The Undernutrition Prevalence of Under-Two-Years Infant in Indonesia: Do breastfeeding Practices Ecologically Matter?

Fandaruzzahra Putri Perdani[1], Agung Dwi Laksono[2], Djazuly Chalidyanto[2], Fandaruzzahra Putri Perdani[3]

[1]Post Graduate Student of Department of Health Policy and Administration, Faculty of Public Health, Universitas Airlangga, Surabaya, Indonesia, [2]Researcher, Ministry of Health of the Republic of Indonesia, Jakarta, Indonesia, [3]Lecturer of Department of Health Policy and Administration, Faculty of Public Health, Universitas Airlangga, Surabaya, Indonesia

Abstract

Undernutrition due to inappropriate feeding practices for children increases morbidity. Breastfeeding is considered the most important in a baby's growth and development. Breastfeeding started within one hour of birth and was maintained exclusively for the first six months until one year of age or more to obtain optimal benefits. The study aims to determine the ecological relationship between undernutrition in 2-year-old infant and breastfeeding practice in Indonesia. This study is based on environmental analysis using a report of the 2018 Indonesia Basic Health Survey. The dependent variable was the prevalence of undernutrition in 2-year-old infant. Besides, the independent variables were four optimum breastfeeding practices. The analysis used bivariate analysis with scatter plot in statistic application. The study results show . The higher the proportion of early initiation of breastfeeding in a province, the lower the levels of undernutrition in children aged two years in that province. The higher the ratio of starting to breastfeed less than one hour in an area, the lower the undernutrition levels in children aged two years in that area. On the other side, the higher the proportion of the mother giving all colostrum in a province, the lower the undernutrition levels in children aged two years in Indonesia in that province. The higher the proportion of still being breastfed 0-23 months in a region, the lower the undernutrition levels in children aged two years in that region. The study concluded that optimal breastfeeding practices negatively affect the levels of undernutrition in children aged two years.

Keywords: *Undernutrition, breastfeeding, early initiation of breastfeeding, exclusive breastfeeding*

Background

Malnutrition during the developmental period can increase the risk of morbidity and mortality. On the other side, the first 1000 days are critical for growth and development throughout the child's life. Meanwhile, undernutrition due to inappropriate feeding practices for newborns and children can increase morbidity[1].

Moreover, children with malnutrition are the trigger of the death of 10.5 million children each year worldwide. Malnutrition is associated with the end of 35% of children. The percentage of stunting is 32% of children less than five years old in developing countries, and 10% of them suffer from malnutrition. Suboptimal breastfeeding, especially non-exclusive breastfeeding in the first six months, causes 1.4 million deaths and causes a 10% disease burden in children aged <5 years[2]. Based on the Indonesian Demographic and Health Survey, the infant and under-five children's mortality rate in Indonesia in Infant Mortality Rate is 35 babies per 1000 births; if the breakdown, 157,000 babies die per year 430 babies per day. Meanwhile, every year, the under-five children mortality rate is 46 out of 1000[3].

We considered breastfeeding to be one of the most critical factors for a baby's growth and development. Breastfeeding offers tremendous health benefits for both the child and the mother. The American Academy of Pediatrics recommends exclusive six months of breastfeeding, followed by introducing supplementary

foods for up to 1 year of age or more as long as the mother and baby want it[4]. One of the programs for accelerating infant mortality reduction in the Early Initiation of Breastfeeding and exclusive breastfeeding[5,6]. Breastfeeding must be started within one hour of the baby's birth and must be maintained exclusively for the first six months of the baby's life to obtain optimal benefits. Exclusive breastfeeding means that a newborn is mother fed the baby only breast milk, and no other fluids (even water) or solids are given, except for oral rehydration salts, vitamins, mineral supplements, or medicines[2,7]. The World Health Organization (WHO) recommends that capable mothers practice and maintain exclusive breastfeeding for the first six months of their baby's life[8].

Inadequate breastfeeding practices can interfere with the health and development of children and mothers[9,10]. Breastfed babies have fewer cases of diarrhea, respiratory infections, ear infections, and other acute illnesses. While these benefits are more excellent in developing countries, they are also crucial in industrialized countries. Inadequate breastfeeding practice caused nearly half of diarrhea episodes and one-third of respiratory infections. During the first six months of life in America, breastfeeding saves almost 1,000 lives and the US $ 13 billion in excess health care costs associated with not breastfeeding[4]. More prolonged breastfeeding was associated with a 13% reduction in the chance of being overweight and obesity prevalence and a 35% reduction in the incidence of type 2 diabetes. We can prevent an estimated 20,000 maternal deaths from breast cancer each year by increasing breastfeeding rates[10].

According to the recommendations, the fulfill optimal exclusive breastfeeding, including breastfeeding until the age of more than two years, start breastfeeding in the first 1 hour, the length of Early Initiation of Breastfeeding and the provision of colostrum are all factors for the success of breastfeeding. This study aims to determine the ecological relationship between undernutrition in two-year-old infant and breastfeeding behavior in Indonesia. This research, hopefully, can be implemented as a consideration for policymakers in promoting the importance of exclusive breastfeeding according to the recommendations.

Methods

The thesis was planned by the author using an ecological research approach. Ecological experiments compare populations rather than entities. The data studied is composite data at a given community or level, particularly the provincial level. Aggregate quantities, environmental measurements, or global measurements may all be used as ecological research variables[11,12].

The study used secondary data from the 2018 Indonesia Basic Health Survey national report. The Ministry of Health of the Republic of Indonesia published the survey report openly, and we can access it on the ministry's website[13]. There are data from 34 provinces throughout Indonesia. The survey carried out measurements on 33,376 children aged two years spread across 34 provinces from Sumatra to Papua. The dependent variable measured was "prevalence of malnutrition and deficiency status." The nutritional status used is the number of malnutrition and deficiency status in children aged two years. The independent variables measured were the fulfillment of exclusive breastfeeding according to recommendations, namely breastfeeding until the age of more than two years, the time to start breastfeeding in the first 1 hour, the duration of Early Breastfeeding Initiation, and colostrum administration.

The study carries out bivariate analysis using a scatter plot. The review uses the linear fit line to determine the relationship between undernutrition in two-year-old infant and the independent variable. The entire analysis process utilizes SPSS 21 software.

Result and Discussion

The study found that the four factors of breastfeeding behavior negatively relationship with the undernutrition prevalence of two-year-old infants based on the scatter plot. The higher the proportion of early breastfeeding initiation in a province, the lower the undernutrition levels in children aged two years in that province.

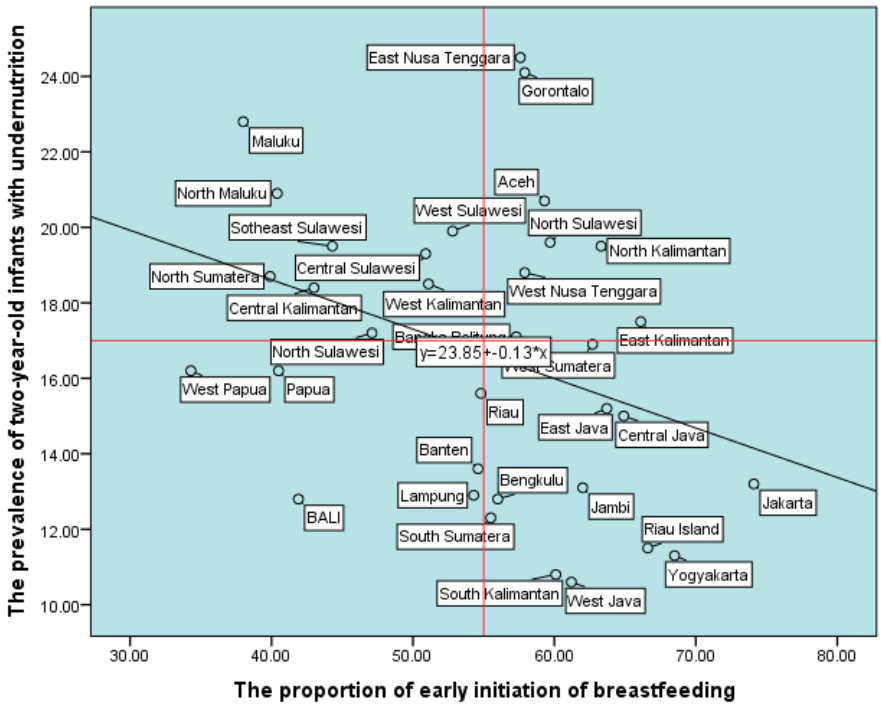

Figure 1. The scatter plot diagram of the undernutrition prevalence of two-year-old infants and the proportion of early initiation of breastfeeding in Indonesia in 2018

The higher the proportion of starting to breastfeed less than one hour in an area, the lower the undernutrition levels in children aged two years in that area. Meanwhile, the higher the proportion of the mother giving all colostrum in a province, the lower the undernutrition levels in children aged two years in Indonesia in that province. Moreover, the higher the proportion of still being breastfed 0-23 months in a region, the lower the undernutrition levels in children aged two years.

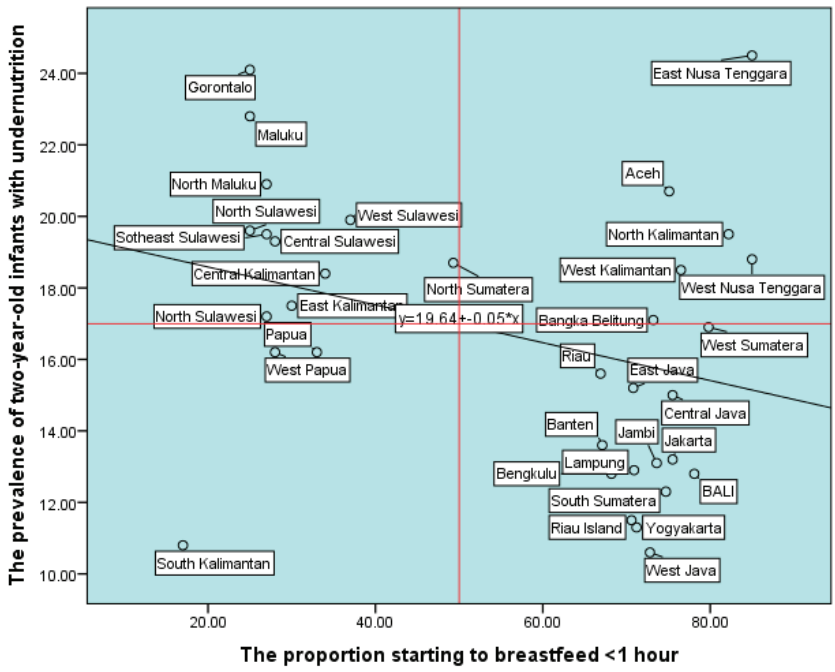

Figure 2. The scatter plot diagram of the undernutrition prevalence of two-year-old infants and the proportion starting to breastfeed <1 hour in Indonesia in 2018

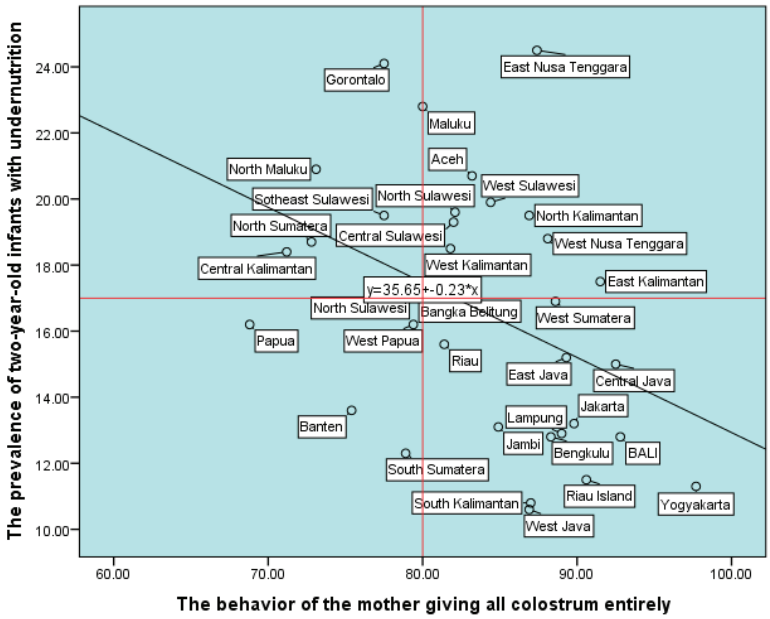

Figure 3. The scatter plot diagram of the undernutrition prevalence of two-year-old infants and the behavior of the mother giving all colostrum in Indonesia in 2018

These results are consistent with all measured factors for optimal breastfeeding behavior. Breastfeeding helps protect babies from acute and chronic illnesses. Babies who are not breastfed have 6-10 times the risk of dying than babies who are breastfed[14]. Babies who are given foods other than breast milk are at risk of developing diarrhea and pneumonia[5]. Diarrhea is common in infants given artificial food even with high hygiene levels, such as in Belarus and Scotland15. Growth and development from birth to the first two years are critical for optimizing growth and development. Nutritional deficiencies at 0-2 years can lead to stunting, so this is a crucial period for implementing strategies to reduce the risk of undernutrition[15].

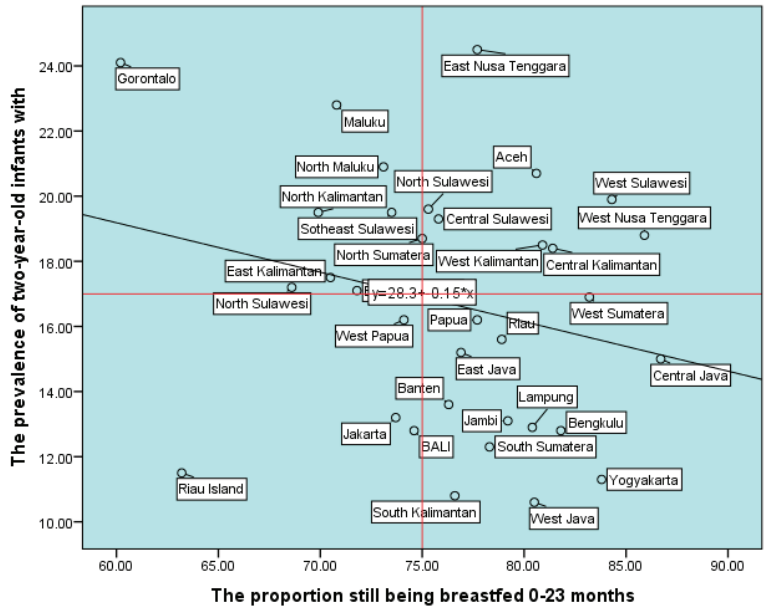

Figure 4. The scatter plot diagram of the undernutrition prevalence of two-year-old infants and the proportion still being breastfed 0-23 months in Indonesia in 2018

Based on data analysis, East Nusa Tenggara has the highest percentage of infants aged two years undernutrition of the total population (24.5%) but has breastfeeding behavior above the national average except for the early initiation of breastfeeding variable. Meanwhile, West Java is a province with the lowest percentage of two-year-old babies with malnutrition and malnutrition of the region's total population (10.6%) having breastfeeding behavior above the national average. Gorontalo, Maluku, and North Maluku are provinces with a higher prevalence of undernutition infants than the national average (16.6%). As well as lower breastfeeding behavior than the national average, including early initiation of breastfeeding (54.8%), percentage breastfed <1 hour (29.0%), giving colostrum entirely (83.5%) and the proportion was still breastfed 0-23 months (76.50%). The highest percentage of early breastfeeding initiation was in Jakarta (74.1%), and the lowest was in West Papua (34.3%)[3].

Based on the scatter plot diagram, the higher the early initiation of breastfeeding practice, the lower the number of undernutrition in a province. According to WHO, early initiation of breastfeeding (EIBF) defines as an initiation of breastfeeding in the first 1 hour after delivery. Early initiation of breastfeeding has the benefit of preventing infection, lowering the risk of diarrhea, and increasing survival rates in children[2]. In mothers who underwent EIBF, neonatal mortality decreased by 33%. Although WHO has recommended every mother to perform EIBF, the practice of EIBF is still low, especially in developing countries[16]. The study found that the average EIBF practice in 34 provinces was 54.8%. The results are consistent with research on EIBF practices in Ethiopia, where EIBF practices in the districts of Amibara, Dale Woreda, Gurage zone, and Debre Birhan are 39.6%, 83.7%, 47.3%, and 62.9%, respectively[17].

Meanwhile, the lowest percentage of breastfed <1 hour was West Nusa Tenggara (38.5%) and the highest was the rate of breastfeeding in the first hour in North Sumatra (17.4%). The practice of breastfeeding in the first 1 hour is essential for the initiation and continuation of breastfeeding and to increase the emotional bond between mother and baby[2]. In initiating early breastfeeding, the mother's skin-to-baby skin contact begins immediately after delivery or at least 1.5 hours and should last as long as possible or at least 1 hour without interruption[18]. Early connection is essential for mother and baby. Early contact stimulates the flow of oxytocin, helps release oxytocin, reduces the risk of bleeding, and facilitates emotional bonding between mother and baby. The neonatal mortality rate increased by 33% in infants whose EBF was longer than 1 hour. The Zimbabwean study showed a risk of sepsis in the first one week of infants who delayed breastfeeding[17].

Giving colostrum entirely mostly done in Yogyakarta province (97.7%), while the lowest was in Papua province (68.8%). Colostrum is the first milk that is very important for newborns to prevent infection. Mother breast produced colostrum in small amounts, namely 40-50 ml in the first days, and all babies are needed. Colostrum is rich in white blood cells and antibodies, especially sIgA, and contains high amounts of protein, minerals, and water-soluble vitamins (A, E, and K) than breast milk[18]. Colostrum can prevent infectious diseases from bacteria, viruses, fungi, and protozoa. The study found that colostrum administration can reduce the risk of malnutrition and malnutrition in children aged two years. Based on other tasks, children who do not get colostrum can be at risk of infection, stunting, and undernutrition[19].

For more than two years, the duration of breastfeeding was mainly in the province of Central Java (86.7%), while the lowest was in Gorontalo province (60.2%). Breastfeeding should be continued until two years of age or older, upon request, as often as possible for as long as the child requests. Breast milk meets half or more of the energy needs of children aged 6-12 months and one-third of energy and high-quality nutrition for children aged 12-24 months[14]. Breast milk provides a critical energy and nutrition source when a child is sick and reduces the risk of mortality in malnourished children. Breastfeeding also reduces acute and chronic illnesses[20]. In children who have received complimentary foods

where breastfeeding is reduced, breastfeeding is given actively to meet breast milk needs in children[19].

The nutrients can explain the nutrition and development of children in breast milk. Breast milk ensures optimal bone development, thereby preventing stunting. Oleic acid in breast milk can increase the absorption of fat and calcium. Meanwhile, breast milk consumption can improve the quality of nutrients and micronutrients in children, but not the energy needs of children[21]. Apart from breastfeeding, several other factors influence the nutritional status of children. The success of breastfeeding optimal is affected by a pregnancy, namely the provision of good nutrition during pregnancy, preparation for breastfeeding, and the support of health workers and families to accompany during the optimal breastfeeding process[16].

Conclusion

The study concluded that optimal breastfeeding practices negatively relationship the undernutrition levels of children aged two years. The research shows the higher the optimal breastfeeding practices, the lower the undernutrition levels of children aged two-years-old.

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Ethical Clearance: The study was conducted by utilizing secondary data from published reports. For this reason, the study's unrequired ethical clearance in the implementation of this study.

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