



## The Effect of Sanitation, Infectious Diseases, and Nutrition Information on Stunting Events in Children in Pariaman City

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**ABSTRACT:** Globally, about 151 million children under 5 years suffer from stunting. The stunting rate in Indonesia from 2014 to 2017 was an average of 28% to 29.6%. The prevalence of stunting based on Riskesdas data in 2013 in West Sumatra was 39.2% of all children under five. Five years later in 2018, the stunting rate in West Sumatra was recorded at 30.0% of all children under five. Based on weighing babies aged under five years old (toddlers) in 2018 in Pariaman City, obtained by allegations that as many as 806 infants in the form of inaction impaired growth (stunting). The high stunting rate is suspected to be due to various problems that require massive and comprehensive handling. Lack of sanitation and poor personal and environmental hygiene, related to the transmission of several infectious diseases, namely diarrhea, cholera, typhoid fever, and paratyphoid fever, dysentery, hookworm disease, ascariasis, hepatitis A and E, skin diseases, trachoma, schistosomiasis, cryptosporidiosis, malnutrition, and diseases associated with malnutrition. The purpose of this study was to determine the effect of sanitation, infectious diseases, and nutritional intake on the incidence of stunting in children under five in Pariaman City. This research method uses a descriptive technique, which describes how sanitation, infectious diseases, and nutritional intake affect public health, especially the impact of stunting on children under five. Growth failure in children under five can be caused by multiple factors, including an unhealthy environment, a history of infectious diseases, and micronutrient deficiencies. Various pollutions of water quality hurt children's health. One of the common pollutions in urban and rural environments is the use of pesticides in agricultural environments. In addition to inadequate intake of nutrients, a history of infectious diseases is one of the causes of stunting. The effect of infection on children's linear growth is obtained through a mechanism by first affecting the child's nutritional status which then affects the child's linear growth.

**Keywords:** sanitation, infectious diseases, nutritional intake, stunting incidence

## INTRODUCTION

The problem of stunting is one of the nutritional problems faced in the world, especially in poor and developing countries (Mitra, 2015; Aprihatin *et al*, 2021). This condition is measured by a length or height that is more than minus two standard deviations of the WHO child growth standard median (KEMENKES, 2016). Globally, about 151 million children under 5 years of age suffer from stunting (WHO, 2013). Children who suffer from stunting will be more susceptible to disease and as adults are at risk for degenerative diseases (Mitra, 2015; Aprihatin *et al*, 2021).

According to UNICEF data (2018), the stunting rate in Indonesia from 2014 to 2017 was an average of 28% to 29.6%. In 2018, 100 sub-districts in 34 provinces were designated as priority locations for stunting reduction. With this cross-sectoral collaboration, it is expected to reduce the stunting rate in Indonesia so that the target for the Sustainable Development Goals (SDGs) in 2025 is to reduce the stunting rate to 40%.

The prevalence of stunting based on Riskesdas data in 2013 in West Sumatra was 39.2% of all children under five. Five years later in 2018, the stunting rate in West Sumatra was recorded at 30.0% of all children under five. Based on weighing babies aged under five years old (toddlers) in 2018 in Pariaman City, obtained by allegations that as many as 806 infants in the form of inaction impaired growth (stunting) (Health Department, 2019).

The high stunting rate is thought to be due to various problems that require massive and comprehensive handling. Lack of sanitation and poor personal and environmental hygiene, related to the transmission of several infectious diseases, namely diarrhea, cholera, typhoid fever, and paratyphoid fever, dysentery, hookworm disease, ascariasis, hepatitis A and E, skin diseases, trachoma, schistosomiasis, cryptosporidiosis, malnutrition, and diseases related to malnutrition.

Children who have infectious diseases can cause them not feel hungry and not want to eat (Tambuwun *et al*, 2015). This disease also consumes a number of proteins and calories that should be used for growth. Children who have infectious diseases will cause a decrease in the body's ability to absorb substances needed by the body for repairing damaged tissues, forming new cells, and inadequate energy sources (Mara *et al*, 2010; Cruz *et al*, 2017; Aprihatin and Imral, 2021).

Growth delay is also a manifestation of the lack of fulfillment of nutritional intake at the time of child development (Checkley *et al*, 2003; Aprihatin *et al*, 2020). This does not only occur during the child's growth period but also must be ordered from the distribution of the food chain in children from the starting point of food intake to their growth. There is a difference in the proportion between the two, toddlers who have low birth weight have a risk of becoming stunted by 1.7 times compared to toddlers who have normal birth weight (El Taguri *et al*, 2009).

## METHODS

This research method uses a descriptive technique, which describes how sanitation, infectious diseases, and nutritional intake affect public health, especially the impact of stunting on children under five in Pariaman City - Indonesia.

## RESULTS AND DISCUSSION

Currently, Pariaman City is still experiencing stagnation of the stunted problem, its prevalence has not shown a decline for a decade. This problem is also a problem that is almost found in all provinces in Indonesia. The impact of stunted has broad dimensions from an individual, family, and intergenerational perspectives. For the development of the country, stunting which causes the quality

of human resources to decline can be a burden on the country's economy because of the large cost of treatment. So far the Stunted problem has not been resolved. Based on data from the Health Profile of Pariaman City in 2016 shows that the prevalence of stunted children under five in Pariaman City is 12.6%. This has increased from 2015 by 0.3%. Judging from the 8 health centers in Pariaman city, the prevalence of stunted children under five from the highest to the lowest is Marunggi Public Health Center 17.4%, Padusunan Public Health Center 16.1%, Kurai Taji Health Center 12%, Attitude Health Center 11.6%, Santok Health Center 10%, Naras Health Center 9%, and the lowest is Pariaman Health Center 7.6%

Growth failure in children under five can be caused by multiple factors, including an unhealthy environment, a history of infectious diseases, and micronutrient deficiencies. Various pollutions of water quality hurt children's health. One common pollution in urban and rural environments is the use of pesticides in agricultural environments (Cruz *et al*, 2013; Aprihatin, 2020). Pesticides are made with a specific purpose to cause harm (to insects, rats, and other pests), pesticides have the potential to cause serious damage to the developing fetus, if introduced into the fetal environment (Mitra, 2015). Studies have shown that pesticides, especially fungicides, appear in the analysis of the umbilical cord blood of infants, proving that the toxins are indeed transferred into the baby's (Mara *et al*, 2010; Cruz *et al*, 2017; El Taguri *et al*, 2009). Overall, the two pesticides most frequently detected in cord blood were dietary Dyltoluamide (DEET) and vinclozolin (fungicide). Although pesticide toxicity is not as frequent as some other methods of environmental toxicity, such as air pollution, contamination can occur at any time from simply engaging in daily activities such as walking down a pathway near a contaminated area or eating food that has not been washed properly (Mara *et al*, 2010).

Residential waste contains domestic waste in the form of organic waste and inorganic waste as well as detergents. Organic waste is waste that can be decomposed or decomposed by bacteria, for example, the rest of vegetables, fruits, and leaves. This inorganic waste cannot be decomposed by bacteria (non-biodegradable) for example paper, plastic, glass or glass, cloth, wood, metal, rubber, and leather. In addition to organic and inorganic waste, detergent is a residential waste that has the most potential to contaminate water. Almost all households use detergent at this time. fruit systematic review of the effects of neurological development from exposure to prenatal and postnatal organophosphate pesticides was conducted in 2014. The review found that "Most studies evaluating prenatal exposure observed negative effects on mental development and increased attention problems in children of preschool and school (El Taguri *et al*, 2009).

In 2017, a research looked at the possible effects of agricultural pesticides on more than 500,000 births in a mostly agricultural area of California and compared their findings with those of births in a less agriculturally dominated area of California. Overall, they found that pesticide exposure increased adverse birth outcomes by 5-9%, but only among mothers exposed to the highest amounts of pesticides. Babies born with high exposure to pesticides are at high risk for their body's development, besides the content of toxic chemicals at a young age makes chemicals cause damage to the body.

Another environmental pollution caused by people's bad habits is air quality pollution caused by smoking behavior. Smoking behavior in parents is estimated to affect stunting children in two ways. The first is through cigarette smoke of smoking parents which has a direct effect on children's growth and development. Cigarette smoke interferes with the absorption of nutrients in children, which in turn will interfere with their growth and development. The second effect of smoking behavior, in terms of the cost of shopping for cigarettes, makes parents reduce the "ratio" of spending on nutritious food, health costs, education, and so on. A research proves the effect of cigarette consumption on poverty and stunting in Indonesia.

This research using longitudinal datasets (1997 – 2014) from the Indonesian Family Life Survey (IFLS) proves that smoking behavior has an impact on the stunting condition of their children as indicated by height and weight. In this research, it is shown that cigarette consumption of around 3.6%

in 1997 has increased by 5.6% in 2014, while other consumption has decreased significantly during 1997-2014. This means that an increase in cigarette consumption of about two percent has been replaced by a decrease in spending on rice, protein, and fat sources, as well as education. Household spending on meat and fish decreased by about 2.3 percent during 1997 – 2014. Yet, as many studies have shown, this type of expenditure will greatly affect children's future development in terms of weight, height, and cognitive abilities (Tambuwun *et al*, 2015).

Malnutrition and stunting cases in Pariaman City were reported to have 12.03% or 806 children under five experiencing malnutrition and stunting symptoms. It is estimated that from four sub-sub-districts in Padang Pariaman City, malnutrition cases were found, namely in East Pariaman Sub-districts as many as 117 toddlers (1.78%), Central Pariaman as many as 415 toddlers (6.33%), South Pariaman as many as 95 toddlers (1.45%), and North Pariaman as many as 179 children under five (2.73%). Low energy intake over a long period will be reflected in stunted growth in height in infants and children who are not following increasing age (Mitra, 2015; Armaita *et al*, 2020). Children under five who lack protein consumption have 10.26 times the odds of experiencing stunting compared to children under five who consume sufficient protein. Kids toddlers who lack the protein intake of 3.46 times at risk of becoming child stunting compared to children whose protein intake is sufficient (Chard *et al*, 2018). More protein intake and more variety of food consumed per day in the normal group of children under five in this research are one of the factors that cause children to have a good growth rate according to their age.

In addition to inadequate intake of nutrients, a history of infectious diseases is one of the causes of stunting. This research showed that toddlers who have a history of infectious diseases have the best odds of 6.61 times to experience stunting compared to children under five years who had no history of infectious diseases (Checkly, 2003). Similar results were obtained from studies Picauly and Toy (2013) which show that children who have a history of infectious diseases will be followed by an increased incidence of stunting by 2,332 times (Italia, 2016). In the last three months, children in the stunting group had more history of infectious diseases than children under five in the normal group. The frequency of children under five experiencing infectious diseases for a long time not only affects their body weight but also has an impact on linear growth. Infections also contribute to deficiencies in energy, protein, and other nutrients due to decreased appetite so that food intake is reduced (Tambuwun *et al*, 2015).

The effect of infection on children's linear growth is obtained through a mechanism by first affecting the child's nutritional status which then affects the child's linear growth. Infection can reduce food intake, interfere with nutrient absorption, cause direct loss of nutrients, increase metabolic needs or decrease catabolic processes of nutrients so that it will affect consumption patterns which in turn will affect the nutritional status of toddlers. If this condition lasts for a long time, it will affect the child's linear growth.

## CONCLUSIONS

Stunting cases in Pariaman City were reported to have 12.03% or 806 children under five experiencing malnutrition and stunting symptoms. It is estimated that from four sub-sub-districts in Padang Pariaman City, malnutrition cases were found, namely in East Pariaman Sub-districts as many as 117 toddlers (1.78%), Central Pariaman as many as 415 toddlers (6.33%), South Pariaman as many as 95 toddlers (1.45%), and North Pariaman as many as 179 children under five (2.73%). Growth failure in children under five can be caused by multiple factors, including an unhealthy environment, a history of infectious diseases, and micronutrient deficiencies. Various pollutions of water quality hurt children's health. One of the common pollutions in urban and rural environments is the use of pesticides in agricultural environments. In addition to insufficient intake of nutrients, a history of infectious diseases is one of the causes of stunting. The effect of infection on children's linear growth is obtained

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