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Research Article
Exclusive Breastfeeding, Complementary Food and Characteristics of the Nutritional Status of Premature Infants in Indonesia in 2018

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Abstract

Background and Objective: Premature birth is a public health problem that has a high impact on morbidity and mortality. Therefore, it is necessary to increase the nutritional status for children's survival through adequate breastfeeding and complementary food as well as reducing the impact of risk factors. The purpose of this study was to determine the effects of exclusive breastfeeding and complementary food and the characteristics of the nutritional status of premature infants in Indonesia. **Materials and Methods:** Data sources were obtained from secondary data from the National Basic Health Research (Riskesdas) conducted by the Health Research and Development National Institute, Ministry of Health of the Republic of Indonesia in 2018. The research design was a national level survey using cross-sectional and nonintervention methods. Respondents were selected households with children under the age of 2 years who were premature in 34 provinces in Indonesia. Data were analyzed using univariate, bivariate and multivariate tests. **Results:** Premature births are found mostly in rural areas (31.44%), whereas infants of normal birth age are found in urban areas (74.42%). Male infants (28.51%) are more likely to be premature than female infants (28.13%). Individuals with occupations as a farmer have 35.31% more premature births than non farmers. Of note, 0.20% of infants with physical disabilities are premature infants. Premature infants who receive exclusive breastfeeding show lower (18.4%) severe undernutrition and undernutrition than those who do not receive exclusive breastfeeding (19.6%). Severe undernutrition and undernutrition nutritional status are found in the following groups: rural premature infants, 19.9%; male infants, 22.3%; low birth weight (<2500 g), 37.0%; short birth length (<48 cm), 25.2% and low education level of parents, 21.1%. Severe undernutrition and undernutrition are found at a higher rate (0.92 times) in premature infants who do not receive exclusive breastfeeding. **Conclusion:** Premature birth is related to residence, education level, occupation, birth gestational age, age of mother, birth weight, birth length, head circumference and nutritional status. Disabilities, severe undernutrition and undernutrition were present more often in premature infants than infants born with a normal gestational age.

Key words: Complementary food, exclusive breastfeeding, nutritional status, premature birth, malnutrition, formula milk

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Data Availability: All relevant data are within the paper and its supporting information files.

INTRODUCTION

Premature birth is a public health problem that has a high impact on morbidity and mortality. Premature births in both female and male infants are associated with poor metabolism. Premature infants are defined as infants born before week 37. In Sub-Saharan Africa and South Asia, more than 60% of 9.1 million births are estimated annually to be premature[1]. In Indonesia, the proportion of premature birth based on the age of the mother's womb reaches one-third or 29.5%[2]. Premature birth may cause death and susceptibility to developmental disorders and disabilities[3].

Adequate nutrition in childhood can improve health and prevent disease during their life span[4]. Nutritional status assessment is performed by monitoring body weight/age index measurements that can explain growth, nutritional status and stored energy[5]. Improvement of nutrition for children's survival is important and can be done through proper feeding and understanding by caregivers[6].

Low birth weight is a leading cause of infant deaths and is associated with cerebral palsy, deafness, blindness and disability[7]. Low birth weight is less than 2500 g and very low birth weight is less than 1500 g[8]. Low birth weight and down syndrome combined are likely to cause a much higher level of morbidity than either diagnosis alone[9].

Down syndrome is a disability caused by a specific genetic syndrome associated with chromosome trisomy 21. Down syndrome presents with unique facial features, mental retardation and hypotonia[10]. The diagnosis of trisomy 21 in Down syndrome infants is difficult when solely based on physical examination of premature infants, including low birth weight[9]. In addition, cleft lip is also an abnormal birth defect[11]. Optimal survival of children is determined by breastfeeding. Infant health development is measured through nutritional status, which is influenced by factors including exclusive breastfeeding and mother's education level[12].

Breastfeeding is an appropriate method of providing ideal food for infant growth and intellectual development and it is a reproductive process with implications for maternal health[13]. The first 1000 days of life (infants aged 6-23 months) are important for the growth and development of children, suggesting that the practice of complementary feeding should be optimized[14].

Complementary food is considered when breast milk is continued with other food or drinks. This period continues until the age of 24 months, which is a time of transition to family food. Complementary food provides benefits for the growth and development of children. However, complementary food often has inadequate nutritional quality and is given too early, given too late or given in small amounts. Moreover, the administration frequency [15], type and feeding practice of complementary food[16] are inadequate.

Understanding the factors that influence breastfeeding can increase the success of breastfeeding promotional programs[17]. Working mothers show difficulties breastfeeding their infants exclusively because they are hampered by full time work[13]. Improvement of knowledge, attitudes and the practice of complementary feeding can be done through improving education about health[18]. Understanding the practice of giving appropriate complementary food is important for mothers to increase awareness of complementary food[19]. The mother's educational level about complementary food contributes to the mother's knowledge for giving the correct complementary food, especially young, single and uneducated mothers[15].

This research was conducted to identify the effects of exclusive breastfeeding and complementary food, as well as the characteristics of the nutritional status of premature infants, in Indonesia.

MATERIALS AND METHODS

The data was obtained from the National Breastfeeding Health Research (Riskesdas) conducted by the Health Research and Development National Institute, Ministry of Health of the Republic of Indonesia in 2018. The research design was a national level survey using cross-sectional and nonintervention methods. The households with toddlers who were respondents in the 2018 Riskesdas study using the Susenas sample framework, were included in this study. The sample included households with children under the age of 2 years who were premature in 34 provinces in Indonesia. The selection of households in each census block was performed by systematic sampling with the implicit stratification of the highest education completed by the head of the household to maintain the representation of the characteristics of the household. The number of selected census blocks was 30. Each census block was selected by 10 households and the target sample was 300 households. The Susenas census block was conducted by the Central National Statistics using a probability proportional size method using linear systematic sampling with two-stage sampling.

The minimum sample size was calculated using premature proportions in children according to the 2018 Riskesdas report, which was based on estimated proportions with absolute precision. The p-value was 29.5 with a confidence level of 95% and a precision of 0.05. A minimum sample size of 640 premature children was obtained.

Independent, dependent and confounding variables were included. The independent variable consisted of breastfeeding and complementary food. The dependent variable was nutritional status. Confounding variables consisted of birth gestational age (month), age of mother (years), birth weight (g), birth length (cm) and head circumference (cm). The characteristics of the premature births of the respondent's children consisted of sex, age, residence, education level, occupation and birth disability.

Operational definition: Premature birth is considered when a baby is born at <37 weeks of gestation and normal pregnancy is considered when a baby is born at 37-42 weeks of gestation. Sex is distinguished as male and female. Education level is classified as no education, before elementary school, graduated elementary school, first secondary school, high secondary school, diploma and bachelor's degree. Low education level consists of no education, before elementary school, graduated elementary school and first secondary school. Higher education level includes high secondary school, diploma and bachelor's degree. Occupation is grouped as follows: no occupation, school, governance, private employer, entrepreneur, farmer, fisherman, driver/servants and other. Disability consists of blind, deaf, mute, physically disabled, harelip and down syndrome. Nutritional status is measured by anthropometry based on age and body weight (body weight index/age), which is converted into a standard value (Z-score) from WHO 2005 as follows: severe undernutrition (Z-score<-3.0), undernutrition (Z-score≥-3.0 to Z-score<-2.0), normal weight (Z-score≥-2.0 to Z-score≤2.0) and overweight (Z-score>2.0).

Exclusive breastfeeding is defined as infants aged 0 to less than 6 months who only receive breast milk (ASI) and are not given food or other drinks, including water (except drugs, vitamins, mineral drops or dairy milk). Exclusive breastfeeding for less than 6 months is a composite of the question whether the infant/child is still breastfed for 24 h and does not receive food or other drinks.

Complementary food is defined as diverse food consumption in children aged 6-23 months. Complementary foods include formula milk, nonformula milk, formula porridge, biscuits, flour porridge, starch water, fruit porridge, rice porridge, juice fruit and others.

Data analysis includes univariate analysis to calculate the frequency, percentage, mean, standard deviation and lower-upper value. Bivariate analysis was performed to investigate the relationship between variables (breastfeeding, complementary foods and characteristics of nutritional status). Multivariate analysis was performed to evaluate the effect of each confounding variable on the relationship between the independent and dependent variable. Analyses were performed using the Statistical Package Social Science (SPSS) software program.

RESULTS

Proportion of premature births based on characteristics: The proportion of premature births based on characteristics is presented in Table 1. Table 1 shows that premature births are found mostly in rural areas, while infants with normal births are found in urban areas. Residence has a significant relationship with premature and normal births.

Males are more likely to be born prematurely than females but there is no significant relationship between sex with premature birth and birth with normal gestational age.

Mothers who are not educated are more likely to give birth to infants with premature conditions compared to infants born with normal gestational age. Mothers with a higher education level have a lower rate of giving birth to premature infants. The results show that there is a significant relationship between the mother's educational level with the birth of premature infants and births with normal birth ages.

Individuals who work as a farmer have a higher premature birth rate than those with other jobs. A significant relationship was found between types of work and the birth of premature infants. With regard to disability, physically disabled mothers tend to have more premature births than mothers with other disabilities. However, this disability does not show a significant relationship with premature births and births with normal gestational age.

Mother and birth characteristics among premature children: The mother and birth characteristics among premature children are shown in Table 2. The following characteristics were found for premature births: birth gestational age is 35 months; age of mother is 29 years; birth weight is 2986 g; birth length is 48 cm and head circumference is 32 cm. There is a significant relationship of maternal gestational age, maternal age, birth weight of the baby, length of baby and the circumference of the baby's head with premature birth and birth with normal gestational age.

The average birth weight, birth length and head circumference were lower for premature births than normal births.

Table 1: Proportion of premature births based on characteristics

	Premature birth				Normal birth				
Characteristic	N	n	Percentage	Lower-upper	N	n	Percentage	Lower-upper	p-value
Residence									
Urban	19266	4927	25.58	24.51-26.67	19266	14338	74.42	73.33-75.49	≤0.05
Rural	16993	5343	31.44	30.53-32.37	16993	11651	68.56	67.63-69.47	
Sex									
Male	18333	5226	28.51	27.53-29.51	18333	13107	71.49	70.49-72.47	>0.05
Female	17926	5043	28.13	27.15-29.14	17926	12883	71.87	70.86-72.85	
Education level									
No education	534	191	35.76	30.82-41.02	534	343	64.24	58.98-69.18	≤0.05
Before elementary school	1916	661	34.53	31.60-37.58	1916	1254	65.47	62.42-68.40	
Graduated elementary school	6688	1928	28.83	27.30-30.41	6688	4760	71.17	69.59-72.70	
First secondary school	8830	2400	27.17	25.78-28.61	8830	6431	72.83	71.39-74.22	
Hight secondary school	12636	3547	28.07	26.85-29.32	12636	9090	71.93	70.68-73.15	
Diploma	1858	538	28.95	26.00-32.09	1858	1320	71.05	67.91-74.00	
Bachelor's degree	2905	782	26.90	24.77-29.14	2905	2124	73.10	70.86-75.23	
Occupation									
No occupation	22387	6295	28.12	27.19-29.06	22387	16092	71.88	70.94-72.81	≤0.05
School	267	78	29.05	21.52-37.95	267	189	70.95	62.05-78.48	
Governance	806	259	32.06	28.34-36.03	806	548	67.94	63.97-71.66	
Private employee	2917	698	23.92	21.44-26.59	2917	2219	76.08	73.41-78.56	
Entrepreneur	2635	725	27.49	25.18-29.93	2635	1911	72.51	70.07-74.82	
Farmer	2413	852	35.31	33.20-37.49	2413	1561	64.69	62.51-66.80	
Fisherman	42	11	25.48	14.94-39.97	42	32	74.52	60.03-85.06	
Driver/servants	854	227	26.57	22.29-31.33	854	627	73.43	68.67-77.71	
Others	3046	904	29.66	27.43-31-99	3046	2143	70.34	68.01-72.57	
Disability									
Blind	10270	14	0.14	0.05-0.38	25989	23	0.09	0.05-0.16	>0.05
Deaf	10270	12	0.11	0.03-0.39	25989	17	0.07	0.03-0.13	>0.05
Mute	10270	12	0.11	0.03-0.39	25989	18	0.07	0.03-0.13	>0.05
Physically disabled	10270	20	0.20	0.11-0.35	25989	35	0.13	0.09-0.21	>0.05
Harelip	10270	8	0.08	0.04-0.15	25989	35	0.14	0.08-0.24	>0.05
Down syndrome	10270	10	0.10	0.05-0.20	25989	47	0.18	0.11-0.29	>0.05

Table 2: Mother and birth characteristic among premature children

	Premature		Normal		
Characteristic	Mean±SD	95% CI	Mean±SD	95% CI	p-value
Birth gestational ages (month)	35.3±2.0	35.2-35.3	38.8±1.9	38.8-38.9	≤0.05
Mother ages (years)	29.6±6.4	29.3-29.9	29.5±6.1	29.3-29.6	≤0.05
Birth weight (g)	2986.5±488.2	2961.5-3011.5	3121.1±412.2	3110.8-3131.5	≤0.05
Birth length (cm)	48.2±2.3	48.1-48.3	48.7±2.0	48.7-48.8	≤0.05
Head circumference (cm)	32.7±1.9	32.6-32.8	32.8±1.7	32.8-32.9	≤0.05

Nutritional status based on weight for premature children: The nutritional status based on weight for premature children is shown in Fig. 1.

Figure 1 shows that severe undernutrition and undernutrition statuses are present more often in premature birth infants than in normal birth infants. In contrast, normal nutritional status is more commonly found in normal birth infants. The results of this study indicate a significant relationship between nutritional status with premature birth and normal birth.

Proportion of exclusive breastfeeding and ever breastfeeding for premature births: The proportions of exclusive breastfeeding and ever breastfeeding for premature births are shown in Table 3.

Table 3 shows that premature infants who received exclusive breastfeeding reached 30.5%, while normal gestational aged infants who received exclusive breastfeeding were higher at 36.1%. Furthermore, 90.6% of premature infants have been breastfed, while 92.8% of normal gestational aged infants have never breastfed.

Table 3: Proportions of exclusive breastfeeding and ever breastfeeding for premature births

		Exclusive breastfeeding				Ever breastfeeding					
		No		Yes		No		Yes		Don't know	
Premature birth		n	Percentage	n	Percentage	n	Percentage	n	Percentage	n	Percentage
Premature	No	15577	63.9	8798	36.1	1437	5.9	22613	92.8	325	1.3
	Yes	8255	69.5	3629	30.5	920	7.7	10763	90.6	201	1.7

Table 4: Risk factors for undernutrition and severe undernutrition for premature infants

	Nutritional status						
	Undernutrition and severe undernutrition		Normal and overweight				
Characteristic risk factor	n	Percentage	n	Percentage	OR	95% CI	p-value
Exclusive breastfeeding							
No	1615	19.6	6640	80.4	0.92	0.79-1.06	>0.05
Yes	666	18.4	2963	81.6			
Complementary food (month)							
<6	974	18.7	4233	81.3	0.99	0.88-1.13	>0.05
≥6	1306	19.6	5369	80.4			
Residence							
Rural	1523	19.9	6099	80.1	1.118	1.009-1.238	≤0.05
Urban	758	17.8	3504	82.2			
Sex							
Male	1354	22.3	4730	77.7	0.655	0.595-0.72	≤0.05
Female	927	16.01	4873	84.0			
Low Birth weight (g)							
<2500	273	37.0	465	63.0	2.610	2.192-3.109	≤0.05
≥2500	2008	18.0	9138	82.0			
Low length birth (cm)							
<48	351	25.2	1041	74.8	1.175	1.014-1.361	≤0.05
≥48	1930	18.4	8562	81.6			
Education level							
Low	1285	21.1	4802	78.9	1.299	1.177-1.433	≤0.05
High	930	17.1	4497	82.9			
Mother age at risk (year)							
<20 or>35	538	18.4	2381	81.6	0.878	0.787-0.981	≤0.05
20-35	1743	19.4					

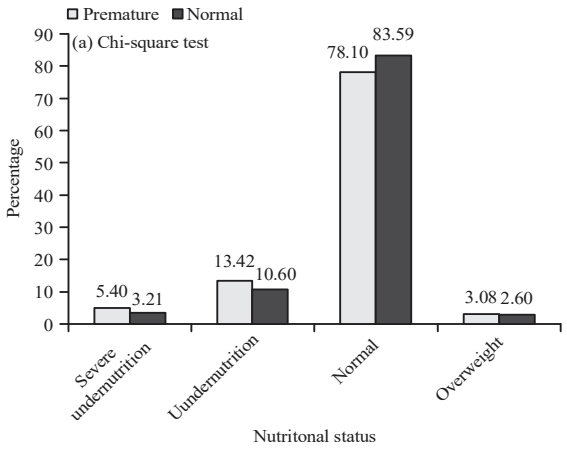

Fig. 1: Nutritional status based on weight for premature children

Proportion of complementary foods post-exclusive breastfeeding of premature infants: The proportion of complementary foods post-exclusive breastfeeding of premature infants is shown in Fig. 2.

Figure 2 shows that the most frequent complementary foods after exclusive breastfeeding are formula milk, rice porridge, biscuits, fruit porridge, formula porridge and flour porridge. The most commonly consumed complementary food type is formula milk, while starch water is rarely consumed.

Risk factors for undernutrition and severe undernutrition in premature infants: The risk factors for undernutrition and severe undernutrition for premature infants are shown in Table 4.

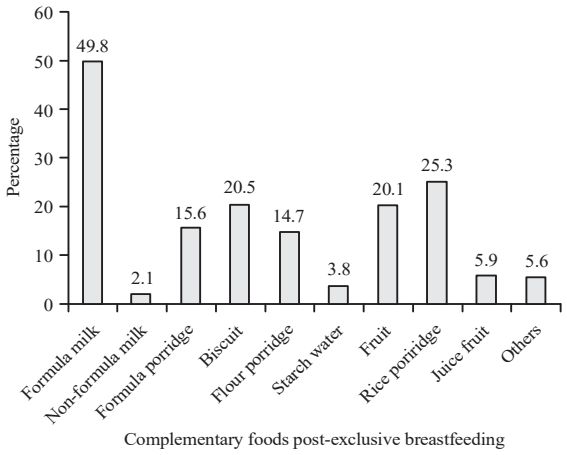

Fig. 2: Proportion of complementary foods post-exclusive breastfeeding of premature infants

Table 4 shows that premature infants who received exclusive breastfeeding showed lower (18.4%) severe undernutrition and undernutrition than those who did not receive exclusive breastfeeding (19.6%). The percentage of premature infants receiving complementary food at ≥6 months (19.6%) was greater than those of premature infants receiving complementary food at<6 months (18.7%).

Severe undernutrition and undernutrition statuses are found in premature births with the following characteristics: rural, 19.9%; males, 22.3%; low birth weight (<2500 g), 37.0%; low birth length (<48 cm), 25.2%; and low education level, 21.1%.

The risk factors for severe undernutrition and undernutrition after being controlled for several characteristic variables are described below. Premature infants who do not receive exclusive breastfeeding have 0.92 times higher chance of having severe undernutrition and undernutrition. Premature infants who are residents in rural areas have 1.12 times higher chance of having severe undernutrition and undernutrition. Males have 0.65 times higher chance of having severe undernutrition and undernutrition. Premature infants with low birth weight (<2500 g) have a 2.6 times chance of having severe undernutrition. Infants with low birth length (<48 cm) have 1.17 times higher chance of having severe undernutrition and undernutrition. Mothers with a low educational level have 1.29 times higher chance to have infants with severe undernutrition and undernutrition. Mothers aged at <20 years or >35 years have 0.87 times higher chance of having infants with severe undernutrition and undernutrition.

There was a significant relationship (≤0.05) of residence, sex, low birth weight, low birth length, educational level and age of mother with severe undernutrition and undernutrition in premature infants.

DISCUSSION

Premature birth is a global health problem that has significant cause of short-term and long-term morbidity and disability as well as neonatal death or death during the first 28 days of life[20]. Premature birth is also the main cause of death in children under the age of 5 and the incidence of premature birth has increased globally[21]. Sociodemographic factors, such as age, education level, occupation and positive perception, can influence breastfeeding[17].

There is a significant difference between the age of development to sit without help, sit with help, walk, chase objects with eyes, handgrip, handoff objects, cooperate for dressing and react to name with the appropriate/actual age[3]. It has been reported that 37 weeks gestation is associated with a greater prevalence of cleft forms[11] with the prevalence of congenital clefts being 0.1%[11]. The effects of Down syndrome in premature births include digestive disorders (10%) and congenital heart defects (50%)[10].

Other studies have shown that there is a relationship between the history of premature birth and low birth weight infants as 49% of premature births have low birth weight[22].

Previous studies have reported disabilities in infants born prematurely with neurological or developmental disabilities at 22-25 weeks gestation with 23% severe disability and 2% deaths. In addition, males are more likely to become disabled than females[23].

Premature birth may cause death, disabilities and susceptibilities to developmental disorders[3] and it may be a major cause of poor health later in life[20]. A lower gestational age impacts morbidity in children and a very low birth weight has a higher rate of morbidity[20]. The nutritional status of premature infants can be determined through anthropometric measurements based on body weight index and head circumference[24]. Children with a history of premature birth and low birth weight have a greater risk of disability and developmental delays[3].

Neonates with premature birth at low gestational age have higher morbidity and mortality compared to premature neonates at appropriate gestational age or term. Higher mortality and morbidity occur in infants with very low birth weight at lower gestational ages[20]. Premature births are associated with factors that include genetics, maternal conditions, nutritional status, infection and antenatalcare[25].

Other studies have found that there are significant differences among the education level, employment status and age at receiving health education (knowledge, attitudes and behavior) in the group of mothers after receiving health education[18]. The maternal age factor is that

younger(<20 years) and older (>34 years) mothers have a higher risk of giving birth to infants with low birth weight compared to mothers aged 20-34 years[7].

Premature infants with low gestational age have a greater risk of hypoglycemia compared with premature infants with appropriate gestational age[20].

Anthropometric measurements based on body weight/age index have a significant correlation to changes in body weight of premature infants[5]. The nutritional status of premature infants can be determined through anthropometric measurements based on body weight index and head circumference[24]. Good nutritional status can improve morbidity in the short term and determine the outcome of development in the long term[26]. Mothers who are stunted significantly contribute to infants who are stunted[27].

Premature infants have more changes in head circumference (5 times more) and are significantly related to head circumference compared to infants born with normal gestational age. In addition, premature children who are not breastfed show an abnormal relationship of the stomatognathic system[25]. The elimination of malnutrition in children is influenced by maternal education, maternal nutrition and duration of breastfeeding[28]. As much as 82.9% of highly educated mothers have infants with normal nutrition[12].

Morbidity caused by nutrition often does not look like to any other disease and can cause long-term adverse effects, thereby indicating the need to focus on nutrition in early neonatal years[26.]

Recommendations from the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) regarding breastfeeding include the initiation of breastfeeding in the first 1 h after birth, exclusive breastfeeding, breastfeeding for the first 6 months and continuous breastfeeding for 2 years or more. The initiation of breastfeeding within one hour after birth is significantly related to maternal education level, gestational age greater than 37 weeks and infant weight[29].

Maternal age and time of first oral feeding significantly affect the success of breastfeeding for premature infants[30]. Guedes[25] reported that the prevalence of successful breastfeeding for premature infants is 7.7 and 9.6% of children are not breastfed by their mothers. Moreover, infants who receive exclusive breastfeeding only reach 18.7%[12]. The appropriate age begins around the sixth month for introduction of complementary foods[31].

Complementary feeding is needed by infants at the age of 6 months because breastfeeding alone is not enough to meet nutritional needs to achieve optimal health at this age[32]. The period of complementary feeding (MPASI) is a period of critical growth in which infants are at high risk of experiencing nutritional deficiencies and illness.

Effective complementary feeding is beneficial and is directly proportional to the linear growth of children within in the first 24 months of life[33].

Only 50% of children receive appropriate complementary feeding[14]. The growth and nutritional status of infants who are fed solid food before the age of 6 months are impacted[27]. The provision of complementary feeding for children aged 6-23 months needs to be increased because it is related to nutritional status, namely, wasting and stunting[14].

The influence of family members and mothers who work full-time can weaken and hinder the practice of exclusive breastfeeding even though working mothers have extensive knowledge of the practice of exclusive breastfeeding[13].

Previous studies have reported that 82.2% of infants have normal nutrition and that 80% of infants receiving exclusive breastfeeding have normal nutrition[12.] Mothers who have a high school education level show the following results: initiation of breastfeeding within one hour after birth, gestational age more than 37 weeks, weight of the infants greater than 2500 g and lack of prelacteal feeding[29]. No significant relationship was found between exclusive breastfeeding and mother's educational level with the nutritional status of infants[12].

In this study, more premature births were found in rural areas and more infants with normal birth ages were found in urban areas. Male infants are more likely to be premature than a female infants. Premature birth is related to education level, occupation, birth gestational age, age of mother, birth weight, birth length, head circumference and nutritional status. Severe undernutrition and undernutrition are present more often in premature birth infants compared to normal birth infants. Conversely, normal nutritional status is more commonly found in infants born with a normal gestational age.

Normal development and prevention of undernourishment can be promoted by providing breastfeeding support to mothers and their families to reduce the risk of premature birth[25]. Increasing knowledge of normal development is an on-going strategy needed to improve the practice of infant feeding by mothers[6].

Premature births have decreased due to education provided before birth, screening for medical disorders in antenatal care guidelines, improving nursing from mothers, introducing kangaroo model mother care, providing better access to contraception and increasing maternal empowerment[20]. In addition, premature infants with low birth

weights need to undergo a development screening test[3]. Early detection for those at high risk of developing cleft deformities should be a strategy to prevent long-term adverse effects. Early identification is aimed at newborns with 37 weeks gestation, maternal age ≥34 years, birth weight <1.5 kg and mothers with parity[11]. Neonatal intensive care is recommended for infants with very low weights due to premature birth[21].

Program policies relating to the nutritional status of children include maternal health and education level[23]. Nutritional management must begin immediately after infants are born to avoid the effects of undernutrition and to obtain optimal health[26]. Recommended policies to reduce undernutrition include maternal education factors, duration of breastfeeding and maternal nutritional status[23].

Breastfeeding provides benefits as an efficient and cost-effective therapeutic approach in reducing morbidity in premature birth. The first time that infants breastfeed is a critical window for mothers. Knowledge of this critical window is improved by strengthening education and breastfeeding practices as well as facilitating direct contact between mother and baby[30].

The level of maternal education shows a significant relationship with breastfeeding in the first hour after birth[29]. The understanding of the benefits of exclusive breastfeeding can be increased for mothers who have low education levels[17]. To increase maternal knowledge about breastfeeding, mothers are encouraged to breastfeed in the first hour after birth, reduce prelacteal feeding in the first hour after birth and increase maternal and infant contact and communication in one room[29].

Counseling conducted during antenatal care is focused on the problem of breastfeeding difficulties as well as increasing breastfeeding support in the workplace[17]. Communication with mothers to increase knowledge and motivation about the concept of breastfeeding and proper feeding is important[18].

Appropriate complementary foods can impact optimal growth[33]. Lactation failure is the main cause of early complementary feeding[32], which can be caused by the inability of the caregiver to implement the recommended feeding practices[6].

The delay in the introduction of solid food and early termination of exclusive breastfeeding are caused by mothers who work full-time[32]. Therefore, we need a rest policy that can ensure and guarantee for mothers who work full-time to avail opportunities to breastfeed their infants, especially exclusively breastfeeding mothers[13]. We recommend that there should be a guarantee that there will be no discrimination from the government for mothers who work to provide breast milk through appropriate mechanisms. Mothers should have the right to breastfeed at work given by the Ministry of Manpower. Hygienic and comfortable breastfeeding facilities should be provided for nursing mothers at workplaces by employers. Mothers who work should arrange babysitter close to the workplace to allow milk to be provided to the infants[13].

CONCLUSION

Premature birth is related to residence (urban and rural areas), education level, occupation, birth gestational ages, mother ages, birth weight, birth length, head circumference and nutritional status. Severe undernutrition and undernutrition in premature infants are caused by several factors, including residence in rural areas, male sex, low birth weight (<2500 g), low birth length (<48 cm), low educational level and age of mother <20 years or >35 years.

Disabilities, severe undernutrition and undernutrition are present more often in premature infants than infants born with a normal gestational age. Mothers with higher educational levels have lower rates of giving birth to premature infants.

Fewer premature infants have undernutrition after being exclusively breastfed compared to those who are not exclusively breastfed.

The most frequent post-breastfeeding complementary feeding (MPASI) is in the form of formula milk, rice porridge, biscuits and fruit porridge.

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