



**THE IMPACT OF BREASTFEEDING, COMPLEMENTARY FEEDING,  
IMMUNIZATION HISTORY, AND MATERNAL AND CHILD HEALTH ON  
CHILD GROWTH**

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## ABSTRACT

*The crucial role of parents in providing breastfeeding, complementary feeding, immunization, and maternal-child health significantly impacts a children's growth. This study aimed to explore the effects of breastfeeding, complementary feeding, immunization history, and maternal-child health on child growth. A quantitative descriptive-analytic study was conducted at the Pengasinan Community Health Center in Bekasi City in 2019, involving 136 mother-child pairs as participants. Data collection utilized questionnaires covering respondent characteristics, breastfeeding and complementary feeding status, basic child immunization, maternal immunization, and the medical history of both mother and child. Data analysis employed chi-square tests using SPSS version 22.0 with a confidence level of 95% and a significance level of  $P < 0.05$ . Findings revealed that nearly 60% of children exhibited normal growth. Statistical analysis results indicated that exclusive breastfeeding, appropriate complementary feeding, complete basic child immunization, and maternal immunization significantly correlated with normal child growth ( $p$ -value  $< 0.05$ ). The implications highlight the urgent need for broader education on the importance of exclusive breastfeeding, appropriate complementary feeding, and complete immunization for both mother and child.*

Keywords: Breastfeeding, Complementary feeding, Immunization History, Maternal and Child Health, Growth

## ABSTRAK

*Peran penting orang tua dalam pemberian ASI, MP-ASI, imunisasi, dan kesehatan ibu-anak sangat berdampak pada pertumbuhan balita. Penelitian ini bertujuan untuk mengeksplorasi dampak pemberian ASI, MP-ASI, riwayat imunisasi, dan kesehatan ibu-anak terhadap pertumbuhan balita. Studi kuantitatif deskriptif analitik dilaksanakan di Puskesmas Pengasinan Kota Bekasi pada tahun 2019, melibatkan 136 ibu balita sebagai sampel. Pengumpulan data menggunakan kuesioner yang mencakup karakteristik responden, status pemberian ASI, MP-ASI, imunisasi dasar anak, imunisasi ibu, serta riwayat penyakit ibu dan anak. Analisis data dilakukan dengan uji chi-square menggunakan SPSS versi 22.0 pada tingkat kepercayaan 95% dan nilai signifikansi  $P < 0.05$ . Temuan menunjukkan bahwa hampir 60% anak memiliki pertumbuhan yang tergolong normal. Hasil analisis statistik menunjukkan bahwa pemberian ASI eksklusif, pemberian MP-ASI yang sesuai usia, imunisasi dasar lengkap pada anak, serta imunisasi ibu, secara signifikan terkait dengan pertumbuhan anak yang normal ( $p$ -value  $< 0.05$ ). Implikasinya menyoroti urgensi edukasi lebih luas tentang pentingnya pemberian ASI eksklusif, MP-ASI yang tepat, dan imunisasi dasar lengkap bagi ibu dan anak.*

Kata kunci: Pemberian ASI, MP-ASI, Riwayat Imunisasi, Kesehatan Ibu dan Anak, Pertumbuhan

## INTRODUCTION

The heightened awareness regarding child nutrition has become a primary concern in Indonesia. The Basic Health Research data from the Ministry of Health of the Republic of Indonesia in 2018 illustrates a decrease in the incidence of malnutrition over the past 11 years, from 5.4% in 2007 to 3.9% in 2018. Conversely, the prevalence of undernutrition has shown an increase from 13.0% in 2007 to 13.9% in 2013, stabilizing at 13.8% in 2018, indicating a minimal reduction of 0.1% over the last five years. This contrasts with the targeted National Medium-Term Development Plan figures for 2019, aimed at 17.7% for malnutrition and 17.0% for undernutrition. These statistics are mirrored in Bekasi, West Java, with relatively high malnutrition rates of 15% in 2013 and 13% in 2018, surpassing the national standards (Kemenkes RI, 2019).

The role of parents and families in providing nutritional intake, immunity, instilling positive values, offering stimulation, and ensuring optimal healthcare during the golden period is crucial. Insufficient stimulation can result in developmental deviations that persist into adulthood. Breastfeeding remains the best source of nourishment for infants up to six months, a practice endorsed by the World Health Organization (WHO) and established in government regulations on exclusive breastfeeding and complementary feeding. Complementary feeding provides essential nutrients as a transition from breast milk to solid foods for children aged 6-24 months (Mufida et al., 2015).

Immunization is the process of acquiring immunity against diseases by introducing weakened or deactivated pathogens. Basic immunization, administered between 0-12 months, includes BCG (Bacillus Calmette Guerin), DPT (Difteri, Pertusis, Tetanus), Polio, Hepatitis B, and Measles

vaccinations. Previous studies highlight the crucial role of immunization timing (child's age and vaccination period) in the occurrence of diseases and child development (Berendsen et al., 2016)

Congenital infections can cause various diseases affecting a child's growth, occurring during fetal development or at birth. Nahmias introduced the 'TORCH' acronym in 1971, representing toxoplasmosis, rubella, cytomegalovirus (CMV), and herpes simplex virus (HSV). Immunizing at-risk mothers helps ensure the normal growth of newborns and reduces the risk of disease (Sari, 2019). Maternal disease history, particularly prenatal infections, can impair the nervous or sensory systems, leading to long-term defects in children. The nature and severity of these effects vary not only with the organism type but often with the timing of exposure. For instance, exposure to toxoplasmosis, cytomegalovirus, or varicella during the first or second trimester can cause various identifiable abnormalities at birth, including microcephaly, hydrocephalus, growth retardation, blindness, seizures, and skin disorders (Chan & Smith, 2018).

Furthermore, both maternal and child disease histories can influence child growth, with nearly all severe diseases leading to growth failure. Growth and maturation abnormalities in children with acute or chronic diseases can result from the primary disease process due to increased energy needs or nutritional deficiencies (e.g., decreased intake or malabsorption) (Rogol, 2020).

Overall, the data suggest a general public understanding of the importance of breastfeeding, complementary feeding, immunization history, and maternal-child health. Researchers aim to understand the impact of breastfeeding, complementary feeding, immunization history, and maternal-child health on child growth.

## METHOD

### *Participant characteristics and research design*

Quantitative descriptive-analytical research employing a cross-sectional approach was conducted at the Pengasinan Community Health Center in Bekasi City from September to November 2019. The inclusion criteria comprised mothers with children's aged 2-3 years, registered as patients at the health center, and willing to participate as research respondents. Exclusion criteria encompassed children's with chronic illnesses and incomplete characteristic data of mother- child pairs, as indicated in the maternal and child health book.

### *Sampling procedures*

In accordance with a cross sectional research design, the sample size is calculated using the formula for a single population proportion. The single population proportion means that the population used as sample is only one population. The formula is used to adjust the research objectives, which are to explore the effects of breastfeeding, complementary feeding, immunization history, and maternal-child health on child growth, so only one population is selected as the sample, namely mothers who have children. The proportion of mothers who have children meeting the inclusion and exclusion criteria is not known, so it's assumed to be 50% of the total population ( $P=0.5$ ), with  $Q=1-P=1-0.5=0.5$ . The relative precision is set by the researcher at 10% ( $d=0.1$ ). The value of  $Z_{\alpha}= 1.96$  for  $\alpha = 0.05$ . Considering the potential for missing samples or data, the researcher decided to add 10% of the total sample as a preventive measure. The sample size calculation is done using the following formula:

$$n = \frac{(Z\alpha)^2 PQ}{d^2} \quad (1)$$

Based on the formula, the sample size was calculated as 96 individuals. The researcher rounded up and increased the total respondents to 136 samples to account for potential missing or lost follow-up data after the data collection is completed.

### Measures

This research uses primary data sources by collecting respondent data directly. The instruments used in this study include a questionnaire that gathers data on respondent characteristics, the status of breastfeeding and complementary feeding, the immunization status of children for basic vaccines, maternal immunizations, as well as the medical history of the mother and child. Additionally, child growth measurements are included. In this research, validity and reliability tests have been carried out on the questionnaire using the Pearson Product Moment coefficient formula with a level of confidence interval with an error rate of 5% ( $\alpha=0.05$ ).

Breastfeeding status, child immunization status, maternal immunization, and medical history data are obtained through interviews and from the mother and child's health records. The assessment of complementary feeding is obtained through interviews regarding the appropriateness of the type and form of food based on the child's age. Maternal immunization involves Tetanus Toxoid (TT) and Toxoplasmosis, Rubella, Cytomegalovirus, and Herpes (TORCH). Child growth measurements are based on anthropometric indices, such as weight-for-age (BB/U), height-for-age (TB/U), head circumference-for-age (LK/U), and weight-for-height (BB/TB). The anthropometric measurements follow the WHO Child Growth Standards and measurement protocols (WHO, 2008).

### Data analysis

Univariate analysis is used to get an idea of the frequency distribution and percentage of respondents for each variable which is the respondent characteristic data. Bivariate analysis was conducted using the chi-square test, considering categorical data. A confidence level of 95% and a significance value of  $P < 0.05$  were employed to determine statistical significance. Data processing was carried out using the statistical software SPSS version 22.0.

## RESULTS AND DISCUSSION

In this study, maternal characteristics showed that the majority had completed high school education, accounting for 36.8%. Nearly all the mothers were not employed, comprising 92.6% of the sample. Additionally, 77.2% of mothers received TT and TORCH immunizations, while 83.8% had no history of diseases. Regarding the children's characteristics, 50.7% were boy and 49.3% were girl, with 2-year-olds dominating the study at 80.9%. Nearly all children received exclusive breastfeeding, constituting 96.3% of the sample. 78.7% received complementary feeding appropriate for their age, 84.6% received complete basic immunizations, and most did not have a history of diseases. Growth indicators for the children showed that 77.9% had normal weight-for-age, 75.7% had normal height-for-age, 100.0% had normal length-for-age, and 82.4% had a good weight-for-height. Based on these indicators, 58.8% of the children exhibited normal growth (Table 1).

**Table 1**  
*Characteristics of Responden*

Characteristics	N	%
<b>A. Maternal Characteristics</b>		
Education		
Not finished school	2	1.5
Elementary school	23	16.9
Junior high school	40	29.4
Senior high school	50	36.8
College	21	15.4
Occupation		
Not work	126	92.6
Work	10	7.4
Immunization		
No	31	22.8

Yes	105	77.2
History of disease		
Have	22	16.2
Don't have	114	83.8
<b>B. Children's Characteristics</b>		
Gender		
Boys	69	50.7
Girls	67	49.3
Age		
2 years	110	80.9
3 years	26	19.1
Breastfeeding		
Not exclusive	5	3.7
Exclusive	131	96.3
Complementary feeding		
Not appropriate	29	21.3
Appropriate	107	78.7
Basic immunization		
Incomplete	21	15.4
Complete	115	84.6
History of disease		
Have	46	33.8
Don't have	90	66.2
<b>C. Child Growth Indicators</b>		
Weight-for-age		
Underweight	30	22.1
Normal	106	77.9
Height-for-age		
Stunting	33	24.3
Normal	103	75.7
Length-for-age		
Abnormal	0	0.0
Normal	136	100.0
Weight-for-height		
Malnutrition	24	17.6
Good nutrition	112	82.4
Child Growth		
Abnormal	56	41.2
Normal	80	58.8

The research findings indicate that children who received exclusive breastfeeding exhibited normal growth compared to those who didn't. There was a significant association between exclusive breastfeeding and normal child growth with a p-value of 0.011 (OR: 0.389; 95% CI: 0.314-0.482). Providing complementary feeding according to the child's age showed a higher likelihood of normal child growth compared to inappropriate complementary feeding. There was a significant relationship between appropriate complementary feeding and normal growth with a p-value of 0.036 (OR: 0.405; 95% CI: 0.314-0.482). Whether the child received complete or incomplete basic immunizations showed some association with normal child growth. However, a significant relationship was found between basic immunization and child growth (p-value: 0.030; OR: 3.508; 95% CI: 1.111-11.072). Regarding maternal immunization, mothers who received immunizations had more children with normal growth. There was a relationship between maternal immunization and child growth (p-value 0.038; OR: 0.410; CI 95%: 0.181-0.927). Children with or without a history of diseases showed varying rates of normal growth. However, a significant relationship was observed between a child's history of diseases and their growth (p-value: 0.042; OR: 2.322; CI 95%: 1.082-4.984). Mothers with a history of diseases had more children with abnormal growth compared to those without a history of diseases. This indicates a significant relationship between a mother's history of diseases and child growth (p-value 0.032; OR: 0.333; 95% CI: 0.129-0.860) (Table 2).

**Table 2*****The Relationship between Breastfeeding, Complementary Feeding, Immunization History, and Mother-Child Health on Child Growth***

Variable	Child Growth		p-value	OR (95% CI)
	Abnormal n(%)	Normal n(%)		
Breastfeeding			0.011*	0.389 (0.314-0.482)
Not exclusive	5(100.0)	0(0.0)		
Exclusive	51(38.9)	80(61.6)		
Complementary feeding			0.036*	0.405 (0.175-0.935)
Not appropriate	17(56.6)	12(41.4)		
Appropriate	39(36.4)	68(63.6)		
Basic immunization			0.030*	3.508(1.111-11.072)
Incomplete	4(19.0)	17(81.0)		
Complete	52(45.2)	63(54.8)		
Maternal Immunization			0.038*	0.410(0.181-0.927)
No	18(58.1)	13(41.9)		
Yes	38(36.2)	67(63.8)		
History of child disease			0.042*	2.322(1.082-4.984)
Have	13(28.3)	33(71.7)		
Don't have	43(47.8)	47(52.5)		
History of maternal disease			0.032*	0.333(0.129-0.860)
Have	14(63.6)	8(36.4)		
Don't have	42(36.8)	72(63.2)		

\* *Significant Chi-square test*

This research indicates that the majority of mothers have completed high school education, most are not employed, have received necessary immunizations, and have minimal medical histories. Meanwhile, concerning the children's characteristics, there is an equal distribution between boys and girls, with the majority being 2 years old, receiving exclusive breastfeeding, and having minimal immunization and medical history. Nevertheless, the results show that almost 60% of the children exhibit normal growth based on indicators such as weight-for-age, height-for-age, weight-for-height, and good BMI-for-age. This aligns with Permatasari et al.'s study, which also demonstrated that nearly 60% of children exhibit normal growth based on these indicators (Permatasari et al., 2023). The research indicates that there are children's experiencing underweight, stunting, and malnutrition, with higher rates compared to the national average in 2022, at 17.1%, 21.6%, and 7.7%, respectively (Ministry of Health RI, 2023). Despite most children showing normal growth, malnutrition remains a significant issue in this study.

Exclusive breastfeeding, timely complementary feeding, complete basic immunizations for children, and maternal immunizations show significant correlations with normal child growth. Children who receive exclusive breastfeeding tend to exhibit normal growth compared to those who do not. Additionally, timely complementary feeding also positively influences child growth. These findings are consistent with previous studies showing the impact of breastfeeding and complementary feeding on the growth and development of children aged 12-24 months in the Kuta Alam district of Banda Aceh (Suryana et al., 2019). According to these studies, breastfeeding and complementary feeding are crucial for meeting children's nutritional needs for growth and development.

Continued breastfeeding contributes significantly to vital nutrition far beyond the first year of life, acting as a significant energy source and providing essential nutrients for growing infants. Studies in developing countries associate sustained and frequent breastfeeding with greater linear growth, delaying maternal fertility after childbirth, reducing child morbidity and mortality risks, and preventing dehydration in those recovering from infections. WHO recommends exclusive breastfeeding for the first six months to achieve optimal growth, development, and health. Afterward,

to meet their evolving nutritional needs, infants should receive adequate and safe complementary feeding while continuing breastfeeding for two years or more (WHO, 2021).

The success of providing exclusive breastfeeding also requires support from those closest to you such as family members, friends, relatives, co-workers and the community. Case control research conducted in Ketapang village, Laok Sampang, Madura involving 170 breastfeeding mothers showed that family support can increase exclusive breastfeeding (Masruroh & Istianah, 2019).

Furthermore, complete basic immunizations, both for children and mothers, are closely associated with normal child growth. Previous research suggests that incomplete basic immunization can increase developmental disturbances, leading to stunting in children's (Aprilia & Tono, 2023; Aprina & Erwandi, 2021; Darmawan et al., 2022; Yuliana & Besral, 2022). Other studies also indicate that immunization serves as a protective factor for a child's nutritional status (Jamil & Subiyatin, 2020).

The primary rationale behind childhood vaccinations is significantly reducing child mortality rates and being a cost-effective way to improve child health, especially for less privileged families in high disease-risk environments. Logistic regression results demonstrate a significant correlation between basic immunizations and growth, increasing the chances of growth by 3,508 times. Childhood vaccines not only reduce disease risks but also enhance child growth, contributing to sustainable development goals related to stunting, wasting, and underweight (Bogler et al., 2019).

Research in India illustrates that the Universal Immunization Program (UIP) positively impacts children's anthropometry, increasing their height and weight. Sensitivity analysis also shows statistically significant results, including a 22-25% decrease in height deficits and a 15% decrease in weight deficits among Indian children (Anekwe & Kumar, 2012).

Meanwhile, the medical history of both children and mothers can affect child growth, with higher rates of normal growth observed in children without medical histories and mothers without medical records. This underscores the crucial role of both maternal and child health conditions in influencing child growth. Previous studies indicate a correlation between infectious diseases in children and the nutritional status of children's aged 24-59 months (Pusung et al., 2018). A strong link exists between stunting and infectious diseases, particularly diarrheal infections, causing not only nutrient wastage but also triggering inflammation that hampers growth by regulating growth factors like insulin (IGF-1) (Berendsen et al., 2016). Other research identifies maternal placental issues during pregnancy as a major risk factor for child growth disorders (Bestari et al., 2019).

Prenatal infections can lead to damage in the baby's nervous system or sensory organs, resulting in long-term defects in children. The effects vary depending on the type of organism and the timing of exposure. For instance, exposure to infections such as toxoplasmosis, cytomegalovirus, and varicella during the early or mid-pregnancy stages can cause various abnormalities evident at birth, such as microcephaly, hydrocephalus, growth retardation, blindness, seizures, and skin issues. Exposure during late pregnancy or at the time of delivery can also lead to infections that may not be apparent at birth, resulting in developmental delays in infants and children (Durkin, 2004).

## **CONCLUSIONS AND SUGGESTIONS**

In this study, it is shown that factors such as exclusive breastfeeding, appropriate complementary feeding, and complete basic immunization for both children and mothers are significantly associated with normal child growth. The health condition of both the mother and child also plays a crucial role in influencing a child's growth. The importance of broader education regarding exclusive breastfeeding, appropriate complementary feeding, and the significance of complete basic immunization for both mothers and children is highlighted. Furthermore, there is a need for a better understanding of the importance of the mother's health condition in impacting a child's growth, along

with efforts to prevent and manage diseases in both mothers and children to ensure optimal child growth.

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### **ETHICAL CONSIDERATIONS**

The study has been granted ethical clearance by the health research ethics committee of the Faculty of Medicine and Health, Universitas Muhammadiyah Jakarta under number 111/PE/KE/FKK-UMJ/X/2019. Participants provided informed consent. The author assures that all procedures adhere to the appropriate guidelines and regulations.

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