



RESEARCH ARTICLE

The Correlation of Exclusive and Non-Exclusive Asi on Stunting In The Context of State Defense: Initial Research on PCBM In Bogor District

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ABSTRACT

In the national defence system, the future projection is for the future of the young generation to have physical resistance to disease to avoid the problem of stunting, which starts from the pregnancy period from pregnant women to children aged 2 years. Stunting is the most common symptom of chronic malnutrition and is measured as height or body length according to age. Malnutrition during the 1000 FDB affects mortality and morbidity and is related to children's overall health from adolescence to adulthood and intellectual performance. This research was carried out as preliminary research to provide a descriptive picture of the pattern of stunting incidents regarding exclusive breastfeeding and non-exclusive breastfeeding in Bogor Regency, Indonesia. This research was conducted by collecting secondary data at the Bogor district health office. Secondary data taken are stunting data, exclusive breastfeeding data, and non-exclusive breastfeeding data. The data was processed and analyzed statistically using Spearman's rho test. The correlation between exclusive and non-exclusive breastfeeding and the incidence of stunting was found to show no relationship. Hence, neither of them showed a cause for stunting. Nutritional patterns can cause other factors during pregnancy and toddlers' growth and development, such as stunting prevalence. Exclusive and non-exclusive breastfeeding show no relationship to the incidence of stunting; other factors, especially nutritional intake factors, can increase the incidence of stunting.

INTRODUCTION

In the national defence system, the future projection is for the future of the young generation at this time to have physical resistance to disease to avoid the problem of stunting, which starts from the pregnancy period from pregnant women to children aged 2 years. Stunting is the most common symptom of chronic malnutrition and is measured as height or body length for age. Other symptoms can include cognitive disabilities, decreased motor skills, and impaired immune function (Soliman *et al.*, 2021)

Malnutrition during the 1000 first day of birth (FDB) affects mortality and morbidity and is related to children's overall health from adolescence to adulthood and intellectual performance (Aramico, Huriyati and Dewi, 2020). Children around the world aged less than 5 years suffer from malnutrition, such as stunting, wasting, and obesity. Malnutrition in children can be avoided by providing appropriate nutrition (Govender *et al.*, 2021).

The fundamental factor in human growth and development is nutrition, which occurs at the beginning of life (Norgan, Bogin and Cameron, 2012). A very important aspect is nutrition, which occurs in the first 1000 days of life. Proper nutrition for 1000 FDB can build the foundation for a

child's ability to grow, learn, and develop. The quantity and quality of food in infants and children plays a role in tissue and organ differentiation and has short and long-term health effects (Likhar and Patil, 2022). Proper nutritional intake can support rapid physical growth and brain development (Suha, 2020).

Providing Infant and Child Feeding (IYCF) by carrying out Early Breastfeeding Initiation (EBI) after the baby is born for a minimum of 1 hour exclusively until the baby is 6 months old and also providing complementary breast milk (PCBM) starting from the baby from the age of 6 months to 24 months and along with providing breast milk until a child is 24 months old is one of the most appropriate strategies for treating stunting (Muleka *et al.*, 2023).

A gradual decrease occurs in the nutritional content of exclusive breast milk (Dror and Allen, 2018). The protein content in breast milk at the beginning of the breastfeeding period is around 1.4-1.6 g / 100 mL; then there is a decrease during the three to four months of breastfeeding to 0.8-1.0 g / 100 mL, then during the six months of breastfeeding, there is another decrease in protein levels of around 0.7-0.8 g / 100 mL (Shah and Alhawaj, 2019). The baby's need for nutrition during the growth and development process will continue to increase as the baby ages. Fulfillment of the baby's large macronutrient and micronutrient needs means that exclusive breastfeeding is insufficient (Dror and Allen, 2018).

When the baby's nutritional needs are not met, other foods and drinks are needed simultaneously with breast milk (Martin, Ling and Blackburn, 2016). Principles of providing PCBM on time, quantity, frequency, consistency, variety, responsiveness, and hygiene (Nirmala, Februhartanty and Wiradnyani, 2016). Providing inadequate complementary foods will cause stunting (Wangiyana *et al.*, 2021).

Giving PCBM for less than 6 months has an impact on the baby's digestive system disorders such as diarrhoea, difficulty defecating, vomiting, lowering immunity, excess weight gain, and allergies to certain nutrients. Giving PCBM beyond the age of 6 months can result in deficiencies of Vitamin A, Vitamin K, iron, and other micronutrients (Lockyer, McCann and Moore, 2021).

6-month-old babies start to be given PCBM (Mehlawat, Puri and Rekhi, 2020). The majority of infants need additional nutrients from PCBM at 6 months of age. Baby's readiness in terms of digestive system, nervous development, baby's nutritional needs (Maheni, Abdiana and Rafika Oktova, 2021) (Suwardianto, 2021) (Ekawidnyani *et al.*, 2022).

PCBM requirements are calculated as the difference between the nutrients in breast milk and the estimated total requirements (Ekawidnyani *et al.*, 2022). The total nutritional requirements used are the recommended Nutritional Adequacy Rates. The Pediatrician Professional Association also recommends dietary needs for children (Pradanie, Rachmawati and Cahyani, 2020).

Providing inappropriate PCBM and poor quantity and quality of PCBM can increase the incidence of infection, thereby becoming a risk factor for stunting (Pradanie, Rachmawati and Cahyani, 2020). The practice of providing PCBM in Indonesia is not optimal and varies between locations, socio-economic conditions, and ages (Flaherman *et al.*, 2018). PCBM can prevent malnutrition in children, including stunting, wasting, micronutrient deficiencies, overweight, and non-communicable diseases related to diet (Abi Khalil, Hawi and Hoteit, 2022) (Feng *et al.*, 2022).

This research was conducted as preliminary research to provide a descriptive picture of the pattern of stunting incidents associated with the relationship between exclusive breastfeeding and non-exclusive breastfeeding in Bogor Regency, Indonesia.

METHODS

This research was carried out by collecting secondary data at the Bogor district health office. Secondary data collection includes data about stunting, exclusive breastfeeding, and non-exclusive breastfeeding. The data was processed and analyzed statistically using the Spearman's rho test.

RESULT

Based on Figure. 1, the total number of stunted babies in Bogor Regency in 2022 is 18,666, resulting from 40 sub-districts.

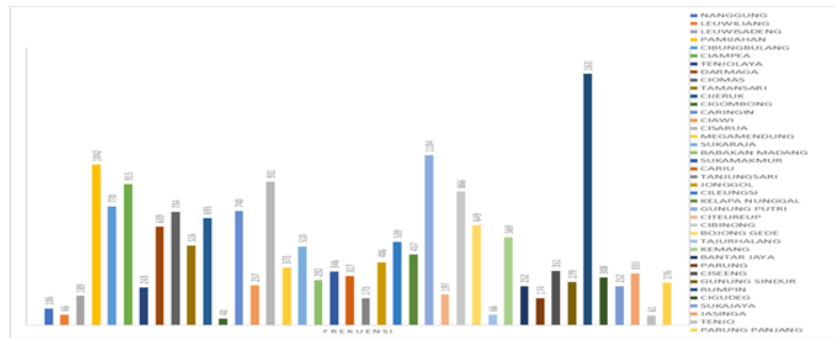


Figure.1 Graph of stunting distribution in Bogor Regency in 2022

Based on Figure_2, the total number of stunted babies in Bogor Regency in 2022 was 18,666, with the total number of non-exclusive breast milk babies being 108,215 in all community health centres in Bogor Regency in 2022.



Figure.2 Frequency graph of projected 6-month-old babies in Bogor Regency in 2022

Based on Figure 3, the total number of stunted babies in Bogor Regency in 2022 was 18,666, and all community health centres in Bogor Regency 2022 had stunted babies.

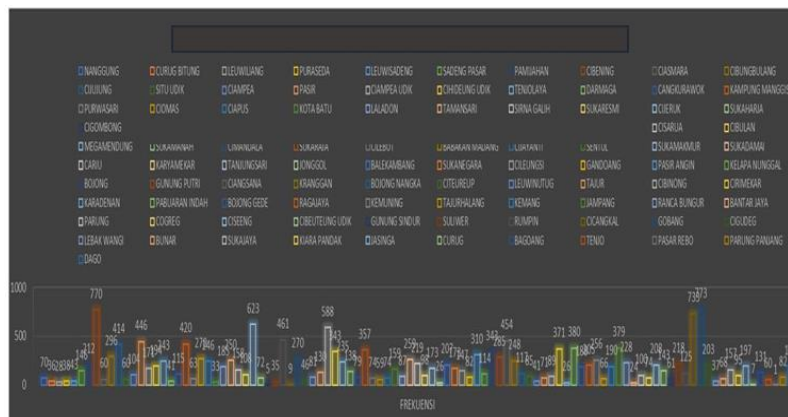


Figure.3 Graph of stunting frequency based on distribution in community health centers in Bogor

Based on Figure. 4, the total number of stunted babies in Bogor Regency in 2022 is 18,666. The following the highest number of stunted babies, namely Gobang Health Center shows the highest number of 773 stunted babies, followed by the second place being Cibineng Health Center, with 770 stunting babies, followed by the third place, namely Cicangkal Health Center, with a total of 733 stunting babies, while in fourth place is the Cijeruk Health Center, with 623 stunted babies. The fifth highest is the Cisarua Health Center, with 588 stunted babies.

Based on Figure.7, the total number of stunted babies in Bogor Regency in 2022 is 18,666 stunted babies with the total number of exclusively breastfed babies being 79,435 babies. The above shows that there are 5 public health centres with the number of exclusively breastfed babies, namely the Cileungsi Health Center showing the highest number at 2559 babies, followed by the second highest at the Tajur Halang Health Center with a total of 2404 babies, followed by the third highest, namely the Jonggol health centre with several 1990 babies, while the fourth highest in the Gunung Putri Health Center, with several 1884 babies, and the fifth highest in the Parung Panjang Health Center, with a total of 1694 babies.

Based on Figure.8, from the total number of stunted babies in Bogor Regency in 2022, there are 18,666 stunted babies, with the total number of babies with exclusive breast milk being 79,435 babies. The above shows 5 groups of health centres with the lowest number of babies with exclusive breast milk, namely the Tenjo Community Health Center, which shows the lowest number. amounting to 110 babies, followed by the second least number of Karya Mekar health centres with a number 116 babies, followed by the third place with the fewest, namely the Sukaharja health centre with some 128 babies, while the fourth place with fewest is the Suka Negara health centre with many 149 babies and the fifth place the least was the Cangku Rawok health centre with a total of 172 babies.

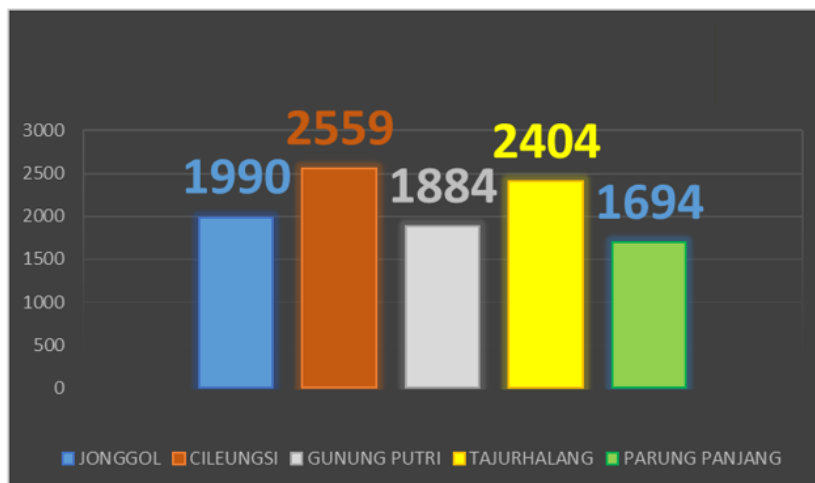


Figure.7 Graph of five health centres on the number of babies the highest exclusive breastfeeding in Bogor Regency in 2022

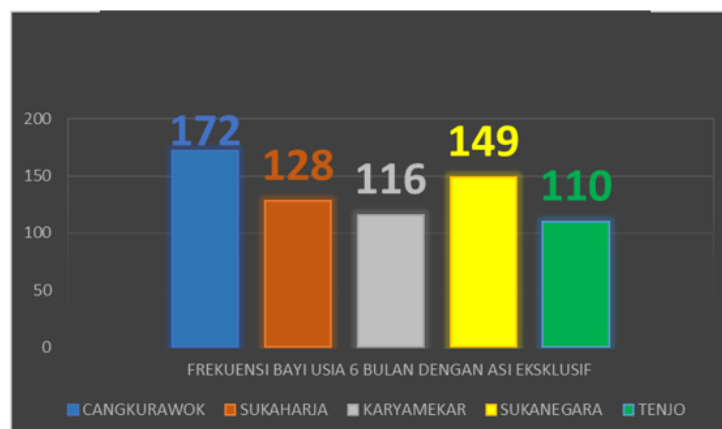


Figure.8 Graph of five health centres on the number of babies with the lowest exclusive breastfeeding in Bogor Regency in 2022

Based on Figure.9, the total number of stunted babies in Bogor Regency in 2022 is 18,666, with the total number of non-exclusive breast milk being 108,215 babies. The above shows that there are 5 public health centres with the highest number of non-exclusive breast milk, namely the Cileungsi Health Center, showing the highest number of 2559 babies, followed by The second highest, the Tajur Halang Health Center, with a total of 2404 babies, followed by the third highest, namely the Jonggol health centre with many 1990 babies, while the fourth highest with some 1401 babies is the Bojong Gede health centre and the fifth highest is with 551 babies at the Pabuarah Indah health centre.

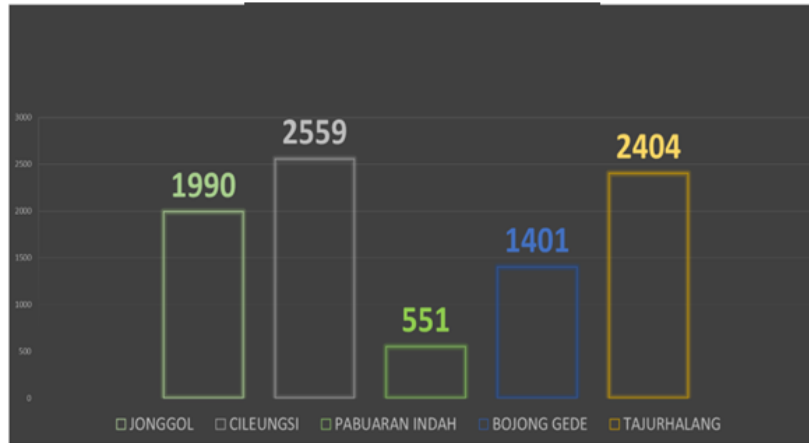


Figure.9 Graph of five health centres on non-exclusive breastfeeding highest in Bogor Regency in 2022

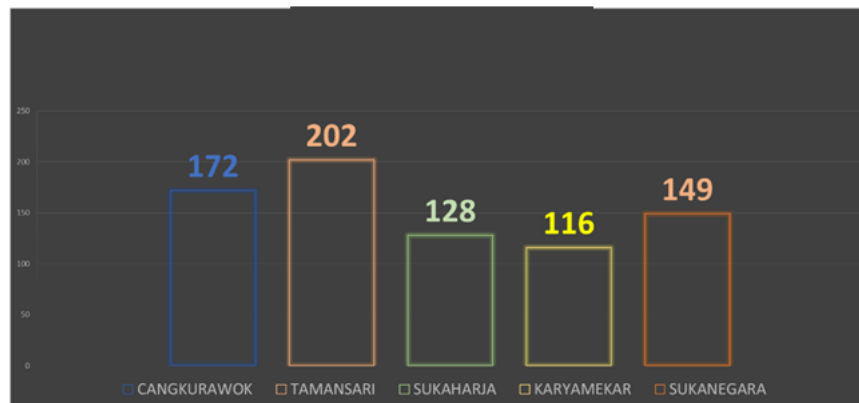


Figure.10 Graph of five health centres on non-exclusive breastfeeding lowest in Bogor Regency in 2022

Based on Figure.10, the total number of stunted babies in Bogor Regency in 2022 is 18,666, with the total number of non-exclusive breast milk being 108,215 babies. The above shows that there are 5 public health centres with the lowest number of non-exclusive breast milk, namely the Karya Mekar health centre, showing the least number of 116 babies, followed by a second place with the least number of Suka Harja health centres, with a total of 128 babies, followed by the third place with the fewest, namely Suka Negara Health Center, with 149 babies, while the fourth place with the fewest Cangkurawok health centre with several 172 babies and the fifth highest is the community health centre. Taman Sari has a total of 202 babies.

DISCUSSION

This study shows a correlation between non-exclusive breastfeeding and the incidence of stunting, with an analysis using the Spearman rank correlation test, with a significance value of $p\text{-value} = 0.279 > \alpha 0.05$. These results showed no relationship between non-exclusive breastfeeding and the incidence of stunting, based on the community health centre's very low correlation level of 0.109, which is shallow.

This study's correlation between exclusive breastfeeding and the incidence of stunting obtained a significance value of $p\text{-value} = 0.548 > \alpha 0.05$. The research results showed no relationship between non-exclusive breastfeeding and the incidence of stunting based on community health centres, with a very low correlation level of 0.060.

The descriptive analysis of the secondary data above shows that the correlation between non-exclusive and exclusive breastfeeding and the incidence of stunting shows that non-exclusive and exclusive breastfeeding does not indicate a cause for stunting. Nutritional patterns during pregnancy and the growth and development of toddlers can be prevalent and can cause stunting.

There is a need for additional nutrition, namely PCBM, which can provide additional nutritional intake to increase toddler nutrition and prevent stunting. Stunting incidents are a national problem, not just a regional problem in Bogor Regency, so there is a need for solutions based on this data so that it can be continued in further research in providing solutions to overcome stunting incidents nationally by providing PCBM which is easy to make, easy to obtain, easy to digest, and is easy to distribute and most importantly offers nutritional adequacy figures (NAF) which support the nutritional intake needed by toddlers for growth and development.

The next research from this research roadmap in the 2nd year is to create a PCBM formulation using the software to meet the NAF for babies 6-8 months. PCBM is fortified with food sources of nutrition, complete nutrition, balanced, varied, sufficient, hygienic, safe to consume, texture and taste needed by babies aged 6-8 months, given in the correct way and on time, contains ligands to prevent interactions between micronutrients in When absorbed in the intestine, it can avoid 540 FDB stunting and cumulative nutritional deficits in babies so that the baby's motor, cognitive and immune functions can work optimally.

The next research in the 3rd year is a secondary descriptive data research design and a randomized simple blind community trial design because it can provide the best evidence regarding the efficacy of an intervention. Random allocation is arranging research subjects into treatment groups where each subject has the same chance of being included in a predetermined group without being predictable.

Group I: babies aged 6 – 8 months are given PCBM, which contains macro and micronutrients according to the NAF and ligands.

Group II: babies aged 6 – 8 months are given MPASI in different portions and types.

Providing PCBM is helpful in developing the baby's ability to chew and swallow food (Monoarfa, T, Kadir, S, Yusuf, 2021)(N et al., 2023)(Anggraeni et al., 2022). The frequency of giving PCBM should increase with age. The consistency is adjusted gradually, starting from soft, semi-solid, to solid, according to the baby's age. PCBM needs to be prepared, stored, and given hygienically and responsibly (Septriana and Suhartono, 2016). PCBM is given when exclusive breast milk is no longer sufficient to fulfil the nutritional needs for the child's growth and development (De-Jongh González et al., 2021). Increased needs for calories, protein, zinc, iron, and fat-soluble vitamins (vitamins A, D, K) in babies aged 6 months are very necessary for adequate growth and development (Savarino, Corsello and Corsello, 2021). Breast milk production and breast tissue volume will decrease after 6 months of breastfeeding (Shah and Alhawaj, 2019). Providing PCBM is one effort to overcome this through specific nutritional interventions (Ford, Underwood and German, 2020). When the baby is 6 months old, PCBM is started (Mehlawat, Puri and Rekhi, 2020). Completes the baby's nutritional sources and guides the baby in recognizing and consuming foods other than breast milk (Bhandari and Chowdhury, 2016). Helps the formation of digestive tract microbiota (Oliphant and Allen-Vercoe, 2019). Associated with a reduced risk of respiratory and digestive system infections (Martin et al., 2022). Prevent malnutrition in children, such as stunting, wasting, micronutrient deficiencies, overweight, and non-communicable diseases related to diet, and reduce the risk of allergies (Vassilakou, 2021). Adequate content of DHA, arachidonic acid, and other fatty acids can result in increased nerve development (Sambra et al., 2021) Further research is needed to create a PCBM formula appropriate with additional nutrition during a child's growth and development to overcome the problem of stunting.

Stunting is a crucial and urgent problem in the growth and development patterns of fetuses up to 2 years old, as the young generation. This is one of the projections of Indonesia's national defence in the future, which will produce generations who are tough, superior, and competitive in globalization and leaps in adaptive and appropriate technological development, with national values and national defence.

CONCLUSION

Exclusive and non-exclusive breastfeeding do not show any relationship to the incidence of stunting; other factors, especially nutritional intake factors, can increase the incidence of stunting. The factors supporting the occurrence of stunting need to be further researched so that the incidence of stunting is reduced or eliminated in national defence efforts to prepare the next generation to be tough, superior, and competitive in globalization and leaps in adaptive and appropriate technological development with national values and national defence.

AUTHORS' CONTRIBUTIONS

Each author has contributed to the research and writing of this article as follows Arfiyanti: Conceptualization, Methodology, Software, Data curation, Writing- Original draft preparation, Visualization, and Investigation. Arif Rachman: Supervision, Software, Validation, Writing- Reviewing and Editing, and Funding Acquisition.

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