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Infant and Young Child Feeding Practices Based on Region of Residence in Bengkulu Province, Indonesia

Praktek Pemberian Makan Bayi dan Anak Berdasarkan Daerah Tempat Tinggal di Provinsi Bengkulu, Indonesia

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ABSTRACT

Background: Children under two years old go through a rapid physical growth period, requiring the highest nutritional intake compared to other age groups. However, infant and young child feeding (IYCF) practices are often suboptimal, leading to nutritional and health problems.
Objectives: This study aimed to determine the determinants of IYCF practices in Bengkulu Province.
Methods: The study used a cross-sectional design from the 2017 IDHS data. The sample was women of childbearing age 15-49 years who had children aged 6-24 months, as many as 73 children with a stratified two-stage sampling technique. Data analysis using proportion difference test with chi-square test and multivariate binary logistic regression.
Results: This study found that in 83.9% of urban areas and 91.5% of rural areas, the practice of IYCF is not by the recommendations. There is no difference in IYCF practice between urban and rural areas. Factors related to the practice of IYCF are pregnancy planning and antenatal care (ANC) quantity. Unplanned pregnancies had a risk of 4.8 times (p-value=0.04) the practice of IYCF was not as recommended compared to the intended pregnancies. The quantity of antenatal care that was not at risk was 4.8 times the practice of IYCF was not as recommended compared to the quantity of good ANC (p-value=0.05).
Conclusions: Pregnancy planning needs to be educational material for young women, and an increase in efforts to increase knowledge of pregnant women about IYCF during antenatal care through nutrition counseling programs or classes for pregnant women in health facilities.

INTRODUCTION

Children under the age of two exhibit a passive role in their consumption habits; their nutritional intake is significantly dependent on the feeding practices of their mother or caregiver[1]. Feeding children plays a crucial role in addressing their nutritional needs, as this developmental stage is a period characterized by rapid growth and increased proneness to health and nutritional problems; therefore, it is essential that feeding practices for this age group receive attention[2–4]. The global strategy for infant and young child feeding recommends that the best feeding pattern for infants and children from birth to 24 months of age, which includes the early initiation of breastfeeding, exclusive breastfeeding until the infant is 6 months of age, and the introduction of complementary feeding, in which complementary feeding should be done at 6 months of age and continue to breastfeed until the child is 24 months of age[5].

Nutritional disorders in children typically occur around the age of 6 months, which is the end of the exclusive breastfeeding period. One of the reasons is the low quality of complementary feeding, as the timing and composition of the nutrition provided are unbalanced, resulting in some nutrients failing to meet the child's needs[6]. A limited number of children receive good complementary feeding[7]. Efforts to address the issue of malnutrition in infants and children involve the provision of proper and accurate nutrition for this age group[8]. The approach to broaden the scope of infant and child feeding based on standards is through the implementation of IYCF practices that adhere to established recommendations, encompassing aspects

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such as feeding frequency and food variety[9]. Moreover, research indicates that a significant proportion of parents, ranging from 25 to 50%, engage in improper feeding practices for their children[10]. Inadequate feeding is cited as the primary cause of two-thirds of deaths among children under five. This issue arises from several factors, including the lack of exclusive breastfeeding, the early or delayed introduction of solid foods, and the provision of incomplete, unbalanced, and unhygienic nutrition[6].

The WHO reported that in developing countries, fewer than 25% of children between the ages of 6 and 23 months received the minimum acceptable diet, including proper food variety and eating frequency standards[11]. The improper feeding of children is evident in the low quality of both macro and micronutrients, inadequate frequency and consistency, improper portion sizes, unsafe food and water, contamination issues, poor hygiene practices, and unsafe methods of food processing and preparation[12]. The minimum dietary recommendation set forth by the WHO encompasses a combination of minimal food diversity and eating frequency, which is distinguished between children who are breastfed and those who are not[13].

National data indicates that addressing child feeding practices is a critical concern and should be prioritized in efforts to prevent various growth disorders in children. Nationally, IYCF practices revealed that only 60% of children consumed the recommended minimum number of food groups, 72% received the recommended minimum eating frequency, and 40% followed the established guidelines for IYCF practices[13]. The findings from the research conducted in Sumedang Regency, West Java, indicated that 43% of children did not receive an early initiation of breastfeeding, a significant majority of children, 78.8%, were not exclusively breastfed, 32.2% of children did not receive breastfeeding until the age of two, and it was observed that 6.2% of children had not received complementary feeding at the age of 6-8 months. The dietary consumption patterns among children fall short of the established minimum requirements for dietary diversity (32.9%), meal frequency (37%), and acceptable diet (55.5%)[14]. In Bengkulu Province, data revealed that only 45.4% of IYCF practices aligned with the recommendations, 59.8% of children were reported to consume at least four food groups as advised, 74.3% received the recommended minimum eating frequency, and only 45% of children followed the IYCF practices as per the guidelines[13]. In general, the food groups consumed by children aged 6 to 23 months consisted predominantly of cereal-based foods (60.5%), followed by fruits and vegetables rich in vitamin A (53.7%) and sources of protein such as meat, fish, and poultry (39%). The data presented indicates that the issue of infant and child feeding in Bengkulu Province remains a significant concern.

The inadequate provision of food to infants and children was reported to contribute to the increase of nutritional problems. Approximately 32% of children under the age of five experienced stunting, while 10% suffered from malnutrition as a consequence of inadequate breastfeeding and complementary feeding practices[15]. Furthermore, Indonesia ranked among the top 17 countries out of 117 countries that encountered three nutritional problems: stunting, wasting, and overweight issuses[11]. Research results from several countries showed an association between food intake and stunting in children under the age of five[16]. Research conducted in Zimbabwe revealed that the consumption of nutritious food can reduce stunting rates by 8%[17]. Additionally, a systematic review identified 17 kinds of literature demonstrating that IYCF interventions have a significant positive impact on nutritional status based on the HAZ index, as well as a reduction in stunting prevalence. Research results showed that IYCF interventions significantly improved children's nutritional status based on the WAZ index[18]. Moreover, research results from several regions of Indonesia indicated a relationship between dietary diversity and the prevalence of stunting in children under the age of five[19–25]. The factors contributing to stunting encompass both early and late complementary feeding, as well as the provision of food that lacks variations according to age and age-inappropriate textures[26]. Parents who apply proper feeding practices typically have children with normal nutritional status, while those who ignore the implementation of good child feeding often have children with thin and fragile conditions[27]. In addition, research conducted in East Nusa Tenggara found that improper feeding practices pose a significant risk of causing stunting in children[28]. Research conducted in Tangerang Regency discovered that children with suboptimal feeding practices were eight times more likely to experience underweight nutritional status in comparison to those who received proper feeding practices[29]. Improper child feeding practices represent a risk factor contributing to child mortality. A significant proportion, more than 45%, of deaths among children under the age of five can be attributed to nutritional problems[30]. Children suffering from malnutrition have a higher risk of death[6].

Various factors, including education, knowledge, occupation, socioeconomic status, maternal age, antenatal frequency, child age, birth spacing, access to information, and postnatal visits, influence improper IYCF failure. Other factors that influence improper IYCF failure are access to radio information, mother's age, access to clean water, access to health services, region of residence, use of prenatal care, and postpartum examination[31–37]. Data from IDHS (2017) indicated that children residing in rural areas (22.4 months) were breastfed for a longer duration compared to their urban counterparts (20.7 months). Furthermore, in urban environment, girls exhibited a more diverse dietary intake than their male counterparts (62% compared to 59%) and children living in rural areas (66% compared to 55%). Additionally, the percentage of children meeting the recommended minimum eating frequency is higher in urban areas (76%) compared to rural areas (68%). The percentage of children following IYCF practices according to recommendations is also higher in urban areas (46%) compared to rural areas (35%)[13].

There are no research results regarding infant and child feeding practices based on the region of residence in Bengkulu Province, as well as the factors that influence it. Meanwhile, the results of periodic national

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surveys indicate that the implementation of IYCF in Bengkulu Province remains low, and various nutritional status problems were found in Bengkulu Province. Further examination is required to identify the factors influencing infant and young child feeding practices in Bengkulu Province, with the aim of developing suitable intervention policies tailored to the region's specific conditions.

METHODS

Research Design and Data Sources

This study employed a cross-sectional design, drawing on data from the 2017 Indonesian Demographic and Health Survey (IDHS), which was the seventh survey conducted in Indonesia under the Demographic and Health Surveys (DHS) program. The IDHS was carried out by the Statistics Indonesia (BPS) in collaboration with the National Population and Family Planning Agency (BKKBN) and the Ministry of Health. The survey received funding from the Government of Indonesia, with technical assistance provided by ICF International through the DHS Measure project, a program supported by the U.S. Agency for International Development (USAID) that offers funding and technical assistance for population and health surveys across various countries. The 2017 IDHS generated updated estimates for key population and health indicators.

Population and Sample

The population targeted in this study consists of women of childbearing age, specifically those between the ages of 15 and 49, who have children aged 6-24 months. The sampling design for the 2017 IDHS was meticulously developed to provide estimates at both the national and provincial levels. The 2017 IDHS sample comprised 1,970 census blocks, encompassing a diverse range of urban and rural areas. This number of census blocks was expected to yield a sample size comprising 49,250 households. Based on this sample, it was anticipated that approximately 59,100 women of childbearing age (aged 15-49 years), 24,625 unmarried male adolescents (aged 15-24 years), and 14,193 married men (aged 15-54 years) would participate as respondents. The 2017 IDHS sampling framework was developed based on the Census Block Sample Master derived from the 2010 Population Census. The household sampling framework for this study was created based on a list of ordinary households, which was updated using data of households from selected census blocks. The sampling unit in this study consists of female sex workers within the age range of 15 to 54 years, all of whom have children aged 6-24 months. The sampling method used in the 2017 IDHS is a stratified two-stage sampling design. In the first stage, a selection of several census blocks was conducted employing a systematic probability proportional to size (PPS) method, with the number of households listed in the 2010 Population Census (SP2010). Stratification was implicitly carried out based on urban and rural areas, and census blocks were sorted according to the Wealth Index category derived from SP2010. In the second stage, a total of 25 ordinary households were systematically selected from the updated household lists in each census block. The sample selection method in this study followed the same process used in the 2017 IDHS, incorporating samples specifically drawn from Bengkulu Province. This study focused on children within the age range of 6 to 24 months as the primary unit of analysis. In Bengkulu Province, the 2017 IDHS sample comprised 278 children aged 6-23 months, of which 73 children aged 6-23 months met the inclusion criteria for this study, with 31 children from urban areas and 42 children from rural areas. The inclusion criteria are the child must be a biological child, reside with their parents, be within the age range of 6 to 23 months, and have complete data for all required variables.

Data Collection

The research variables were obtained from the women's questionnaire in the 2017 IDHS. The dependent variable is infant and young child feeding (IYCF) practices. The practice of IYCF can be seen in the IDHS women's questionnaire, specifically part VI, which addresses health and child nutrition, items number 650-653. The practice of IYCF can also be seen from indicators such as the diversity of children's food and the frequency of their feeding based on the WHO recommendations regarding complementary feeding.[9] IYCF practices were categorized according to recommendations regarding the child's food diversity and eating frequency. If either or both of these indicators do not match the recommendations, then IYCF practices are deemed not in accordance with the recommendations. The categorization of food diversity is based on the WHO recommendations in 2008, which state that a child's diet should include a minimum of four food groups. These groups consist of staple foods, at least one animal food, and at least one group of fruit and vegetables, derived from a total of seven food groups: tubers and seeds, nuts, milk and its processed products, meat (beef, poultry, fish, and liver/offal), eggs, fruits and vegetable sources of vitamin A, and other fruits and vegetables. The categorization of eating frequency is in accordance with the WHO recommendations, stipulating that children aged 6-8 months who are breastfed should be given semi-solid or solid food at least twice a day, children aged 9-23 months at least 3 times a day, and children aged 6-23 months who are not breastfed should be given semi-solid or solid food at least four times a day. Furthermore, the independent variables encompass family characteristics such as socioeconomic status, household size, and the number of children under five in the family; maternal characteristics including mother's education, mother's occupation, quality and quantity of antenatal care, antenatal care providers, delivery location, age at first marriage, marital status, parity, mother's age at childbirth, pregnancy planning, and location of prenatal care; and child characteristics such as sex, birth weight, birth spacing, and postnatal check-ups. The variables can be seen in some questionnaires employed in this study, such as residence in IDHS women's questionnaire part I (introduction) number 5, socioeconomic status of the family in household questionnaire part IV questions number 121, 122, and 123, several household members in IDHS women's questionnaire question Part II (officer visits), age of mother and age of the child in household questionnaire part I question number 105-106, mothers occupation in

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IDHS women's questionnaire question number 108-109, maternal education in IDHS women's questionnaire question number 108-109, pregnancy check-up personnel in IDHS women's questionnaire question number 409), maternity attendants in IDHS women's questionnaire question number 429-430, age of first marriage and marital status in IDHS women's questionnaire question number 701, 702, 703, and 704, parity in IDHS women's questionnaire question number 203, 205, 207, and 208, pregnancy planning in IDHS women's questionnaire question number 405), gender in IDHS women's questionnaire question number 214), birth weight in IDHS women's questionnaire question number 428, quality of antenatal care services in IDHS women's questionnaire question number 408-420, and quantity of antenatal services in IDHS women's questionnaire question number 408-420). The quality of antenatal care (ANC) was assessed based on a mother's visit to a health facility for pregnancy check-ups in terms of the type of antenatal services received (10T): weighing weight, measuring height, measuring blood pressure, taking blood samples, urine tests, consuming iron tablets ≥90 tablets, and explaining signs of pregnancy complications. The quality of ANC was categorized as good if mothers received 10 T services during pregnancy check-ups; meanwhile, the quality was categorized as bad if mothers received less than 10 T services. The quantity of ANC was measured based on the frequency of maternal visits to health facilities for pregnancy check-ups, starting from the first trimester until the third trimester. The quantity of ANC was categorized as good if the frequency of pregnancy check visits met the minimum standard (at least four visits, including one visit during the first and second trimesters and two visits during the third trimester). The quantity of ANC was categorized as bad if the frequency of ANC visits did not meet the minimum standards.

Data Analysis

This study employed bivariate analysis through chi-square tests to examine differences in the proportions of family, mother, and child characteristics between urban and rural areas, as well as to investigate differences in the proportions of IYCF practices based on these characteristics. Moreover, the bivariate analysis functioned as the selection stage for candidate variables for multivariate analysis (p-value≤0.25). The multivariate analysis employed multivariate binary logistic regression to assess the relationship between multiple independent variables and the dependent variable simultaneously and to determine which variables exhibited the strongest association with IYCF practices.

Research Ethics

The voluntary participation of respondents in the collection of IDHS data occurred subsequent to their signing of informed consent, which indicated their agreement to receive an explanation. The 2017 Indonesian Demographic and Health Survey (IDHS) was reviewed for research ethics by the Institutional Review Board of the International Classification of Functioning (ICF), under ICF Project Number 132989.0.00. Additional analysis of the IDHS data received ethical approval from the Health Research Ethics Commission, with approval number KEPK.M/014/05/2021.

RESULTS AND DISCUSSIONS

The data presented in Table 1 indicates that the IYCF practices in Bengkulu Province were suboptimal. The diversity of food for infants and children did not meet the recommendations, with 77.4% in urban areas and 91.5% in rural areas. The frequency of feeding infants and children in urban areas was as low as 32.9%, meanwhile in rural areas it reached 50%, indicating a significant discrepancy with the recommendations. Upon analyzing food diversity and eating frequency, it was determined that 83.9% of children in urban areas and 91.5% of children in rural areas did not adhere to the recommendations. The analysis revealed no significant difference in the proportion of food diversity (p-value=0.123), frequency of eating (p-value=0.13), and IYCF practices (p-value=0.397) based on the region of residence in Bengkulu Province.

Food diversity, defined as the variety of food groups consumed within a 24-hour period, has been established as a valid and reliable indicator of dietary adequacy of children. Therefore, food diversity serves as a relatively easy proxy variable for assessing children's nutritional intake. The World Health Organization (WHO) considers food diversity a crucial indicator to assess children's eating practices[38]. Furthermore, food diversity serves as an approach to assessing the adequacy of micronutrient sources in the food consumed. In addition, the minimum meal frequency can serve as an estimate of children's energy adequacy[13].

Research conducted in Indonesia revealed that among children under five, cereals, roots, and tubers are the most frequently consumed food groups, while fruits and nuts are the least consumed food groups[39]. In developing countries, the primary source of food intake is calorie-rich food, with the lack of intake of animal foods, fruits, and vegetables[40]. Food diversity serves as a representation of the quality of food consumed by toddlers[41]. Additionally, in Bengkulu Province, the predominant food items consumed by children aged 6-23 months were cereals/grains, accounting for 60.5%. In contrast, only 39% of children consumed meat, fish, and poultry, while a mere 31% consumed eggs[13]. Moreover, this study discovered that 77.4% of children in urban areas and 91.5% of children in rural areas did not follow the recommendations. The frequency of feeding infants and children did not meet the recommendations, with 32.9% in urban areas and 50% in rural areas. A significant majority of children in both urban (83.9%) and rural (91.5%) areas did not follow the recommended practices of IYCF. The IYCF practices in Bengkulu Province exhibit no distinction between urban and rural communities. This IYCF practices problem may have an impact on the emergence of various problems related to the nutritional status of children. The results of this study are in line with those observed in Ethiopia, in which only 13% of optimal dietary diversity was reported[36]. Furthermore, a systematic review study revealed that dietary diversity is a contributing factor to stunting[42]. The results of the Analysis of the Individual Food Consumption Survey in Indonesia reported an association between dietary

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diversity and the nutritional status of children[39]. In addition, research conducted in Klaten Regency found an association between food diversity and stunting in children aged 24-59 months[41].

Table 1. Frequency distribution of IYCF practice, Family, Child, and mother characteristics based on residence in Bengkulu

Variable	Urban	Rural	Total	p-value
Food Diversity				
According to Recommendation	22.6	9.5	16.1	0.123
Not According to the Recommendation	77.4	91.5	83.9	
Frequency of Eating				
According to Recommendation	67.7	50.0	58.9	0.13
Not According to the Recommendation	32.3	50.0	41.1	
Infant and Young Child Feeding				
According to Recommendation	16.1	9.5	12.8	0.396
Not According to the Recommendation	83.9	91.5	87.2	
Family and Child Characteristics				
Socio-Economic Status				
Richest	9.7	14.3	12.0	
Richer	12.9	7.1	10.0	
Middle	16.1	38 .1	27.1	0.206
Poor	35.5	19.0	27.3	
Poorest	25.8	21.4	23.6	
Number of Families				
Small Family	61.3	64.3	62.8	0.793
Large Family	38.7	35.7	37.2	
Total Toddlers in the Household				
1 Toddler	61.3	71.4	66.4	0.362
>1 Toddler	38.7	28.6	33.6	
Gender				
Male	58.1	50.0	54.1	0.495
Female	41.9	50.0	45.9	
History of LBW				
Normal	93.5	83.3	88.4	0.189
LBW	6.5	16.7	11.6	
Distance between Birth				
First Child	20.9	31.0	26.0	
<2 Years	12.9	2.4	7.7	0.211
≥2 Years	58.1	66.7	62.4	
Perinatal Examination				
Health Workers	74.2	85.7	79.9	0.217
Non-Health Workers	25.8	14.3	20.1	
Mother Characteristics				
Mother's Education				
Higher	6.5	16.7	11.6	
Secondary	74.2	69.0	71.6	0.396
Elementary	19.4	14.3	16.9	
Mother's Occupation				
Employed	22.6	57.1	39.9	0.003
No Employed	77.4	42.9	61.1	
Mother's Age				
<20 Years	0	9.5	4.8	
20-25 Years	90.3	76.2	83.2	0.158
>35 Years	9.7	14.3	12.0	
Marital Status				
Married	93.5	95.2	94.4	0.754
Single and Divorced	6.5	4.8	5.6	
Parity				
Primiparous	29.0	31.0	30.0	
Multiparous	71.0	66.7	68.9	0.668
Grande-Multiparous	0	2.3	1.1	
Age at First Marriage				
<21 Years	93.5	97.6	95.4	0.386
≥21 Years	6.5	2.4	4.5	
Pregnancy Planning				

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Variable	Urban	Rural	Total	p-value
Pregnancy Wanted	87.1	88.1	87.6	0.898
Unwanted Pregnancy	12.9	11.9	12.4	
Place of ANC				
Health Facilities	100.0	78.6	89.3	0.006
Non-Health Facilities	0	21.4	10.7	
Quantity of ANC				
Good	83.9	66.7	75.3	0.098
No Good	16.1	33.3	24.7	
Quality of ANC				
Good	38.7	16.7	27.7	0.034
Not Good	61.3	83.3	72.3	
Place of Delivery				
Health Facilities	93.5	59.5	76.5	0.001
Non-Health Facilities	6.5	40.5	23.5	

Table 1 further demonstrates that the family and child characteristics by region of residence are consistent between urban and rural areas (p-value>0.05). In terms of socioeconomic status, the majority of families in both urban and rural areas are from the middle to lower classes. Regarding household size, the majority of families in urban (61.3%) and rural (71.4%) areas are classified as small families. The proportion of children under the age of five and their gender distribution is nearly identical in both urban and rural areas. As for children's characteristics, historical data indicates that 6.5% of children in urban areas are classified as having low birth weight (LBW), in contrast to 16.7% in rural areas. The proportion of children with a birth spacing of over 2 years is higher in rural areas (66.7%) compared to urban areas (58.1%). Additionally, 25.8% of urban children and 14.3% of rural children did not receive perinatal examinations from healthcare workers.

Table 1 highlights differences in maternal characteristics based on region of residence. Notable differences were observed in the mother's occupation (p-value=0.003), place of antenatal care (ANC) (p-value=0.006), quality of ANC (p-value=0.034), and place of delivery (p-value=0.001). In contrast, other maternal characteristics did not show significant differences between urban and rural areas (p-value>0.05). In terms of education, the majority of mothers in both urban and rural areas have a lower secondary education. The proportion of working mothers is lower in urban areas, which is 22.6%, in contrast to rural areas, in which it is higher at 57.1%. Regarding age, most mothers in both urban and rural areas are within the 20 to 35-year-old range. It was also observed that a significant majority of mothers reside with their partners, with 93.5% in urban areas and 95.4% in rural areas. The predominant characteristic of mothers in both areas is multiparous. Almost all mothers in both urban (94.1%) and rural (95%) areas married before the age of 21. Most pregnancies in both urban and rural areas are planned. In terms of ANC location, all pregnant women in urban areas received ANC in health facilities, whereas 21.4% of pregnant women in rural areas received ANC outside of health facilities. The quantity of ANC is better in urban areas (83.9%) than in rural areas (66.7%); nevertheless, the quality of ANC is generally poor in both urban (61.3%) and rural (83.3%) areas. In urban areas, nearly all deliveries took place in health facilities (93.5%), while in rural areas, 59.5% of deliveries occurred outside of health facilities.

Table 2. IYCF Practices Based on Family, Mother, and Child Characteristics based on residence in Bengkulu

Family, Mother, and Child Characteristics	Urban (%)		p-value	Rural (%)		p-value	Bengkulu (%)		p-value
	NAR	AR		NAR	AR		NAR	AR	
Areas									
Rural							56.5	36.0	0.099*
Urban							43.5	640	
Socio-Economic Status									
Richest	7.7	11.1		30.0	9.4		17.4	10.0	
Richer	23.1	5.6		40	9.3		13.0	8.0	
Middle	7.7	22.2	0.520	0.0	37.5	0.403	21.7	32.0	0.786
Poorer	30.8	38.9		20.0	18.8		26.1	26.0	
Poorest	30.8	22.2		10.0	25		21.7	24.0	
Number of Families									
Small Family	76.9	50	0.129	60	65.6	0.746	69.6	60.0	0.432
Large Family	23.1	50		40	34.4		30.4	40.0	
Total Toddlers in the Household									
1 Toddler	61.5	61.1	0.981	80	68.8	0.492	69.6	66.0	0.763
>1 Toddler	38.5	38.9		20	31.3		30.4	34.0	
Gender									
Male	61.5	55.6	0.739	30	56.3	0.147	47.8	56.0	0.515
Female	38.5	44.4		70	43.7		52.5	44.0	
History of LBW									

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Family, Mother, and Child Characteristics	Urban (%)		p-value	Rural (%)		p-value	Bengkulu (%)		p-value
	NAR	AR		NAR	AR		NAR	AR	
Normal	84.6	100	0.085	90	81.3	0.517	87.0	88.0	0.9
LBW	15.4	0		10	18.7		13.0	12.0	
Distance between Birth									
First Child	30.8	27.8		10	37.5		21.7	34.0	
<2 Years	7.7	16.7	0.763	0	3.1	0.197	4.3	8.0	0.422
≥2 Years	61.5	55.6		90	59.4		73.9	58.0	
Perinatal Examination									
Health Workers	84.6	66.7	0.260	80	87.5	0.554	82. 6	80.0	0.793
Non-Health Workers	15.4	33.3		20	12.5		17.4	20.0	
Mother's Education									
Higher	0	11.1		30	12.5		13.0	12.0	
Secondary	69.2	77.8	0.220	60	71.9	0.422	65.2	74.0	0.684
Elementary	30.8	11.1		10	15.6		21.7	14.0	
Employment Mother									
Employed	23.1	22.2	0.955	60	56.3	0.834	39.1	44. 0	0.696
No Employed	76.9	77.8		40	43.8		60.9	56.0	
Mother's Age									
<20 Years	0	0		0	12.5		82.6	82.0	
20-25 Years	84.6	94.4	0.361	80	75	0.455	0.0	8.0	0.281
>35 Years	15.4	5.6		20	12.5		17.4	10.0	
Marital Status									
Married	92.3	94.4	0.811	100	93.8	0.418	95.7	94.0	0.773
Single and Divorced	7.7	5.6		0	6.2		4.3	6.0	
Parity									
Primiparous	30.8	27.8		10	37.5		21.7	34.0	
Multiparous	69.2	72.2	0.856	80	62.5	0.067	73.9	66.0	0.212*
Grande-Multiparous	0	0		10	0		4.3	0.0	
Age at First Marriage									
≥21 Years	15.4	0	0.085	10	0	0.070	13.0	0.0	0.009*
<21 Years	84.5	100		90	100		87.0	100.0	
Pregnancy Planning									
Pregnancy Wanted	76. 9	94.4	0.151	70	93.8	0.043	73.9	94.0	0.015*
Unwanted Pregnancy	23.1	5.6		30	6.2		26.1	6.0	
Quantity ANC									
Good	84.6	83.3	0.924	100	56.3	0.010	91.3	66. 0	0.022*
Not Good	15.4	16.7		0	43.7		8.7	34.0	
Place of ANC									
Health Facilities	100	100	<0.001	80	78.1	0.900	91.3	86.0	0.522
Non-Health Facilities	0	0		20	21.9		8.7	14.0	
Quality of ANC									
Good	53.8	27.8	0.141	30	12.5	0.195	43.5	18.0	0.021*
Not Good	46. 2	72.2		70	87.5		56.5	82.0	
Place of Delivery									
Health Facilities	100	88.9	0.214	60	59.4	0.972	82.6	70.0	0.254*
Non-Health Facilities	0	11.1		40	40.6		17.4	30.0	

*) Multivariate Candidate (<0.25), AR=According to Recommendation, NAR=Not According to Recommendation, ANC=Antenatal Care, LBW=Low Birth Weight

Table 2 shows that there is no significant difference in IYCF practices between urban and rural areas (p-value=0.099), and the proportions of family, mother, and child characteristics are similar across these areas (p-value>0.05), with the exception of the location of ANC in urban areas (p-value<0.001) and the quantity of ANC in rural areas (p-value=0.021). The variables selected for multivariate analysis with a p-value of≤0.25 are region of residence, parity, age at first marriage, pregnancy planning, ANC quality, and ANC quantity. The final model presented in Table 3 reveals that the factors associated with IYCF practices include pregnancy planning and ANC quantity. Furthermore, unplanned pregnancies exhibited a 4.8 times higher risk (OR=4.862; 95% CI=1.04-22.725) of not following the recommended IYCF practices in comparison to planned pregnancies. Additionally, inadequate ANC was associated with a 4.8 times higher risk of not following the recommended IYCF practices when contrasted with those who received adequate ANC (OR=4.894; 95% CI=1.00-24.073).

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Table 3. Determinants of IYCF Practices in Bengkulu

Characteristics	B	p-value*	OR (95% CI)
Planning of Pregnancy			
Pregnancy Wanted			1
Unwanted Pregnancy	1.582	0.04	4.862(1.04-22.725)
Quantity of ANC			
Good			1
Not Good	1.588	0.05	4.894(1.00-24.073)

*) Multivariate Logistic Binary Regression

The findings of this study identified pregnancy planning and antenatal care visits as factors associated with IYCF practices. Unwanted pregnancies (KTD) have a 4.8 times higher risk of not following recommended IYCF practices compared to planned pregnancies. Moreover, research conducted in Bogor Municipality revealed that unwanted pregnancies have an impact on infant care, as mothers frequently require time to adjust to the presence of the infant[43]. Unwanted pregnancies have an impact on maternal behavior in antenatal care, as mothers experiencing such pregnancies face a risk of forgoing prenatal care[44]. The results of the 2012 SKI data analysis also indicated that mothers with unwanted pregnancies are 1.4 times more likely to forgo a complete pregnancy check-up compared to those with planned pregnancies[45]. Mothers' negligence in prenatal care may lead to undetected complications during pregnancy and childbirth, as well as fetal growth disorders that can affect the growth and development of newborns.

The findings of this study indicate an association between the quantity of antenatal care and IYCF practices. Mothers with inadequate ANC visits exhibited a 4.8 times increased likelihood of engaging in IYCF practices that did not align with the recommendations. This is consistent with findings of research conducted in India, which discovered an association between having four or more antenatal care visits and improved child feeding practices[31]. A research investigation carried out in Ethiopia also revealed an association between the use of maternal healthcare services and greater dietary diversity among children aged 6-23 months[36]. The quantity of ANC in Bengkulu Province is 75.3%, indicating that a majority of mothers in Indonesia met the standard. However, the coverage has not yet achieved the national target for ideal K4 antenatal care visits, which was set at 95%[13]. In comparison to other countries, the quantity of ANC in Ethiopia and Malaysia is higher at 77.7%[46] and 78.0%[47], respectively. However, it is lower in India (51.6%) than in Indonesia[48]. A research investigation conducted in India identified multiple factors contributing to the inadequate utilization of ANC services, including lack of awareness, financial limitations, and limited access to transportation. Additionally, there exists a lack of knowledge regarding the recommended number of ANC visits[14]. The level of a mother's education plays a crucial and consistent role in the utilization of maternal and child health services. A mother with higher levels of education is more likely to seek higher-quality services and is better equipped to provide improved healthcare. Research carried out in India found that women who begin antenatal care (ANC) at an early stage of their pregnancy are more inclined to receive the recommended services compared to those who begin ANC at a later stage, approximately four to five months into their pregnancy. The research suggested that educating women about the importance of early ANC screenings may increase their likelihood of receiving the recommended care. A significant factor contributing to the postponement of ANC among women is the inadequate information concerning the optimal timing for ANC visits[31].

ANC visits provide pregnant women with valuable opportunities to receive counseling on dietary and lifestyle choices that can improve their health and that of their fetuses. Pregnant women have the ability to identify potential complications associated with pregnancy and childbirth at an early stage, enabling timely interventions to prevent possible complications and loss of life during childbirth[49]. Regular antenatal care is essential for maintaining the physical and mental health of pregnant women while also playing a crucial role in reducing the risks of maternal and infant mortality throughout the pregnancy and childbirth. It equips women with the necessary knowledge and skills for early initiation of breastfeeding, newborn care, and exclusive breastfeeding, thereby prompting the healthy and normal progression of these essential processes[50]. The provision of care during pregnancy is a crucial measure in ensuring a healthy pregnancy, preventing the risk of maternal mortality associated with childbirth, and preventing potential complications during pregnancy[51]. The counseling provided during ANC visits is associated with maternal knowledge and attitudes. Providing counseling on the signs and risks of pregnancy enhances comprehension of pregnant women and fosters positive changes in their attitudes, enabling them to recognize and detect early warning signs of pregnancy-related complications[52]. In addition, research conducted in the Eastern and Central regions of India found that mothers who regularly attended ANC visits demonstrated a higher likelihood of introducing complementary feeding to their babies than those who did not attend ANC visits[31].

This study has several strengths, such as the use of large and representative data sourced from the 2017 IDHS (Indonesian Demographic and Health Survey). The data encompass both urban and rural areas, facilitating a thorough examination of the differences between these areas. The cross-sectional research design facilitates the analysis of relationships among variables at one point in time, while the two-stage stratified sampling method ensures accurate representation of the population under investigation. Additionally, the multivariate analysis employed provides a more profound understanding of the factors influencing infant and young child feeding (IYCF) practices. However, this study has some limitations, one of which is the restriction imposed by the

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cross-sectional design, which precludes the possibility of drawing causal inferences. Another limitation is the reliance on pre-existing secondary data, which may limit the thoroughness of measurement for certain variables pertinent to this study. Lastly, while the findings are relevant for health policy, it is essential to approach the generalization of the results to the entire population of Indonesia cautiously, considering the focus of this study is Bengkulu Province, which may have distinct characteristics compared to other regions.

CONCLUSIONS

Factors related to IYCF practices in Bengkulu Province include pregnancy planning and quantity of antenatal care. It is essential to implement strategies aimed at preventing the incidence of unplanned pregnancies. The government should prioritize IYCF program interventions for young mothers, particularly in cases of unwanted pregnancies. Additionally, it is crucial to promptly implement training for IYCF facilitators among healthcare workers at community health centers and health cadres at integrated service posts across Indonesia. This will facilitate the provision of education to mothers during antenatal care. The relationship between the quality of ANC and IYCF practices shows that it is vital to implement health education initiatives regarding IYCF when young mothers and pregnant women engage in ANC, in order to increase their knowledge and practices of IYCF. Furthermore, it is imperative to improve both the quantity and quality of prenatal care, in line with standards, to ensure that mothers are provided with accurate information about IYCF practices. In addition, it is essential to enhance communication, information dissemination, and educational initiatives for low-income families, young mothers, and those with limited educational backgrounds.

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CONFLICT OF INTEREST AND FUNDING DISCLOSURE

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AUTHOR CONTRIBUTIONS

DS: conceptualization, methodology, formal analysis, funding acquisition, writing-original draft, and writing-review & editing. DS, Y: resources, data curation, project administration, investigation, and software, YF: validation and visualization.

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