ORIGINAL ARTICLE

Prevalence and risk factors of underweight status among children aged between six to twenty-four months in Hlaing Tharyar Township of Myanmar

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Abstract

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A cross-sectional study was used to identify the prevalence of underweight status and risk factors among children aged between six to twenty- four months in Hlaing Tharyar Township. Two-stage stratified sampling method was used to randomly select 385 respondents. A face to face interview with a structured questionnaire were used to obtain data from mothers and their child's weight were measured. Chi-square test and multiple logistic regression were used to examine associations between independent variables and underweight of children.

Prevalence of underweight status was 17.7%. The underweight status was significantly associated with family income, mother's occupation, father's occupation, gestational period, age of the child, immunization, food intake between 10 to 12 months and 13 to 24 months. Immunization (Adj OR= 3.31, 95%CI= 1.13-9.66) remained significant predictors for underweight status of children when adjusting for the other factors. Children not taking vaccination were 3.31 times more likely to be underweight than those taking vaccination. The findings of this study suggested that promoting health education programs to increase knowledge of mothers, and increasing immunization coverage up to 100% should be done by the authorities to improve the nutritional status of the children.

Keywords: prevalence of underweight status, risk factors, children aged between six to twenty-four months, Myanmar

ความชุกและปัจจัยเสี่ยงต่อการมีน้ำหนักต่ำกว่าเกณฑ์ของเด็กที่อายุ 6 -24 เดือน ในเมืองไลน์ตาย่าร์ ประเทศพม่า

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บทคัดย่อ

เซย่า โซ จิราพร ชมพิกุล และโซอะ หงส์
ความชุกและปัจจัยเสี่ยงต่อการมีน้ำหนักต่ำกว่าเกณฑ์ของเด็กที่อายุ 6 -24 เดือน
ในเมืองไลน์ตาย่าร์ ประเทศพม่า
ว.สาธารณสุขและการพัฒนา 2559; 14(3):29-44

การศึกษานี้เป็นการศึกษาแบบภาคตัดขวางเพื่อศึกษาความชุกและปัจจัยเสี่ยงของการมีน้ำหนักต่ำกว่าเกณฑ์ของเด็กที่อายุ 6 -24 เดือนในเมืองไลน์ตาย่าร์ ประเทศพม่า โดยสุ่มตัวอย่างแบบมีชั้นภูมิสองขั้นเพื่อให้ได้เด็กอายุ 6-24 เดือน จำนวน 385 คน การเก็บข้อมูลโดยการสัมภาษณ์มารดาตามแบบสอบถามที่มีโครงสร้างและชั่งน้ำหนักของเด็ก วิเคราะห์ข้อมูลโดยใช้การทดสอบไคสแควร์และการถดถอยลอจิสติคพหุคูณเพื่อค้นหาปัจจัยที่มีความสัมพันธ์กับการมีน้ำหนักต่ำกว่าเกณฑ์ของเด็ก

ความชุกของการมีน้ำหนักต่ำกว่าเกณฑ์ของเด็กเท่ากับ 17.7% ปัจจัยที่มีความสัมพันธ์กับการมีน้ำหนักต่ำกว่าเกณฑ์ของเด็กอย่างมีนัยสำคัญทางสถิติ ได้แก่ รายได้ครอบครัว อาชีพของมารดา อาชีพของบิดา อายุครรภ์ อายุเด็ก การฉีดวัคซีน อาหารที่กินระหว่างช่วงอายุ 10 ถึง 12 เดือน และ 13 ถึง 24 เดือน แต่เมื่อได้ปรับอิทธิพลของตัวแปรอื่นๆ แล้ว พบว่าการฉีดวัคซีน (Adj OR=3.31, 95%CI=1.13-9.66) ยังคงมีความสัมพันธ์กับการมีน้ำหนักต่ำกว่าเกณฑ์ของเด็กอายุ 6-24 เดือน เด็กที่ไม่ได้รับการฉีดวัคซีนมีแนวโน้มที่จะมีน้ำหนักต่ำกว่าเกณฑ์ 3.31 เท่าของเด็กที่ได้รับการฉีด

ข้อเสนอแนะจากผลการวิจัยของการศึกษานี้คือ กระทรวงสาธารณสุขและทุกฝ่ายที่เกี่ยวข้อง ควรส่งเสริมโปรแกรมสุขศึกษาเพื่อเพิ่มความรู้ของมารดาในเรื่องการเลี้ยงดูและภาวะโภชนาการของเด็ก และจัดบริการให้เด็กได้รับการฉีดวัคซีนครบทุกคนเพื่อส่งเสริมภาวะโภชนาการของเด็ก

คำสำคัญ: ความชุกของการมีน้ำหนักต่ำกว่าเกณฑ์ ปัจจัยเสี่ยง เด็กอายุ 6-24 เดือน ประเทศพม่า

Introduction

Under-nutrition is one of the leading public health problems around the world particularly in developing countries[1]. It is estimated that more than 10 million children aged 0-4 years died in 1999[2]. Globally, almost 50% of the countries are now facing with several serious health problems related with under-nutrition like poor child growth and micronutrient deficiency. There were around 101 million children less than 5 years of age were suffered from underweight in 2011. Although the prevalence of underweight and stunting were reduced from 1990, these children nutritional problem was still a worldwide problem[3]. While all the organizations are trying to reduce malnutrition, the progress is too slow and too even. Almost fifty percent of the countries does not have enough nutritional data for meeting the global World Health Assembly (WHA) targets. Moreover, around 45% of deaths of children under 5 years of age are linked to under-nutrition[4]. These children deaths vary among the world regions and highest in sub-Saharan Africa (41% of child death) and 34% in southern Asia, and lowest in industrialized countries[5]. More than one third of the deaths of the children are due to malnutrition because these malnourished children are prone to infection. In addition, undernourished children are more likely to suffer from chronic illness like disabilities and illness compared with normal children[6-7] because the immune system of children declines to defence complication from subsequent diseases like measles[5]. However, millions of children still suffer from malnutrition[6], particularly in developing countries. It is reported that more than one-third of deaths are occurring during early childhood and are attributed to under-nutrition which is mostly from preventable through economic development and public health measures[6]. With the importance of early childhood to prevent growth faltering, research efforts have become focused on the first two years of a child's life. As a proper identification of population at risk of malnutrition is crucial to prompt timely intervention and health policy, it is required to prioritize effective intervention based on accurate information about the causes of malnutrition[8].

In Myanmar, every year there are about 56,000 children under 5 years of age died from preventable health problems. Moreover, this child mortality rate was still high among ASEAN countries[9]. About 70 percent of the people are living in rural areas and majority of under-nutrition is common in both rural and urban areas. A large proportion of rural population in developing world has no access to modern health services[10]. Therefore some of the people living in rural areas are moving towards urban cities and they are living around the peri-urban and rural areas without permission. So, children living in that area are laid in unhealthy environment like overcrowding, insufficient health facilities and spaces leading to malnutrition. Malnutrition at the early stages of life can lower child resistance to infections, increasing child morbidity and mortality, and decrease mental development and cognitive achievement and nutritional status is the best global indicator of well-being in children[11]. According to Multiple Indicator Cluster Surveys (MICS) report from 2009-2010, prevalence of underweight was 22.6% meanwhile, MDG goals for underweight prevalence was 19.3% by 2015[12].

Therefore, it is necessary to estimate the magnitude and determinants of under-nutrition[6]. Malnutrition rates are alarming features in Myanmar today. Better nutrition increases labor productivity directly for future. Better nutrition also may improve the immediate consumption and welfare of the poor members of the society and contribute to the broadest goal[13]. Among other risk factors, economic level of the household and schooling of the mothers and income have direct effects on children's nutritional status[14]. Moreover, there is a need to address the immediate cause and underlying basic factors associated with under-nutrition in the area[15]. There is limited information in this township related with the nutritional status of the children. Only the sentinel surveillance was done for the nutrition. This township, Hlaing Tharyar is a newly built township. There is one of the industrial zone townships among Yangon City, so a lot of people from rural area especially Ayarwaddy Division came to that township and stay there for job. Moreover, last 8 years ago, there was a storm Nargis occurred in our country most severely affected in Ayarwaddy Division. So, many people from rural areas who worked as farmers are moving towards urban cities and most of them reach and stay in Hlaing Tharyar Township to work in industries. Therefore, the population in the study area is very overcrowded and majorities are internal migrants. Some people are living illegally by building houses in the garden and aside the streets, roads without permission. They live without latrines and safe water supply, and the majority were daily workers. Therefore, the health status of this township is different from other townships. Moreover, inadequate food patterns or improper type of food is also a contributing factor to under-nutrition. Some factors like high food prices, poor feeding practices and non-exclusive breastfeeding and inappropriate weaning diets and complementary feeding before six months contribute children's under-nutrition[6,7]. In that township, as majorities are daily workers and factory workers, most of them might not provide exclusive breastfeeding, continuation of breastfeeding up to 2 years as well as proper time and types of complementary food to their children. This raises to a nutritional problem among children aged under 2 years in this Township. Therefore, the aims of this study were to determine prevalence and risk factors of underweight status among children aged six to twenty-four months in Hlaing Tharyar Township, Yangon division of Myanmar.

Methods

The sample was collected from the last week of April to the last week of May in 2016. A total of 385 mothers including their children aged six to twenty-four months participated in the study. Face to face interview was conducted with a structured questionnaire to obtain data from the mothers and then anthropometric measurements (weight) was done in their children. Those children whose mothers did not want to participate in the study or ill or disable children were excluded from the study. Not only face to face interview to the mothers, but also antenatal care and child immunization record cards were also checked to minimize information bias and recall bias.

Sampling techniques

Two-stage stratified sampling method was conducted in rural and urban areas. Five wards, 4 village tracts and 7 villages were randomly selected from the study areas which consisted of 20 wards, 9 village tracts and 18 villages. Then, households were randomly taken from the selected wards and villages. Then the estimated data about total population of children between 6 to 24 months of age in that selected areas were obtained from the midwives and the head of the villages. This data were estimated according to the number of children in the previous immunization records. The sample size was estimated using a confidence interval of 95%, an acceptance error of 5%, and stunting prevalence of 35.1% (from MICS 2009-2010)[12] The sample size was allocated proportionately to the population size. Since we did not know exactly about the percentage of children in the study area due to migration and overcrowding, we select according to the distribution of people around the country. In Myanmar, 30% of the people are living in urban areas and 70% were living in rural areas. Therefore, 30 % of the participants (n=115) from the urban area and 70% (n=270) from the rural area were selected according to the population proportionate to size. This village tracts and villages are different mainly in population. Most of the socioeconomic status was the same. These villages and village tracts were included in the rural portion. Then, a structured questionnaire was used to interview mothers who had the children of aged between 6 months to 24 months and anthropometric measurements was done among their children.

Research instruments

Questionnaires were structured first in English and then translated to Myanmar Language, grammar and spellings including meanings and back translation were carefully rechecked by Academic English teacher. Weighting scale (salter scale) was calibrated and used to measure the weight of the children by only the researcher. Methods of measurements were used based on the WHO child growth standard guideline. The questionnaires were developed by using UNICEF model for child nutrition categorized into basic influences, underlying influences and immediate influences. Two variables; food intake and child illness from immediate influences, eleven from underlying influences such as mother's age at delivery, mother's height, gestational period, birth weight of the child, gender, age of the child, birth order, antenatal care services, immunization of the child, breastfeeding including knowledge of mothers, and another eleven variables from basic influences like maternal occupations and education, father's occupations and education, number of children in the family, types of latrine used, types of drinking water, types of building, types of residence, marital status and family income per months were structured consequently in 56 questions.

Outcome measurements

With the use of WHO standard guideline, weights of the children aged between 6 to 24 months were measured using salter scale hanging machine. If the child was wearing sweater or shoes, we took off the clothes before we measured. The weighting scale will be recorded to the nearest 0.1 kg or 100g. Measurements were conducted only by one researcher and one research assistant was involved only for questionnaire. After calculating the weight of the children with their age groups, all the scores were converted into Z-scores which were separated for boys and girls. Underweight was resulted when the Z-scores was less than -2SD. These scores were analysed according to WHO child growth standard. To estimate the nutritional status of the study area, the resulting weight, length and age were recorded and put into the Anthro-Calculator version 3.2.2. The results were transferred into Microsoft excel 2010 and then put into SPSS software version 22. Based on WHO-Anthropometric software version 3.2.2, date of visit and sex (male/female) including weight of the child were put in the anthropometric calculator. Depending on WHO standard Z - score of weight for age, the outcome was further categorized into six groups for underweight (weight for age). Nutritional status using weight-for-age Z-score were categorized as followed: too light (<-3.0 SD), light (-3.0 to < -2.0 SD), underweight (-2.0 to <-1.5 SD), average weight (-1.5 to 1.5 SD), overweight (1.5 to 2.0 SD), and heavy (>2.0 SD)[16]. In this study, Z score less than -2SD was classified as underweight.

Validity of the instruments

A questionnaire was structured based on reference books and research articles and recommendation was taken from two technical experts. To get the reliability of anthropometric measurement, only single weight scale (salter scale) and one researcher measured weight and height of children. These instruments were accepted by WHOs standard. A pre-test was conducted with 30 participants of the same age group in another similar area with the study. The pre-test data was analysed for internal consistency. The reliability of the knowledge part (KR-20) was 0.728. Only one research assistant from public health field was allowed to assist for interviewing using the questionnaire. But in some parts of the questionnaire like immunization status (complete or not), only the researcher determined this question by considering child's immunization records. During pre-test, the validity of the weighting scale was checked. Firstly the scale of the weighting machine was set to zero. After that the child was put into the container hanging with the weighting scale. All the heavy clothes, shoes were taken off to get the actual weight of the child. After reading the weight of the child in kilograms by one decimal place, the instrument was set to zero. The weight of this child was measured three times and if it was found that the following three measurements had the same results and identify this instrument as valid. The research proposal was approved by the Ethical Committee of Mahidol University with certificate of approval number 2016/154.2604.

Data processing and analysis

To convert the result of measurement into the Z-score, WHO anthro calculator version 3.2.2 was used which was saved in Microsoft excel 2009 and then put into SPSS version 22. All data were coded and analysed using SPSS program. Descriptive statistics, such as frequency, percentage, mean, standard deviation were used based upon types of variables. Chi-square test was used to examine an association between each independent variable and underweight of the children. Lastly, multiple logistic regressions was analysed to determine significant predictors associated with underweight status.

Results

From a total 385 children aged between six to twenty four months, prevalence of underweight (light) status was 17.7% and among them 2.3% were severe underweight (too light) which was shown in Table 1. The result showed that 70.1% of the children lied within the average weight and 10.7% have reached to the risk zone between -1.5 SD and -2 SD. The prevalence was higher in urban than rural area.

Table 1 Prevalence of the underweight status of the children

Nutritional status	Total		Areas	
	Number	%	Rural %	Urban %
Weight for age	**385**	100		
Too light	9	**2.3**	**2.2**	**2.6**
Light	59	**15.4**	**14.1**	**18.1**
Underweight	**41**	10.7	10.9	10.3
Average weight	270	70.1	70.6	69.0
Overweight	4	1.0	1.5	0.0
Heavy	2	0.5	0.7	0.0

Table 2 shows about half of the mothers (51.7%) completed primary or below primary education level. Most of the mothers (80.8%) were housewives (women staying at home and working only housework such as cooking and washing and cleaning). In this study, it was found that over half of the fathers finished their education level higher than primary level. The majority was working as daily workers, the rest (45.2%) were working as factory workers, government staff, own business and merchant. Over half of the families have one child and remaining 42.9% have children more than one. Around 86% of the respondents were using sanitary latrines and 87% were utilizing drinking water from the sources of clean water and pipe water. Clean water means water which is manufactured from the factory registered by ISO and FDA (Food and Drug administration) committee and packed with plastic bottles. Over half were staying in wooden house. On regarding with marital status, 3.1% of the respondents were single mothers (divorced, widow and women who adopted the orphan children). 58.4% of the families had income less than 200,000 kyats.

Table 2 Distribution of respondents by socioeconomic factors

Socioeconomic factors	Frequency	Percent
Mother's education		
Primary level and below	199	51.7
Above the primary level	186	48.3
Mother's occupations		
Housewife	311	80.8
Occupied	74	19.2
Father's education		
Primary level and below	155	40.7
Above primary level	226	59.3
Missing	4	
Father's occupations		
Daily workers	207	54.8
Well occupied	171	45.2
Missing	7	
Total number of children in the family		
One Child	220	57.1
More than one child	165	42.9
Marital status		
Married	373	96.9
Single mother	12	3.1
Family income per month*		
<200,000 kyats	225	58.4
200,000 kyats or more	160	41.6
Median= 200,000, QD= 75,000		
Min= 60,000, Max= 700,000		
Types of latrine used		
Sanitary latrine (ventilated/water sealed)	329	85.5
Unsanitary pit latrine	56	14.5
Types of drinking water		
Shallow/ deep well/ water from ponds	50	13.0
Clean water/ Pipe water	335	87.0
Types of housing		
Bamboo type	91	23.6
Wooden type	201	52.2
Bricks	93	24.2

*1 USD = 1200-1300 kyats

Table 3 presents 79.5% of the mothers were within normal age groups between 20 to 35 years and 11.2% had the height lower than 145cm. Among the children, 5.2% were born as preterm, gestational age less than 37 weeks and 10.9% with low birth weight. The gender distribution of the children in this study area was almost equal, 48.6% for males and 51.4% females. The age distribution of them was different: 41% was between 6 to 9 months, 43.7% between 13 to 24 months, and 15.3% between 10 to 12 months. Over 95% of the children were received immunization and 65.7% of them completed vaccination. Exclusive breastfeeding among the respondent was 23.1% which was almost similar with the national data reported in MICS 2009-2010 showing that 23.6%.

In this study, 46.2% of the children were suffered from illness previous one month. Majority had acute fever accounting for 48.3 (Table 4). Among 178 ill children, only 123 children received treatment from the hospital and general practitioner and the remaining 55 children did not take treatment from the health care staff or health centres. The majority of them (94.5%) were treated by their mothers and grandparents (self-medication).

Table 3 Distribution of respondents by biological and behavioural factors

Biological and behavioural factors	Frequency	Percent
Mother's age at birth		
Less than 20 years	42	10.9
20 to 35 years	306	79.5
More than 35 years	37	9.6
Maternal height		
High risk group (< 145 cm)	43	11.2
Normal group (≥ 145 cm)	342	88.8
Gestational period		
< 37 weeks	20	5.2
≥ 37 weeks	364	94.8
Missing	1	
Birth weight of the child		
Normal birth weight (≥ 2500 grams)	342	89.1
Low birth weight (< 2500 grams)	42	10.9
Missing	1	
Gender of the child		
Female	198	51.4
Male	187	48.6
Age of the child		
6 to 9 months	158	41.0
10 to 12 months	59	15.3
13 to 24 months	168	43.7
Antenatal care services (n= 371)		
< four times	69	19.1
≥ four times	292	80.9
Immunization		
Yes	367	95.3
No	18	4.7
Immunization status (n= 367)		
Complete	241	65.7
Not complete	126	34.3
Exclusive Breastfeeding (Six months)		
Yes	89	23.1
No	296	76.9

Table 4 Distribution of respondents by child illness

Child illness	Frequency	Percent
Illness during last month		
Yes	178	46.2
No	207	53.8
Types of illness (n= 178)		
Diarrhoea	23	12.9
Acute fever	86	48.3
Acute respiratory infection	48	27.0
Pneumonia	2	1.1
Febrile convulsion	6	3.4
Others	13	7.3
Self-medication (n= 55)		
No	3	5.5
Yes	52	94.5

Table 5 shows underweight status had a significant association with each factor (family income, mother's occupation, father's occupation, gestational period, age of the child, immunization, food for children aged ten to twelve months and food for children aged 13 to 24 months). On the other hand, gender of the child, birth weight, birth order, mother's age, maternal height, mother's education, father's education, marital status, number of children in the family, types of residence, types of drinking water, types of latrine, types of housing, knowledge of mothers, number of ANC visits, exclusive breastfeeding, initiation time of breastfeeding, illness during last month, types of illness, time of complementary food introduced, current food within 7 days and food for children aged six to nine months were not associated with underweight status. Children not taking vaccination were 3.19 times more likely to be underweight than those taking vaccination. Multiple logistic regression also indicated that children not taking vaccination were 3.31 times more likely to be underweight than those taking vaccination when adjusting for the other factors (Table 6).

Table 5 Association between independent variables and underweight status of the children

Independent variables	Underweight status			Crude OR (95% CI)	p-value
	n	Yes %	No %		
Family income					
< 200,000 Kyats	212	22.6	77.4	2.24 (1.27-3.94)	**0.005**
≥200,000 Kyats	173	11.6	88.4	1	
Mother's occupation					
Occupied	74	9.5	90.5	0.43 (0.187-0.98)	**0.044**
Housewife	311	19.6	80.4	1	
Father's occupation (n= 378)					
Daily workers/ farmers	207	21.3	78.7	1.83 (1.05-3.19)	**0.034**
Well occupied	171	12.9	87.1	1	
Type of latrine used					
Unsanitary	56	26.8	73.2	1.91 (0.98-3.69)	**0.056**
Sanitary	329	16.1	83.9	1	
Gestational period					
<37 weeks	20	35.0	65.0	2.68 (1.03-7.00)	**0.044**
≥37 weeks	364	16.8	83.2	1	
Gender of the child					
Male	187	21.4	78.6	1.65 (0.97-2.81)	**0.064**
Female	198	14.1	85.9	1	
Age of the child					
13 to 24 months	168	28.0	72.0	4.73 (2.40-9.31)	**<0.001**
10 to 12 months	59	15.3	84.7	2.19 (0.87-5.51)	**0.096**
6 to 9 months	158	7.6	92.4	1	
Immunization					
No	18	38.9	61.1	3.19 (1.19-8.56)	**0.021**
Yes	367	16.6	83.4	1	
Knowledge of mother					
Poor	271	19.2	80.8	1.45 (0.79-2.67)	**0.228**
Fair to good	114	14.0	86.0	1	
Food for children aged ten to twelve months (n= 227)					
Less than four food groups	84	32.1	67.9	1.86 (1.01-3.44)	**0.047**
Four or more food groups	143	20.3	79.7	1	
Food for children aged 13 to 24 months (n= 168)					
Less than four food groups	34	44.1	55.9	2.52 (1.15-5.52)	**0.021**
Four or more food groups	134	23.9	76.1	1	

Table 6 The predictors of underweight status of the children

Independent variables	Underweight status Adjusted OR (95%CI)
Family income	
< 200,000 Kyats	2.34 (1.28-4.29)**
≥200,000 Kyats	1
Maternal occupation	
Occupied	0.47 (0.20-1.11)
Housewife	1
Age of the child	
13 to 24 months	5.43 (2.67-11.01)***
10 to 12 months	2.12 (0.82-5.48)
6 to 9 months	1
Knowledge of mother	
Less than 60%	1.22 (0.64-2.34)
60% or more	1
Immunization	
No	3.31 (1.13-9.66)*
Yes	1

*p-value <0.05, **p-value <0.01, ***p-value <0.001

Discussion

Our study showed that prevalence of underweight (Z-score less than -2SD) was 17.7% (16.3% in rural and 20.7% in urban) which was similar to the estimation (22.6%) from MICS 2009-2010 report[12]. Moreover, the main type of occupation in study area was daily workers (it meant people who were working as day time workers and got money day by day, if they did not work one day, they were not paid). Yangon is commercial city and Hlaing Tharyar Township is one of the industrialized townships in Yangon with highest population. During last eight years, there was Nargis Storm occurred in our country and there were a lot of damages and loss especially delta and rural regions. Although the government tried to recover the affected areas, most of the people living in that area were moving towards the urban cities. Therefore, the population and socioeconomic status were different from other regions.

Factors related to underweight was similar with those in the previous studies, such as family income[17, 18], maternal occupation[18, 19], father's occupation[17], types of latrines used[17, 6], gestational period, gender of the child[20], age of the child[18], immunization[21, 22], food between 10 to 12 months and 13 to 24 months[23]. After adjusting all confounding factors, family income, age of the child and immunization were significant predictors for underweight status. The highest p-value was found in age of the child which was similar with the previous studies showing that as the child gets older, it is more likely to cause under-nutrition meaning that weaning and breast milk make them more vulnerable to malnutrition. This result was similar with the study showing that highest proportion of underweight was observed in children age group between 12 to 24 months[7, 15, 24]. So, there might be inadequate supplementary food supply for children as the child reached beyond six months since breast milk alone cannot supply the required energy for growth and development[18].

Several studies[17, 18, 22] approved that income is directly related with nutritional status of the children. Household with low income and household monthly expenditure would have increase in prevalence of underweight status as it is a root cause of diseases[22]. It might be possible that high income families can have more nutritious food, more health care facilities like sanitary latrines than low income families[18].

Another predictor of underweight was immunization. In this study, children with no immunization was 3.31 times more likely to be associated with underweight than immunized children. This finding was similar to the studies done in Uganda showing that immunized children had more significant better good health than those children who were not immunized[21]. Moreover, it was found that incomplete immunization was nine folds at risk to cause under-nutrition than non-immunized children[22].

Although some factors like maternal occupations and knowledge of mothers had no significant associations, they also play a critical role in determining the nutritional status of the children. In this study, occupied mothers were 0.47 times less likely to have underweight children compared to those being housewife, which showed the opposite result with the previous studies[23, 19]. In this study area, most of the participant mothers were housewife and they have low education level than occupied mother. This might be possible due to low knowledge and education level of mothers. Moreover, poor knowledge leads to poor food intake that causing chronic malnutrition[25]. Some studies found that educated mothers can decide what to do for their children in caring and notice from diseases or acute illness. Moreover, educated mothers were easier to gain knowledge about their child's health[21, 26].

Recommendations

This current study showed that family income, maternal occupation, age of the child, knowledge level of mothers and immunization were associated with underweight status of the children. The results pointed out that the policy makers should emphasize for the following sectors; 1) Providing low cost or free of charge health care services for the children in low income families or jobless parents in that area, 2) Promote health education and supportive health care services like home visit teams or mobile teams , 3) Providing immunization coverage up to 100% and supportive mobile immunization teams for rural and urban areas and collaborate with NGOs and INGOs for immunization and nutrition programs, 4) Providing knowledge about the importance of environmental sanitation and food intake for the child, 5) Prioritizing nutritional programs and weight monitoring for the children above one year than under one child.

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