Prevalence and Determinants of Stunting among Children Aged 3-5 Years in *Waw* Township

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Abstract

Nutritional issues in early childhood have potential impacts on growth of the children. Along with urbanization, feeding and nurturing practices have changed day after day and factors that determined nutritional status of children might be different from former evidences. Accordingly, this study was conducted among 363 respondents from 4 Wards and 4 Villages at *Waw* Township which was selected by stratified two stages random sampling to identify the determinants of stunting among children aged 3-5 years. Anthropometric measurements to children and self-administered questionnaire were used to collect the required data. Logistic regression was applied to identify the determinants of stunting among children 3-5 years in *Waw* Township. The findings revealed that double burden of malnutrition were evidenced among the children from this study. As the determinants of stunting among children aged 3-5 years, the respondents' educational status, monthly family income, and proper drinking practices of water are less likely to have stunted children in family. To reduce the risk of stunting among those children, provision of proper health education, strengthening the public health care strategies and effective coordination mechanism should be suggested to meet the health needs of the targeted population. Also, further nutritional researches using both of quantitative and qualitative approach are recommended to explore the context of malnutrition.

***Keywords**: Stunting, Children aged 3-5 years, Nutritional Status*

1. Introduction

As stunting among children is a critical evidence of malnutrition in early childhood, good nutrition is essential by eating the right amounts, the right variety of safe and good quality foods compatible with the daily nutritional requirements (Food and Agriculture

Organization (FAO), 2003). Globally, 151 million (22%) children under five year of age were stunted and 51 million were wasted. Particularly, two out of five stunted children in the world and more than half of all wasted children in the world live in Southern Asia (World Health Organization (WHO), UNICEF, & World Bank, 2018). In Myanmar, the prevalence of stunting among children under five was still increased up to 29% in 2016. As its prevalence in some areas of Myanmar was up to 41%, it indicated that nearly 4 out of 10 children cause not to be their full potential of growth in life. It affects not only being too short for child's age but also being stunted development of brain and cognitive capacity of those children.

Those nutritional problems during childhood delay the growth of children which ultimately propagates the vicious cycle of intergenerational malnutrition. Because ensuring health and wellbeing of the children is a critical for the overall development of the country, the contribution factors of stunting among children are essential to be explored (Lucile Packard Foundation for Children's Health, 2017). Based on these issues, this study was conducted among 3-5 years children in *Waw* Township to identify the prevalence of stunting and its contributing factors to stunting among those children.

2. Data and Methods

A cross-sectional primary survey was conducted in 4 wards and 4 villages of *Waw* Township. The required sample of 363 respondents was selected by two stages stratified random sampling. Data were collected by measuring the anthropometry to children aged of 3-5 years and delivering self-administered structured questionnaire to caregivers of those children. Those data were analyzed by descriptive statistics and modeling with binary logistics regression.

3. Results and Discussion

According to the fitted model by Binary Logistic Regression, background characteristics of respondents, the prevalence of nutritional status among children aged 3-5 years and determinants of stunting among children aged 3-5 years were described.

3.1 Background Characteristics of Respondents

Mothers' educational status, occupational status, monthly family income and the number of family members are described in Table (1) as the background characteristics of the respondents.

Table (1) Characteristics of Respondents

Characteristics of Respondents	Number of respondents	Percentage
Educational Status		
Illiterate	34	9.4
Read and write	131	36.1
Primary school level	77	22.1
Middle school level	78	21.5
High school level	32	8.8
University graduate	11	3
Occupational Status of Respondents		
Dependent	120	33.1
In-house Business	153	42.1
Out-house Business	90	24.8
Monthly Family Income		
Ks. ≤ 200,000	119	32.8
Ks. 200001-300000	161	44.4
Ks. >300,000	83	22.9
Number of Family Members		
≤5 family members	243	66.9
>5family members	120	33.1

Source: Survey Data, 2019

This finding expressed that 131 (36%) of respondents were got primary school level and 243 (66.9%) of respondents had the family members of less than five. Among the study population, 153 (42.1%) of respondents employed with in-house business and 161 (44.4%) of respondents are able to earn about Ks. 200001-300000. Those background characteristics of respondents revealed that the characteristics of respondents from this study are similar with working class (bourgeoisie) of the population.

3.2 Child Feeding Practices

Ever breast feed had been practiced by 350 (96.4%) mothers and 268 (73.8%) of mothers initiated breastfeeding timely, within an hour of delivery. Also, 197 (54.3%) of mothers introduced complementary foods at six months of the child's age. And, 231 (63.6%) of children aged 3-5 years were having good dietary diversity because of getting the

minimum dietary diversity score more than 4. Those child feeding practices are expressed in Table 2.

Table (2) Feeding Practices of Children Aged 3-5 years in *Waw* Township

Feeding Practices of Children	Number of respondents	Percentage
Breastfeeding		
Practice incorrectly	95	26.2
Practice correctly	268	73.8
Knowledge on Complementary Feeding		
Incorrect Knowledge	86	23.7
Correct Knowledge	277	76.3
Introducing Complementary Food		
Below Six Months	148	40.8
At Six Months	197	54.3
Over Six Months	18	5.0
Dietary Diversity Score		
Poor Dietary Diversity	132	36.4
Fair Dietary Diversity	174	47.9
Good Dietary Diversity	57	15.7

Source: Survey Data, 2019

According to the results of this study, 95 (26.2%) of respondents and 148 (40.8%) of respondents are incorrectly carried out breastfeeding and complementary feeding respectively. It was indicated to concern more on uplifting infant and child feeding practices effectively. In my opinion, as infant and young child feeding practices are related with socio-economic status of the population, it will be more efficient and effective by collaboration and coordination with all stakeholders from public and private sectors in implementation of the strategic plan to cover the development of the whole country.

3.3 Water Hygiene and Sanitation Characteristics

The findings showed that 181 (49.9%) of respondents used drinking water from protected sources such as protected well, lakes and pipe etc. However, 182 (50.1%) of respondents took drinking water from unprotected sources like open wells. And 318 (87.6%) of respondents used toilets for waste disposal while 45 (12.4%) of respondents did not use

toilet for its purpose. Concerning with hand washing practices, 280 (77.1%) practiced proper hand washing practices after exposing with dirty materials.

3.4 Child Health Characteristics

Among children from this study, 66 (18.2%) of children suffered illness in previous two weeks like fever, diarrhoea and other illness. Regarding childhood immunization, 260 (71.6%) of children took immunization completely and 280 (77.1%) of those children took vitamin 'A'. The revealed findings are shown in Table 3.

Table (3) Child Health Characteristics

Child Health Characteristics	Number of respondents	Percentage
Getting illness in previous two weeks		
Yes	66	18.2
No	297	81.8
Taking Vitamin 'A' Supplementation		
Yes	280	77.1
No	83	22.9
Taking immunization		
Complete	260	71.6
Incomplete	103	28.4

Source: Survey Data, 2019

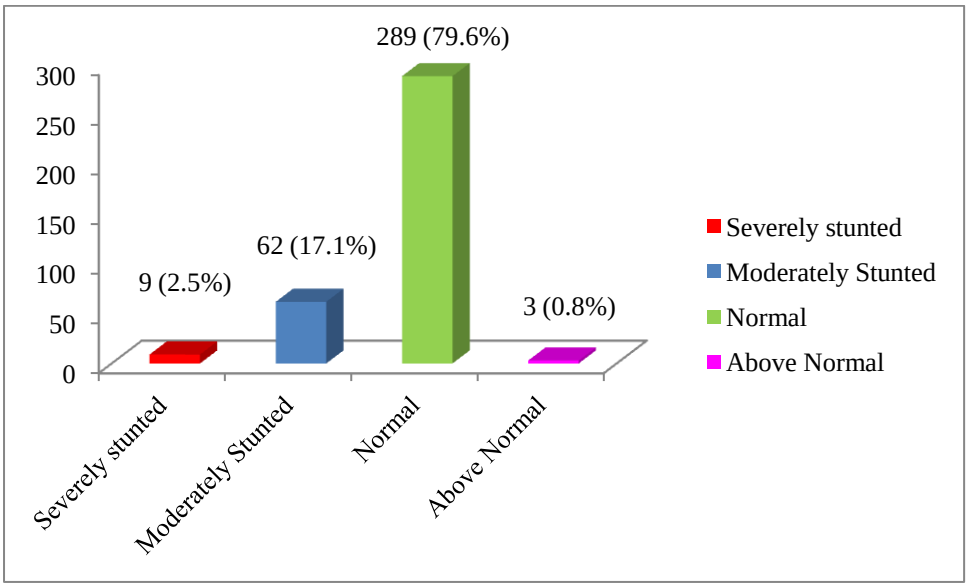
It was showed that there was still present of incomplete on taking immunization and vitamin 'A' supplementation among children aged 3-5 years. It was highlighted that there was still reluctant to take immunization among community members. For those reason, community awareness on immunization should be raised through needs based education using participatory approach.

3.5 Nutritional Status among Children Aged 3-5 years

Nutritional indicators such as height-for-age, weight-for-height and weight-for-age were assessed by anthropometric measurements to those children.

Prevalence of Stunting among Children Aged 3-5 years

Stunted among children aged 3-5 years is assessed using height-for-age (z-score). The prevalence of stunted among children aged 3-5 years is shown in Figure (1).



Source: Survey Data, 2019

Figure (1) Stunting among Children Aged 3-5 years

This study found that 289 (79.6%) of children are normal height while 9 (2.5%) of children are severely stunted and 3 (0.8%) are above normal respectively. It is categorized into having stunted and not having stunted as dichotomous variable. It is found that 191 (52.5%) are not stunted while 172(47.4%) are stunted. It is shown in Table (4).

Table (4) Stunted of Children Aged 3-5 years

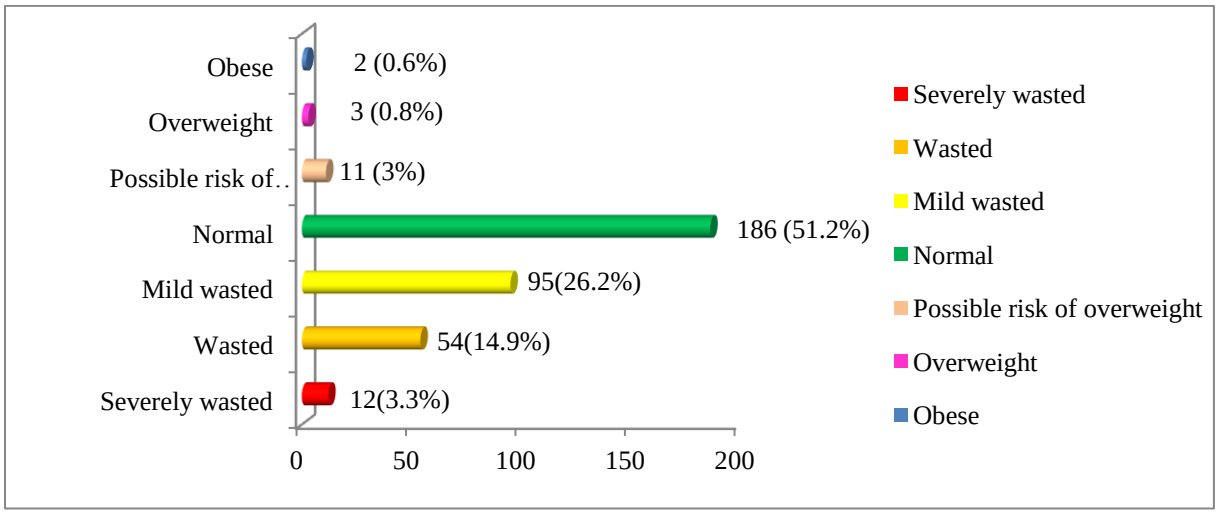
No.	Stunted	Number of Children	Percent (%)
1.	No Stunted	292	80.4
2.	Stunted	71	19.6
	Total	363	100

Source: Survey Data, 2019

According to the result of this study, it is found that 292 (80.4%) of children aged 3-5 years are not being stunted, whereas, 71 (19.6%) of children aged 3-5 years are stunted.

Wasted among Children Aged 3-5 years

Wasted is denoted as low z-score of weight-for-height among the children respondents of this study.



Source: Survey Data, 2019

Figure (2) Wasted among Children Aged 3-5 years

Figure (2) shows that 186 (51.2%) of children aged 3-5 years are of normal weight; however, 2(0.6%) are obese. On the other hand, 12 (3.3%) of those children are severely wasted. Accordingly, it can be assumed that double burden of malnutrition are occurred among the children of this study. And also, it is described in two groups as wasted and not being wasted as shown in Table (5).

Table (5) Wasted of Children Aged 3-5 years

No.	Wasted	Number of Children	Percent (%)
1.	No Wasted	202	55.6
2.	Wasted	161	44.4
	Total	363	100

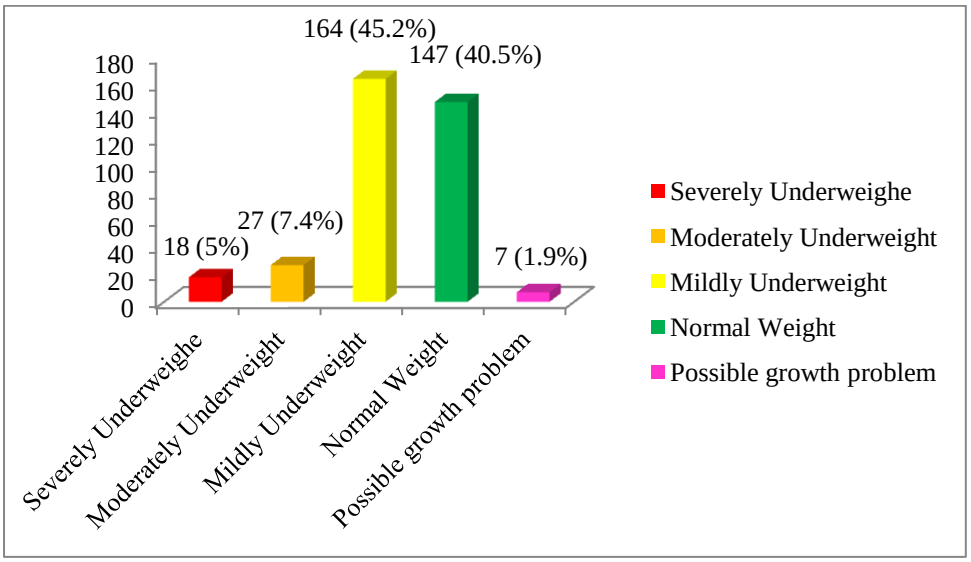
Source: Survey Data, 2019

The survey results reveal that 161(44.4%) children aged 3-5 years are wasted while the remaining children are not. According to the findings of nutritional statuses among children aged 3-5 years, double burden of malnutrition are suffered among those children. It

indicates for further researches in order to identify the morbidity and mortality patterns relating to malnutrition of those children.

Underweight among Children Aged 3-5 years

In this study, underweight is classified by z-score of weight-for-age. The prevalence of underweight among children aged 3-5 years is described in Figure (3). It was found that 164 (45.2%) of the children aged 3-5 years are mildly underweight, while 7(1.9%) are possible growth problem and 18 (5%) of children are severely underweight respectively. It can be assumed that double burden of malnutrition are occurred among children aged 3-5 years of *Waw* Township.



Source: Survey Data, 2019

Figure (3) Underweight among Children Aged 3-5 years

Also its prevalence is grouped into underweight or not being underweight which are shown in Table (6).

Table (6) Underweight of Children Aged 3-5 years

No.	Underweight	Number of Children	Percent (%)
1.	No Underweight	154	42.4
2.	Underweight	209	57.6
	Total	363	100

Source: Survey Data, 2019

Based on this survey result, 209 (57.6%) of children aged 3-5 years are underweight, while 154 (42.4%) of children aged 3-5 years are not being underweight.

3.6 Determinants for Stunting among Children Aged 3-5 years

In this section, Binary Logistic Regression Model is developed to determine stunting among children aged 3-5 years.

Table (7) Parameter Estimates for the Binary Logistic Regression Model of Stunting among Children Aged 3-5 years

Characteristics	Stunting		OD (95%)	Marginal Effect (ME)
	Yes	No		
Respondents' educational status Illiterate (ref:)	14	20	1	
Read and Write	23	108	.381*	-0.1639
Primary	16	61	.350*	-0.1728
Middle	12	66	.373	-0.1680
High	6	26	.413	-0.1532
University/Graduate	0	11	.000	
Respondents' occupational status Dependent (ref:)	23	97	1	
In-house Business	27	126	.988	-0.0004
Out-house Business	21	69	1.527	-0.0621
Monthly family income Ks. ≤200,000 (ref:)	26	93	1	
Ks. 200,001-300,000	36	125	.806	-0.0333
Ks. ≥300,001	9	74	.347**	-0.1302
Family Size ≤ 3 family members (ref:)	48	195	1	
> 3 family members	23	97	.708	-0.0461
Use of toilet for waste excreta Not use (ref:)	9	36	1	
Use	62	256	1.565	0.0617
Water sources Don't use water from proper sources (ref:)	32	150	1	
Use of water from proper sources	39	142	.642	-0.0624
Proper practices of drinking water Score '0' (ref:)	4	2	1	
Score '1'	35	167	.056***	-0.5445

Characteristics	Stunting		OD (95%)	Marginal Effect (ME)
	Yes	No		
Score '2'	11	62	.069**	-0.5171
Score '3'	21	61	.116*	-0.4337
Proper practices of hand washing	20	63	1	
Not proper hand washing (ref:)				
Do Proper Hand washing	51	229	.930	-0.0095
Uses of hand washing accessories	30	105	1	
Don't use the right facilities (ref:)				
Use the right facilities	41	187	.741	-0.0424
Breastfeeding practices	19	76	1	
Incorrect breastfeeding practices (ref:)				
Correct breastfeeding practices	52	216	.632	-0.0611
Knowledge on complementary feeding	25	61	1	
Incorrect Knowledge (ref:)				
Correct Knowledge	46	231	.490	-0.1113
Practices on Complementary feeding	34	114		
Less than six months (ref:)			1	
At six months	33	164	.895	-0.0622
Above six months	4	14	.653	-0.0075
Minimum Dietary Diversity Score	25	107		
Low Dietary Diversity (ref:)			1	
Medium Dietary Diversity	29	145	.812	-0.0227
High Dietary Diversity	17	40	1.801	0.1089
Completeness of immunization	29	87	1	
Incomplete Immunization (ref:)				
Completed Immunization	17	205	2.839**	0.12878
Taking Vitamin 'A' Supplementation*	22	61		
Did not take (ref:)			1	
Take	49	231	.399	-0.1421
Getting of illness	57	240	1	
No (ref:)				
Yes	14	52	.824	-0.0242

Source: Survey Data, 2019

Hosmer-Lemeshow test p value = 0.181, Omnibus Test of Model Coefficient p value = 0.005
*** denotes significant at 1% level** denotes significant at 5% level,
* denotes significant at 10% level

In conducting logistic regression, the explanatory variables of educational status and monthly family income of respondents, proper practices of drinking water, and completeness

of immunization to children were found to be significantly associated with stunting among children aged 3-5 years in *Waw* Township.

According to the revealed findings, t is found that the marginal effect of the respondents who have the educational level of read and write are 16.39% less likely to have stunted children compared to its reference category (illiterate mothers) (ME= -0.1639). Additionally, respondents with primary school level of education are 17.28% less likely to have stunted children compared to the respondents' educational status of illiterate (reference category) because of its marginal effect (ME=-01728). According to the revealed findings, mothers with higher educational status could nurture their children not to be stunted.

Because mothers have to arrange family resources for nurturing, education can raise the decision making skills for uplifting the growth and development of the children (Wachs, 2008). It was similar with the findings of Demographic Health Surveys from 2004 to 2006 in Peru. It was found that mothers with no formal education or incomplete primary education were four times more likely to have stunted children than mothers who have higher education or completed primary education (Burke et al., 2011). Accordingly, policy makers should implement the policies by coordination and collaboration of intra-ministerial decisions for reduction of the occurrence of stunting among children aged 3-5 years in *Waw* Township.

In preceding the individual regression analysis, the coefficient of family which earned more than Ks. 300,000 is -1.06, indicating negative in direction which is statistically significant at 5% level. The value of marginal effect is -0.1302; it means that the percentage of stunting among children aged 3-5 years is 13.02% less for the respondents who earned more than Ks. 300,000 monthly than those respondents who earned below Ks. 200,000 monthly. Based on this finding, it can be assumed that the children from the better earned family seem to have less stunted children than those children from the less earned family. It was congruent with Adeela and Seur (2016) findings, and it was evidenced that mothers from lower socio-economic class had the highest chance of having stunted children. In accordance with those findings, nutritional education should focus on well balance diet with locally available foods in order to meet the nutritional needs of the children.

As the individual regression analysis of proper drinking practices, this study evidences that the respondents who got the higher score on proper drinking practices is negatively associated with the possibility of stunting among children aged 3-5 years at *Waw* Township. And the value of its marginal effect for children who got the score '1' on proper

drinking practices is -0.5445; it shows that the percentage of stunting among those children is 54.45% less than the children whose mothers got the score of '1' on proper drinking practices compared to the reference category of those respondents who got the score of '0' on proper drinking practices. Moreover, the value of marginal effect for the respondents who got the score of '2' on proper drinking practices (ME=-0.5171) shows that the percentage of the occurrence of stunting among children aged 3-5 years is 51.71% less likely for this variable, holding the other independent variables constant at the reference point.

And, the marginal effect of the respondents who got the score of '3' on proper drinking practices (ME=-0.4337) shows that the percentage of the occurrence of stunting among children aged 3-5 years is 43.37% less than the reference category of the respondents who got the score of '0 on proper drinking practices. According to the revealed findings, it can be suggested that the higher scores on proper practices of drinking water among respondents are associated with the less occurrence of stunting among children aged 3-5 years at *Waw* Township. It was congruent that lack of clean water was an important determinants of child stunting due to leading cause of infectious diseases [Kjellstorm, Friel, Dixon, et. al cited in WHO (2018)]. Accordingly, this finding highlighted that the knowledge of water and sanitation should be delivered in nutrition education session in order to reduce the occurrence of stunting among children aged 3-5 years in *Waw* Township.

Additionally, the marginal effect of completeness of immunization is 0.1288, indicating that the percentage of the occurrence of stunting is 12.88% higher for children who got the complete immunization schedule. Actually, the main determinants of stunting among children aged 3-5 years were quite different from literatures. In reviewing related studies, Mengistu, Alemu and Destaw (2013) described that factors contributed to malnutrition might be differed by regions, communities and over time. Accordingly, particular determinants of stunting in *Waw* Township should be figured again to deal with the emerging nutritional problems in this township. Based on this finding, further studies should be recommended in this setting.

4. Conclusion

Nowadays, unhealthy eating patterns and food insecurity challenge the good nutritional status among children. Along with the lifestyle changes, the determinants of nutritional status among children might be changed day after day. Thus, this study aimed to study the

determinants of nutritional status among the children aged 3-5 years using cross-sectional primary survey. Stratified two stages random sampling was applied to select the required samples. And Binary Logistic Regression Model was applied to identify its key determinants of stunting among children aged 3-5 years in *Waw* Township.

In this study setting, the double burden of malnutrition such as under nutrition and over nutrition are affected among children aged 3-5 years. Accordingly, feeding practices and its influencing factors will be necessary to study the actual impacts on nutritional status among children. Particularly, this study describes that the predictors of stunting among children aged 3-5 years such as educational status; monthly family income, proper drinking practices, and completeness of immunization are statistically significant among 16 predictors of this model.

By highlighting the results of this study, it is imperative to take collective actions between community members, health care personnel and policy makers for proper nutritional interventions among children aged 3-5 years. More importantly, community awareness on childhood malnutrition should be strengthened in order to gain good nutritional status among children which would help in country's development. Also, future researches should be conducted in this area to reduce the burden of nutrition related problems.

Acknowledgements

The author would like to thank study participants, midwives from study settings, Professor Dr. Maw Maw Khin (Programme Director of MAS, Head of Statistics Department, YUE), and my supervisor, Professor Dr. Mya Thandar, (Department of Statistics, YUE) for their invaluable cooperation, supervision and guidance of this study.

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