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ORIGINAL ARTICLE

Factors related to stunting status of the children aged under two years in Magway Township, Myanmar

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Abstract

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This cross-sectional analytic study was carried out to determine factors related to stunting status of children aged under two years in Magway Township, Myanmar. Data were collected by using multi-stage cluster sampling and a total of 399 children aged under two years and their mothers were included in this study. After interviewing the mothers by using a face to face method, anthropometric measurements of the children and mothers were performed. Descriptive statistics were used to describe the characteristics of independent variables, dependent variable, and stunting status of the children. Chi-square test and multiple logistic regression were applied to identify the factors related to the stunting status of children.

The finding shows that nearly one-fourth of the under two years children (23.8%) were stunted. The result from multiple logistic regression showed that mother's height (<145 cm), family income (<25 percentile/ <60$), child age (>10 months), gestational age of the child (<37 weeks) and early introducing of complementary food to the children (<6 months) were the predicting factors of the stunting status of the children in this population.

Therefore, Maternal and Child Health Care Services, implementing various health education and intervention programs to the mothers and families focusing on quality antenatal care and an appropriate time for introducing complementary food should be addressed.

Keywords: Stunting, Children aged under two years, ANC, Complementary food, nutritional status

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ปัจจัยที่มีความสัมพันธ์กับภาวะเตี้ยในเด็กอายุต่ำกว่าสองปี ในเมืองแมกเวย์ ประเทศเมียนม่าร์

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บทคัดย่อ

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ว.สาธารณสุขและการพัฒนา. 2557; 12(3): 3-16

การศึกษาครั้งนี้เป็นการวิจัยเชิงสำรวจ มีวัตถุประสงค์เพื่อศึกษาปัจจัยที่มีความสัมพันธ์กับภาวะเตี้ยในเด็กที่อายุต่ำกว่าสองปีในเขตเมืองแมกเวย์ ของประเทศเมียนม่าร์ เก็บรวบรวมข้อมูลโดยการสุ่มตัวอย่างแบบกลุ่มแบบหลายขั้นตอน กลุ่มตัวอย่างในการศึกษาครั้งนี้ ได้มีการสัมภาษณ์มารดาที่มีบุตรอายุน้อยกว่า 2 ปี มีจำนวนทั้งสิ้น 399 คน โดยการชั่งน้ำหนักวัดส่วนสูงทั้งของบุตรและมารดา และการสัมภาษณ์จากมารดาของเด็ก การศึกษาภาวะปัญหาความชุกความเตี้ย ดำเนินการโดยการเทียบเคียงกับมาตรฐานการเจริญเติบโตขององค์การอนามัยโลก ได้ใช้สถิติเชิงพรรณนาเพื่ออธิบายลักษณะของตัวแปรในการศึกษานี้และค้นหาตัวแปรที่มีความสัมพันธ์กับภาวะเตี้ยในเด็กโดยใช้การทดสอบไคสแควร์ และการศึกษาครั้งนี้ได้ใช้การวิเคราะห์แบบสถิติถดถอยพหุเพื่อทำนายปัจจัยที่มีความสัมพันธ์ภาวะเตี้ยของเด็ก

การศึกษาครั้งนี้พบว่า ในตัวอย่างกลุ่มนี้มีเด็กจำนวนเกือบหนึ่งในสี่ มีลักษณะภาวะเตี้ย (ร้อยละ 23.8) และจากการศึกษาโดยการวิเคราะห์ทางสถิติแบบถดถอยพหุ พบว่าความสูงของแม่ ที่ต่ำกว่า 145 ซม. ครอบครัวมีรายได้น้อย (น้อยกว่าค่าเปอร์เซ็นไทล์ที่ 25 หรือประมาณ 60 ดอลลาห์สหรัฐต่อปี) อายุเฉลี่ยของเด็ก (มากกว่า 10 เดือน) อายุครรภ์มารดาเฉลี่ยน้อยกว่า 37 สัปดาห์ และพบว่ามีการให้อาหารเสริมเด็กเฉลี่ยก่อน 6 เดือน มีความสัมพันธ์ภาวะเตี้ยในเด็กที่อายุต่ำกว่าสองปีในเขตเมืองแมกเวย์ ของประเทศเมียนม่าร์

ดังนั้นแม่และบริการดูแลสุขภาพเด็ก การดำเนินการศึกษาสุขภาพต่างๆ และจัดโปรแกรมสำหรับแม่และครอบครัวที่มุ่งเน้นไปที่คุณภาพของการฝากครรภ์และเวลาที่เหมาะสมสำหรับการแนะนำอาหารเสริมให้บุตรนั้นควรได้รับการส่งเสริมและพัฒนาในระดับนโยบายต่อไป

คำสำคัญ: ภาวะเตี้ยในเด็ก อาหารเสริม ภาวะโภชนาการ เด็กต่ำกว่าอายุ 2 ปี การฝากครรภ์

Introduction

Globally, 162 millions of children under five years were stunted in 2012[1]. All over the world, paying attention to nutrition becomes increased and prevalence of under nutrition among the children under five years of aged is projected to decline[1,2]. Approximately, the stunted rate was 40 percent in 1990 to 26 percent in 2011 and decline rate was 36%[3]. Even though the prevalence of stunting among the children has been decreased, the progress of problems and decline rate are not uniformly. Most of the stunted children are in Africa and South Asia countries. In South East Asia, Myanmar is in the second highest countries and the stunting prevalence among children under five years were 35.1% in 2010[4].

Child stunting is one of the indicators of under nutrition which is the main cause of morbidity and mortality among the children and make the permanent impairment of physical and mental growth[5]. Some study indicated that stunting of the children associated with risk of coronary heart disease[6, 7] . It is the result of insufficient nutrition for a long period of time after conception to two years of age and defined as the length/height for a given age is less than -2SD (standard deviation score)[8, 9 , 10]. Previous studies[11-13] designated that the effect of stunting is throughout the lifespan which is suboptimal function such as brain development, immune system and school performance in childhood life, direct cause of short adult height, reproductive performance, and work capacity, high risk of hypertension, obesity and diabetes6. A long-lasting consequences of stunting is less earns and potential development of nation in future[5, 7, 10, 14-18, 19]. According to MICS survey (Multiple Indicator Cluster Survey) 2010, the report from Magway region in Myanmar showed the third highest prevalence of under nutrition among the children under five years and also showed higher prevalence rate than the other regions. With reference to Ministry of Health in Myanmar in 2010, the prevalence of stunting among under five years in Magway region was 36.4%[4]. World Health Organization (WHO) has mentioned that the important of the nutritional status of the first two years of life and inadequate nutrition in those crucial periods cannot recover later in life[10, 20, 21]. In addition, in reference to MDG goal of nutrition improvement, it has mentioned that underweight children indicators need to be strengthening[22]. Previous studies found that stunting was started from two or three months and declined after two years[8, 9, 17, 23]. Several previous studies[8, 10, 15-17, 24-40] reported on factors associated with child stunting however, few study elaborated on factors effecting child stunting in Myanmar[4], particularly on early child age below 2 years old.

Magway region is the largest division of Myanmar with an area of 17,306 square miles or 44,820 km^2 and located in central Mynmar. In 2010, the prevalence of child stunting among under 5 years in Magway region was 35.1% and it was much higher than global prevalence prevalence rate.

This study aimed to determine the prevalence of stunting among under two years aged by using WHO child growth reference and to identify the factors are related to the stunting status of the children under two years aged. It is supporting to improve and treat the developmental effect of early childhood under nutrition. The finding from this will be benefit not only for the mothers and families but also to improve the nutritional policy of Myanmar[22].

Methods

A cross-sectional study was conducted to determine the prevalence of child stunting and to examine the factors related to the stunting status of the children under two years age who live in Magway Township, Myanmar. The data was collected from December 2013 to January 2014. The sample size was 399 children to analyze in this study. The studied children in this study were the youngest child of their family and the biology mothers were interviewed. To reduce information bias and recall bias, both mothers and children who had maternal and child health hand books, growth monitoring chart and immunization records in health center were included in this study. Those mothers and children who had severe medical condition or congenital malformations were excluded from this study.

Sampling techniques

A multistage cluster sampling was used to select a sample size. Firstly, one urban health center (UHC) and two rural health centers (RHC) in Magway Township were chosen by simple random sampling. Secondly, 5 wards and 15 villages were selected by using simple random sampling method, then and lastly, 3 wards from UHC and 8 villages from RHCs were chosen by using sample random sampling. The list of all registered mothers who have children age under two years were randomly selected. 130 mothers were selected from 3 wards and 269 subjects were selected from 8 villages. Total number of 399 mothers whose children age under two years were included in this study. Face to Face interview method was used to collect the data. Consent form was obtained from mothers who had willing to participate in this study.

Research instruments

A structured questionnaire translated into Myanmar language, standard infant meter, weighting machine, MCH records, immunization records and growth chart were study instruments of this study. By using UNICEF conceptual framework, in this study the independent variables of this study were organized as immediate factors, underlying Factors and basic factors. **Immediate factors of this study** are breastfeeding, introducing time of complementary food, illness of the children, taking antenatal care, child growth monitoring and immunization status of the children. **Underlying factors of this study** are family income, mother's occupation and father's occupation. And, **basic factors of this study** are mother's age, mother's height, mother's education, father's education, child's age in months, child's gender, birth weight and gestational age of the children. The questionnaire composed of five parts; socioeconomic factors (10 questions), child information (4 questions), nutrition including breast feeding (9 questions), maternal and child health care services (7 questions) and information from MCH records (10 questions). The University of Community Health Ethic Committee, Myanmar provided the approval for ethical clearance to conduct this study.

Outcome measurement

Anthropometric measurements for height (length) and weight of the children were taken according to WHO standard guideline. Length of the children was measured by using a graduate board with a fixed headboard and movable footboard and recorded to the nearest 0.1 cm. Weight of the children was measured by using weighting machine (salter scale) and recorded

to the nearest 0.1 kg. In this study, all the children were measured their length by recumbent position. A portable length/height board, weight machine and all research assistants were trained to use standardized methods carefully for outcome measurement. Based on the WHO currently child growth standard guideline regarding height-for-age indicator, the prevalence of stunting among under two years children in this study was defined as z-score <-2SD[4].

Validity of the instruments

Questionnaire was sent to the experts committee to examine the correction, validity and language clearness. Portable length/height board and weight machines were WHO standardized instruments. To get the accuary of height and weight, children were had been taking off their winter hat, shoes, sock and thick clothes and they were measured by following WHO guideline. Height of mothers were measured in Health Centers and by skillful health workers. MCH hand books, immunization cards and growth charts were assured by using health records from the health canters.

Data processing and analysis

WHO anthropometric calculator version 3.2.2[41] was used to calculate the z- score of height-for-age, weight-for-age, weight-for-height and BMI of the children. After retrived the z-scores, the data was export to microsoft office exel data base and tranfered to SPSS software version 16.0. Descriptive statistics was used to explore the prevalence of the stunting status of the children and the characteristics of independent variables. Chi square test was used to identify the relationship between each independent variables and dependent variable. Multiple logistic regression was used to determine the predicting factors of the stunting status of the children.

Results

A total of 399 under two years children were included and stunting status of the children are shown in Table 1. Nearly one fourth of the children (23.8 %) were stunted, height-for-age z score <-2SD.

Table 1 Prevalence of the stunting status of the studied children

Stunting status	Frequency	Percentage
Stunted	95	23.8
Normal	304	76.2
Total	399	100

The independent variables were composed of basic factors, underlying factors and immediate factors by applying the UNICEF conceptual framework of child malnutrition. In regarding to basic factors, only 3.5% of the studied mothers were younger than 20 years and 10.8% were shorter than 145 cm. One-half of the mothers and nearly two-third of the fathers have higher than primary education level. The majority of the studied children were in the families that have less than 3 children. Nearly half of the children were 10-24 months and boys and girls are almost similar in number. Only 1.3% of children had low birth weight and 8.3% were gestational age (<37 weeks), preterm babies. According to underlying factors, nearly one-third of the studied children were in the families with very low income (60 $ per month). Only 33.3% of the fathers were government staff and employee, and 43.4% of the mothers were housewife. In reference to the immediate factors, over 50% of children were reported illness by the mother within one month. Almost all children were had been breast-feeding and (23.8%) of the children were introduced complementary food before 6 months. Around 70% of the mothers took ANC at least 4 times and over one half of mothers started taking ANC earlier than 12 weeks of pregnancy. Only 29.1% of the studied children were measured their weight monthly and all of the children were immunized completely according to their age.

Table 2-4 shows that the association between the basic factors, underlying factors, immediate factors and stunting status by using Chi-square test, this study found that height of the mothers, father's education, age of the children and gestational age of the children were the basic factors which each associated significantly with the stunting status of the children. According to the characteristics of underlying factors, income of the family was the factor which is associated significantly with the stunting status of the children. In reference to the variables of immediate factors, introducing age of complementary food and times of taking ANC were the factors which each significantly associated with stunting status of the children. For the Chi-square test, there were 7 independent variables significantly associated with stunting status of the children (p-value < 0.05), hence and all those variables were comprised into the full model.

Table 2 The association between stunting status of the children and basic factors of the respondents

Basic Factors	Stunting status			Crude OR	95% CI	Chi square p value
	n	Yes %	No %			
Mother Height (cm)						
≥ 145 cm	356	21.6	78.4	1		
<145 cm	43	41.9	58.1	2.61	1.35 – 5.03	0.004*
Father's Education						
> primary level	239	18.0	82.0	1		
≤ primary level	160	32.5	67.5	2.19	1.37 – 3.50	0.001**
Child Age (months)						
≤ 10 months	208	16.3	83.7	1		
> 10 months	191	31.9	68.1	2.46	1.52 – 3.96	0.0002**
Gestational Age						
≥ 37weeks	366	21.6	78.4	1		
< 37 weeks	33	48.5	51.1	3.42	1.65 – 7.07	0.001**

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

Table 3 The association between stunting status of the children and underlying factors of the respondents

Basic Factors	Stunting status			Crude OR	95% CI	Chi square p value
	n	Yes %	No %			
Family income						
> 25 percentile	276	18.8	81.2	1		
≤ 25 percentile	123	30.8	69.2	2.31	1.44 – 3.73	0.001**

** p-value <0.001

Table 4 The association between stunting status of the children and immediate factors of the respondents

Basic Factors	Stunting status			Crude OR	95% CI	Chi square p value
	n	Yes %	No %			
Complementary food introducing Time						
6 months and after	304	20.4	79.6	1		
< 6 months	95	34.7	65.3	2.08	1.25 – 3.45	0.005**
Taking ANC times						
≥ 4 times	271	19.2	80.8	1		
< 4 times	128	33.6	66.4	2.13	1.32 – 3.43	0.002**

** p-value <0.01

After adjusting the confounding factors, table 5 shows that the present significantly predictors of stunting status of the under two years children. The children who were above 10 months are 2.6 times more likely to be stunted children than birth to 10 months children. Studied children who had gestational age less than 37 weeks (pre-term babies) are about nearly 5 times more likely to be stunted compared to the children who had gestational age ≥ 37 weeks. Mother who has the height < 145 cm are nearly 4 times more likely to get the stunted child than who has the height >145 cm. Studied children who had the family with income <25 percentile (< 60$ per month) are about 3 times more likely to be stunted. Studied children who were introduced complementary food before and after 6 months of age are 2 times more likely to be stunted than who were introduced at 6 months of age and after.

Table 5 The predictors of stunting status of children

Predictors	Adjusted OR	95%CI		p-value
		Lower	Upper	
Mother Height (cm)				
≥ 145 cm	1			
<145 cm	3.75	1.82	7.73	0.0003***
Income				
>25 percentile	1			
≤ 25 percentile	2.90	1.71	4.89	0.0007***
Child Age (months)				
≤ 10 months	1			
> 10 months	2.68	1.60	4.49	0.0001***
Gestational Age				
≥ 37 weeks	1			
< 37 weeks	5.16	2.31	11.51	0.0001***
Complementary food introducing Time				
6 months and after	1			
< 6 months	2.07	1.20	3.57	0.004**

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

Discussion

To determine the child stunting prevalence, by using WHO child growth standard reference, the prevalence of child stunting among under two years children in this study was 23.8 percent. The currently report from WHO data showed that globally stunting prevalence of children under 5 years was 25 percent[43]. It was not very different from WHO data due to the stunting prevalence of children under two years is included in prevalence of under five children. Among Asian countries, this study showed higher rate in comparing with same age group of Thai cohort study[4, 8, 43] and China[44] study. But this study showed smaller rate comparing with national report in Myanmar prevalence of child stunting (33.2%)[4]. This may be possible that, the improvement of socioeconomic or may be because of an improvement of nutrition program in this region of Myanmar. However, further qualitative study should be elaborated for more knowledge.

The present study is the first attempt to explore of the factors related to stunting of the children under two years aged in this area. After adjusting the confounding factors in final model, this study indicated that the gestational age of the children was the most significant factor for this study. This study showed similar result to the study of low and middle income countries which found that child stunting is associated with SGA (small gestational age) and preterm[45], and AGA (adequate size in gestational age) and preterm[46, 7, 10].

The factor of maternal height showed significant level with child stunting in this study and indicated the same direction of the study in Thailand which was found that the maternal height shorter than 145 cm was significantly associated with the child age at birth[6, 12, 18, 24] months[8]. A study in India also found that the taller the maternal height, the lesser the risk of the child stunting[47]. The association between short maternal stature and stunting status of the child are described as a circle of logical outcome. A stunted child is going to be a short stature adult and can deliver preterm and low birth weight children and those children can be stunted[16].

Family income per month showed the ample evidence that it was significantly associated with the stunting status of the child. This result was similar to the previous studies[8, 17, 23] which reported that family income significantly associated with child stunting status. This finding was the logical outcome to one[47] which concluded that the higher family incomes the more available intake of better and adequate nutrient food. High family income is possibly associated with high education and knowledge. Higher family income can generate knowledge about health, nutrition and child care as well. Moreover, the people those who have high income families might be able to take adequate health care than low income families[44], as a result the children may improve nutrition status more than those who have low income families[48]. One study report that the association of health expenditures and stunting differed by region. Higher immunization rate and, for Asia only, energy availability were the most important factors associated with lower prevalence of wasting[49].

The result showed that an early introducing of complementary food to the children is the detrimental effect on their nutrition. After adjusting in multiple logistic regressions, the child who was introduced before 6 months of aged had 2.8 times higher risk to be stunted. This study showed similar result to a study in Thailand which found that complementary food is introduced after 6 months benefit to the health and nutritional status of the children[40]. Moreover, many previous studies[1, 2] also found that an appropriated time introduction of complementary food was significant associated with child stunting.[32, 50-52]. Intervention for correct complementary food feeding practice can improve the nutrition status of children age under two years[24, 53]. However, WHO[54] recommend that breastfeeding alone is not enough for the infant to get required nutrient. The target age of introducing complementary food is after six months of age[1, 2]. The factors of an exclusive breastfeeding and introducing complementary food before six months play the vital role for the child growth and development[54].

Recommendations

The results from the present study showed that to decrease the stunting status in Magway region of Myanmar should point out the children who had gestational age <37 weeks (preterm babies), short mothers and families with very low income. These results highlight the following recommendations: 1) Policy makers in department of health should be strengthened the policy focusing on MCH services, especially supporting for quality ANC services. 2) Health Information department should provide the health education program for promoting on timely complementary food introducing by using public medias. 3) Local health centers should be organized the community nutrition program for 10-24 months of the children.4) should also be promoted and improved. The nutritional status of low income families.

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