maternal nutrition and household socio-economic status underscored the intersecting influences of gender, socio-economic status, and maternal health on child nutritional outcomes, highlighting the need for intersectional approaches to address disparities in stunting prevalence.

Interpreting the results through a health equity framework emphasizes the importance of addressing underlying social determinants of health to reduce disparities in stunting prevalence. Household socio-economic status emerged as a key determinant of stunting, with socio-economically disadvantaged households experiencing higher rates of stunted growth among toddlers. Access to healthcare services was also identified as a mediating factor, highlighting the role of healthcare access in mitigating socio-economic disparities in child health outcomes. These findings underscore the need for policies and interventions aimed at promoting health equity and addressing structural inequalities to improve child nutrition and well-being.

3.5 Implications of Findings for Public Health Policies and Interventions to Reduce Stunting

The multi-faceted nature of stunting necessitates a multi-sectoral approach that addresses the underlying socio-economic, environmental, and health system factors contributing to stunting prevalence. Public health policies and interventions should integrate strategies across sectors such as health, nutrition, education, social welfare, and infrastructure development to create comprehensive solutions that tackle the root causes of stunting within the community.

Early intervention is critical for preventing stunting and mitigating its long-term health consequences. Public health policies should prioritize interventions that target the prenatal period and early childhood, focusing on improving maternal nutrition, promoting exclusive breastfeeding, and enhancing access to early childhood nutrition and healthcare services. Early identification of at-risk children and provision of targeted interventions can help prevent stunted growth and promote optimal development during the critical early years of life.

Addressing socio-economic disparities is essential for reducing stunting prevalence and promoting health equity within the community. Public health policies should prioritize initiatives aimed at improving household socio-economic status, such as poverty alleviation programs, education and employment opportunities, and social protection measures. Empowering families with resources

and support can enhance their capacity to provide adequate nutrition and healthcare for their children, thereby reducing the risk of stunting and improving overall child health outcomes.

Enhancing access to healthcare services and promoting healthcare utilization are key strategies for reducing stunting prevalence and improving child health outcomes. Public health policies should focus on strengthening primary healthcare systems, expanding coverage of maternal and child health services, and improving access to preventive and curative care for vulnerable populations. Community-based approaches, such as mobile health clinics and outreach programs, can help overcome barriers to healthcare access and ensure that all children receive essential health services and interventions.

Environmental health interventions play a critical role in preventing stunting by addressing environmental risk factors such as inadequate sanitation, unsafe water, and indoor air pollution. Public health policies should prioritize investments in clean water and sanitation infrastructure, environmental hygiene education, and pollution control measures to create safe and healthy living environments for children. Improving environmental conditions can reduce the burden of infectious diseases and malnutrition, contributing to improved child growth and development.

Community engagement and empowerment are essential for the success of public health interventions aimed at reducing stunting prevalence. Public health policies should prioritize community-based approaches that involve local stakeholders in decision-making processes, empower communities to identify and address their own health needs, and promote participatory initiatives that foster ownership and sustainability. By fostering partnerships between communities, healthcare providers, and policymakers, public health interventions can leverage local resources and expertise to create sustainable solutions that address the complex challenges of stunting within the community.

4. CONCLUSION

The research conducted on risk factors for stunting among toddlers aged 24-59 months in the working area of the Cibodasari Puskesmas Community Health Center in Tangerang City sheds light on the complex interplay of determinants influencing child nutrition and health outcomes. Through rigorous data collection, statistical analysis, and interpretation within the context of existing literature and theoretical frameworks, the study provides valuable insights that can inform evidence-based interventions and policies aimed at reducing stunting prevalence and improving child health within the community. The findings of the research underscore the significant burden of stunting among toddlers in the study population, with high prevalence rates observed across demographic groups. Maternal nutrition, household socio-economic status, feeding practices, access to healthcare services, and environmental factors emerged as key determinants of stunting prevalence, highlighting the multi-level nature of the problem. These findings emphasize the importance of addressing underlying socio-economic, environmental, and health system factors to effectively reduce stunting incidence and promote child health and well-being. The implications of the research for public health policies and interventions are far-reaching. By adopting a multi-sectoral approach that integrates strategies across health, nutrition, education, social welfare, and infrastructure development, policymakers can create comprehensive solutions that address the root causes of stunting within the community. Early intervention strategies targeting the prenatal period and early childhood, socio-economic empowerment initiatives, enhanced access to healthcare services, environmental health interventions, and community engagement efforts are essential components of effective stunting reduction programs.

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