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Magnitude and Associated Factors of Protein Energy Malnutrition among Children Aged 6-59 Months in Wondogenet District, Sidama Zone, Southern Ethiopia

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Abstract: *Background:* Failure to provide sufficient nutrients during rapid rates of growth results in malnutrition, which is complex in its etiology and increasing in its manifestations. Ethiopia is one of the developing countries where malnutrition and communicable diseases represent the major health problems, and children are the more vulnerable group than others. Objectives: To assess magnitude of protein energy malnutrition and associated factors among children aged 6-59 months in Wondogenet district, southern Ethiopia. Methods: A community based cross-sectional study was employed on 422 mother-child pairs of 6-59 months old children in April 2017 using both quantitative and qualitative methods. A pretested semi-structured questionnaire and anthropometric measurement were used to collect data. Logistic regression was fitted to identify associated factors, and Focused Group Discussion was used to substantiate the quantitative finding. Result: The analysis of this study revealed that, 45.5%, 38.7% and 15.7% of children were stunted, underweight and severely wasted respectively. The major predictors of stunting were weight at birth and food distributions in the households. Age of the children was independently associated with wasting and underweight. Conclusion: The prevalence of malnutrition among children aged 6-59 months in the study area was very high. A child less than 2 years of age, a weight<2.5 kg at birth and deprived special attention during feeding children in the households were associated with increased odds of being malnourished. Thus, it is recommended that the parents and care givers should strive to improve the awareness on timely introduction of supplementary food with optimum nutritional value for children less than 2 years of age, and to pay special attention for children on meal time. Birth attendants should pay due attention on proper identification for birth weight and early diagnosis and on time management of neonatal illnesses related with low birth weight.

Keywords: Protein Energy Malnutrition, Stunting, Underweight, Wasting, Children Aged 5-59 Months

1. Background

Malnutrition remains among the most devastating problems worldwide, particularly facing the worlds under privileged and poor. It covers a broad spectrum of illness, including under nutrition, specific nutrient deficiencies and over nutrition. The persistent crisis of malnutrition has profound and frightening effects for children, society and future of human kind. It is not a simple matter of whether a child can satisfy his or her appetite but a child who eats enough to satisfy immediate hunger can still be malnourished. In addition, malnutrition is not just a silent emergency; it is largely an invisible one as well. Three quarters of children who died worldwide of causes related to malnutrition are what nutritionists describe as mildly to

moderately malnourished [1, 2]. Around half of all deaths in under-five children are related to under nutrition [3]. Globally, about 800 million people are affected with malnutrition, majority of them live in the developing countries [4]. According to WHO report, about 178 million children are stunted, while 115 million children are under weight. The report adds that the stunting rate is higher in African and Asia than anywhere in the world [5].

More than half of all deaths in children are stunting and wasting as the underlying cause; they are too thin or too short for their age because they have not had sufficient type II nutrients (the growth nutrients that are required to build new tissue) to grow properly and many have lost weight. These children would have recovered from other illnesses if they had not been malnourished, but because they are malnourished, they die. Thus, most deaths in childhood have some form of malnutrition as the underlying cause. Stunting is due to chronic malnutrition while wasting and edema are due to acute malnutrition [6].

Deficiency of a single nutrient is an example of under nutrition or malnutrition, but deficiency of a single nutrient usually is accompanied by a deficiency of several other nutrients. Protein-energy malnutrition (PEM) is manifested primarily by inadequate dietary intakes of protein and energy, either because the dietary intakes of these 2 nutrients are less than required for normal growth or because the needs for growth are greater than can be supplied by what otherwise would be adequate intakes. PEM is almost always accompanied by deficiencies of other nutrients [7]. Under-five children are the most susceptible age group for malnutrition. Malnutrition at the early stages of life can increase risk infections, morbidity, and mortality together with decreased mental and cognitive development. The effect of child malnutrition is long lasting and goes beyond childhood. For instance, malnutrition during early age decreases the educational achievement and labor productivity and raises the risk of chronic illnesses in later age [8-10]. Malnutrition is the major cause of illness and death among under-five children in Ethiopia. The rate of malnutrition among under-five children in the country is among the highest in the world and Sub-Saharan Africa. Moreover, malnutrition is the underlying cause for three-fifth of child death in the country [11-13]. According to the 2014 Ethiopian Mini Demographic and Health Survey (EMDHS) report, 42%, 26.7%, and 9% of under-five children were stunted, underweight, and wasted, respectively. The problem is even worse in rural areas. For instance, the prevalence of underweight and stunting among rural children was 27% and 42% compared with only 13% and 24% among urban children, respectively [14]. The planning of an appropriate intervention requires the knowledge of the extent and the underlying causes of the problem. Thus, Protein Energy Malnutrition of under-five aged children is a public threat in Ethiopia, and there is no adequate scientific evidence in Sidama zone, south Ethiopia. Hence the aim of this study was to assess the magnitude and associated factors of Protein energy malnutrition among children aged 6-59 months at Wondogenet district, Sidama zone, southern Ethiopia.

2. Methods

The study was conducted in Wondogenet district, southern Ethiopia in April 2017. A community based cross-sectional study was employed using both quantitative and qualitative data collection methods. The study included mother-child pairs of 6-59 months old children who were permanent residents at least for one year in the study area.

The Sample size was determined by single population proportion formula, $N = Z \ (\alpha/2)^2 \ \times p \ (1-p)/d^2$ with assumption of 48.5% prevalence of malnutrition among rural children from previous study in Ethiopia [15]. The estimated sample size was desired to be precise at a confidence level of 95%, a margin of error of 5% and considering 10% of non-response rate that resulted in 422. The district was selected by purposive sampling technique while 4 of 13 (30.8%) kebeles (smallest unit of administration) were selected by simple random sampling technique. The total sample size was distributed among selected kebeles using simple random sampling technique.

The dependent variable of measure was: - Protein energy malnutrition indicated by wasting, stunting and underweight status in children 6-59 months of age.

While the independent variables of the study were:-

1. Socio-demographic and economic variables:- Age of child and mothers, child sex, family size, income status of the family, maternal/paternal education and occupation, marital status of the mother and number of livestock owned.
2. Maternal caring practices during pregnancy:- ANC visits, place of delivery, assistant at delivery, nutrition awareness, number of children ever born, pre-pregnancy weight, health status during pregnancy, use of extra food during pregnancy and autonomy in decision-making.
3. Child characteristics: - Weight at birth, height and weight at childhood, birth order and history of neonatal and childhood illness of children aged 6-59 months.
4. Child caring practices: - Immunization status, time of colostrum feeding initiation, exclusive breast feeding and complementary food initiation.
5. Maternal knowledge and practice on: - Feeding children and malnutrition risks (diarrhea, intestinal parasites…); food distribution experience in the family.
6. Environmental health condition and personal hygiene practice:-Housing conditions, solid and liquid waste management, water supply, sanitation and hygiene facilities were assessed as independent variables of protein energy malnutrition of children aged 6-59 months.

A semi- structured questionnaire adapted from Ethiopian demographic and health survey [16] was used for data collection. Interviewers and supervisors were trained in data collection and measurement techniques for two days. Four diploma graduated health professionals speaking local language (Sidaamu afoo) and working outside the study

kebeles collected the data by conducting face-to-face interview with mother in their home with the support of one supervisor holding Bachelor of Science in nursing. In addition, focus group discussion had been conducted with three focus groups, each consisting of six to eight participants selected from currently delivered women and their husbands. Furthermore, community elders were involved in focused group discussion (FGD) in order to elicit their perception towards nutritional status of children aged 6-59 months. The questionnaire was pretested on 5% of the respondents in Yuwo village, neighboring the study kebeles. Data was checked for completeness and cleanness, and analyzed by SPSS version 20.0. The result was presented using tables and figures. Qualitative data from FGD was analyzed by thematic areas and triangulated with quantitative findings.

Ethical clearance was obtained from ethical Review committee of College of medicine and Health Sciences, Hawassa University. The regional health bureau and other respective offices were informed by letters while verbal consent was obtained from respondents during data collection.

3. Result

3.1. Socio- demographic and Economic Characteristics of Study Participants

A total of 422 heads of households were interviewed with a response rate of 90.5%. Among the respondents, majority (94.5%) were mothers with the age range between 20-49 years old. The higher proportions (95.2%) of the mothers were married within the mean age 21.61 ± 2.269 years at first marriage. About half (58.3%) of the respondents had attended 1-6 grade and 43.8% of them were married to husbands completed at least secondary school. Majorities (89.8%) of the respondents were farmers, 11% were governmental employee and 31% were engaged in trade with average annual income of 10,000 and 25,000 ETB respectively. In addition, 62.9% of the respondents were protestant religion followers, and about the quarter had more than four family members per households (Table 1).

Table 1. Socio - demographic and Economic and Characteristics of Study Participants in Wondogenet district Sidama zone, Southern Ethiopia April 2017.

Variables		Frequency	Percent
Maternal age (n=382)	≤19	12	3.1
	20-49	361	94.5
	50+	9	2.4
Maternal educational status (n=382)	Illiterate	72	18.8
	Primary school	223	58.4
	Secondary school above	87	22.8
Maternal occupation (n=382)	House wife	220	57.6
	Merchant	120	31.4
	Government employee	42	11.0
Average annual family income (n=382)	<10,000	100	26.2
	10,000-50,000	214	56.0
	>50,000	68	17.8

3.2. Maternal Caring Practice During Pregnancy in Wondogenet District, Sidama Zone Southern Ethiopia, April 2017
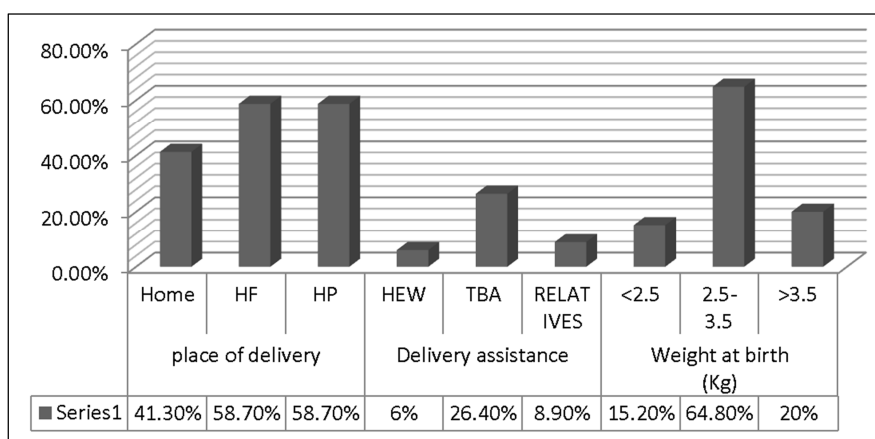
Two hundred twenty two (58.1%) of the mothers had given birth at health facilities by skilled birth attendants; 217 (97.7%) of them experienced spontaneous vaginal mode of delivery and majority, 64.8% of their neonates' weight lied at normal range (2.5kg-3.5kg) at birth with only a few proportion, 58 (15.2%) of them were recorded as underweighted. Concerning bad obstetric conditions, only seventy one and twenty six of the mothers had experienced at least one of the conditions and referred to higher medical institutions respectively. Among complications related to child birth, above half of the cases being excessive vaginal bleeding followed by 33.3% of prolonged labor (Figure 1).

	place of delivery			Delivery assistance			Weight at birth (Kg)		
	Home	HF	HP	HEW	TBA	RELATIVES	<2.5	2.5-3.5	>3.5
Series1	41.30%	58.70%	58.70%	6%	26.40%	8.90%	15.20%	64.80%	20%

Figure 1. Maternal Caring Practice during Pregnancy in Wondogenet District, Sidama Zone Southern Ethiopia April 2017.

3.3. Reasons Why Pregnant Mothers Preferred Giving Birth at Home to Health Facility in Wondogenet District, Sidama Zone Southern Ethiopia, April 20017

One hundred and sixty (41.8%) of the mothers had given birth at home in the current study. Different reasons were mentioned for preferring home delivery than health facility. Forty percent of the participants expressed the occurrences of inconvenient incidences during labor and delivery in the facilities. Thus, 35% of them were not satisfied with the skilled birth attendant services, and consequently resulted in poor health seeking behavior. In addition, 45.6% participants have traditional birth attendants at their neighborhoods, thus could be pretended to attend traditional than skilled birth attendances.

The FGD participants shared these perceptions, associating the lower utilization of the service with the lower decision making power of women to choose where they give birth. In addition, shortage of equipment and supplies in the health facilities and, unwelcoming behaviors of providers may affect their preferences. A forty five years old woman participant stated as "...in rural areas health facilities are not attractive for mother because of unclean equipment, bad odor, lack of water and electric power, inconvenient coach of delivery and the professionals are not sensible to attend mothers and not keeping privacy in difficult labor" (Table 2).

Table 2. Reasons why pregnant mothers preferred giving birth at home to health facility in Wondogenet district, Sidama zone southern Ethiopia, April 20017.

Variables	Frequency	percent
Presence of traditional birth attendants (n=160)	73	45.6
Occurrence of a problem during labour and delivery (n=160)	64	40.0
Inaccessibility of health facility (n=160)	0	0.0
Dissatisfaction in services delivered (n=160)	56	35.0
In affordability of services (n=160)	0	0.0
Partner was not cooperative (n=160)	17	10.6

3.4. Children Characteristics and Child Caring Practices in Children Aged 6-59 Months in Wondogenet District Sidama Zone, Southern Ethiopia April 2017

Three hundred and fifty six (93.2%) of the mothers had initiated colostrum feeding after an hour of birthing and high proportion 260 (68.1%) of them had practiced exclusive breast-feeding until the completion of six months. Contrary to that, only 121 (31.7%) of the mothers had experienced breast-feeding for more than 2 years and 249 (65.2%) of them started complementary feeding at full of six months. High proportion, 43.2% of the mothers had used cow's milk as complementary food most of the time. As frequency of feeding and dish utilization experience concerned, only 34.6% and 78.0% of the children used to consume more than four meals per day and had been managed in separate dish respectively. With regard to food distribution experience for children, a high proportion, 69.9% of the parents used to give priority for children below five years.

Lower experience of breast feeding for more than two years leads to lower decision making power of women to use modern family planning. One of the FGD participants stated this concern as"...in rural areas women are not sole decision makers on modern family planning methods utilization and deciding on the number of children they would have and when they should conceive the next baby, however the partner's decision is always placed on upper stairs."

Regarding the neonatal weight, higher proportion 248 (64.9%) of neonates' weight at birth lied at a range of 2.5-3.5 kilograms. Majorities, 75.9% and 81.15% of the children were identified in normal range of weight for height and weight for age respectively. As anthropometric condition concerned, 45.5% of the children were presented with stunting, 38.7% underweight and 15.7% severe wasting. In the case of immunization status of the children, majority 288 (75.4%) of them were declared as fully vaccinated, and the immunization card of 265 (69.4%) were verified at their home. According to the report, only 12.3% of the children had received some part of scheduled vaccination, 22 (5.8%) missed measles and the remaining (14.1%) were not ever vaccinated. Regarding the health status of the children, 168 (44.1%) had at least one episode of illness in their life time and 96 (57.1%) of them had diarrheal disease; 74.7% were presented with wasting on physical examination (Table 3).

Table 3. Child Caring Practices and Characteristics of Children Aged 6-59 Months in Wondogenet District, Sidama Zone Southern Ethiopia April 2017.

Variable	Options	Frequency	Percent
Time of BF Initiated after birth/ Fed colostrum (n=382)	After 1 hour	356	93.2
	Within an hours	26	6.8
	After 6 hours	4	1.0
Mothers experienced Exclusive BF (n=382)	Yes	260	68.1
	No	122	31.9
Complementary Feeding Practice (n=382)	Before 6 months	61	16.0
	At 6 months	249	65.2
	>6 months	72	18.8
Complementary Feeding mostly received (n=382)	Cow's milk	165	43.2
	Powder milk	40	10.5
	Gruel	84	22.0

Variable	Options	Frequency	Percent
	Adults' food	93	24.3
	< 1year	66	17.3
Duration of BF (n=382)	1year-2year	195	51.0
	>2years	121	31.7
	Once	26	6.8
Frequency of feeding per day (n=382)	Twice	28	7.3
	Three times	196	51.3
	Four or more times	132	34.6
Feeding on separate dish (n=382)	Yes	298	78.0
	No	84	22.0
	Stunted	174	45.5
Anthropometric condition of children (n=382)	Underweighted	148	38.7
	Severely wasted	60	15.7
	Fully immunized	288	75.4
Immunization Status of Children (n=382)	Not ever immunized	54	14.1
	Missed BCG	18	4.7
	Missed Measles	22	5.8

3.5. Mothers'/Care Givers' Personal Hygiene Practice in Wondogenet District, Sidama Zone Southern Ethiopia, April 2017

High proportion 279 (73%) of the mothers/care givers had not owned appropriate materials for keeping menstruation hygiene. This is because of they are not such aware of the scientific facts and hygienic health practices which sometimes may result into adverse health outcomes. About 52.6% of the mothers/care givers had practiced hand washing before cooking food. In addition, 47% had received the shower less frequently (Figure 2).
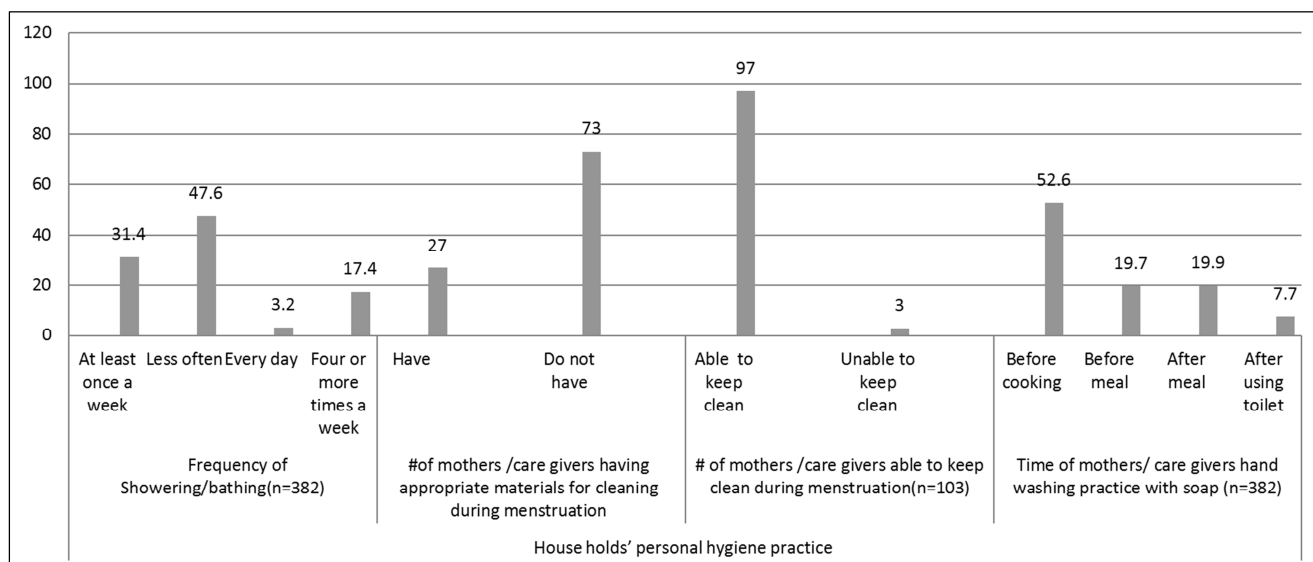

Figure 2. Mothers/Care Givers Personal Hygiene Practice in Wondogenet District, Sidama Zone Southern Ethiopia, April 2017.

3.6. Status of Water for Drinking and Domestic Use and Environmental Health Condition at Household Level in Wondogenet District, Sidama Zone Southern Ethiopia, April 2017

Higher proportion, 78.5% of the households had sufficient water for drinking and domestic use but only 52% of them had been used tap water for both drinking and domestic activities. In the study, high proportion 234 (61.2%) of the households did not have solid waste management system and having not taken any action to collect and segregate solid wastes produced in domestic action. Moreover, only 6% of the households used to collect solid waste products in weekly base and only 153 (40%) of them had sanitation facility for safe disposal of liquid waste and human excreta. High proportion (74%) of the households were used to defecate in open field and around bushes and 67% of the households did not have sanitary facility and sewerage system for safe disposal of waste water and all domestic effluents. According to the study, majority 314 (82.2%) of the households and 68 percent of them were used to live in houses corrugated with iron sheet and constructed with concrete floor respectively (Table 4).

Table 4. *Environmental Health condition and status of water for drinking and domestic use at household level in Wondogenet district, Sidama zone southern Ethiopia April 2017.*

Variable			Frequency	Percent
Source and sufficiency of drinking domestic water (n=382)	Source of drinking domestic water	Tape water	202	52.9
		Well water	112	29.3
		Other sources	68	17.8
	Sufficiency of drinking domestic water	Yes	300	78.5
		No	82	21.5
Solid Waste Management (n=382)	Frequency of solid waste disposal	Once per week	23	6.0
		Every two weeks	80	20.9
		Every months	45	11.8
		No action taken at all	236	61.8
	Having solid waste disposal system	Yes	148	38.7
		No	234	61.3
Households' Sanitation facilities, liquid waste and human excreta disposal system (n=382)	Availability of Sanitation facilities,	Yes	152	39.8
		No	230	60.2
	Safe disposal of waste water	Yes	126	33.0
		No	256	67.0
	Human excreta disposal system	Improved, latrine	100	26.2
		No latrine/bush/field	282	73.8
	Roof of the house	Thatched	68	17.8
		Corrugated iron sheet	312	81.7
Household's housing condition (n=382)	Floor of the house	Earth	23	6.0
		Wood	33	8.6
		Concrete	261	68.3

4. Prevalence and Predictors of Protein Energy Malnutrition in Wondogenet District Sidama Zone, Southern Ethiopia April 2017

All types of protein energy malnutrition were a public health challenges in the study area. Stunting is the most leading prevalent case and accounting for 45.5% of the cases followed by underweight and severe wasting having a share of 38.7% and 15.7% respectively (Figure 3).
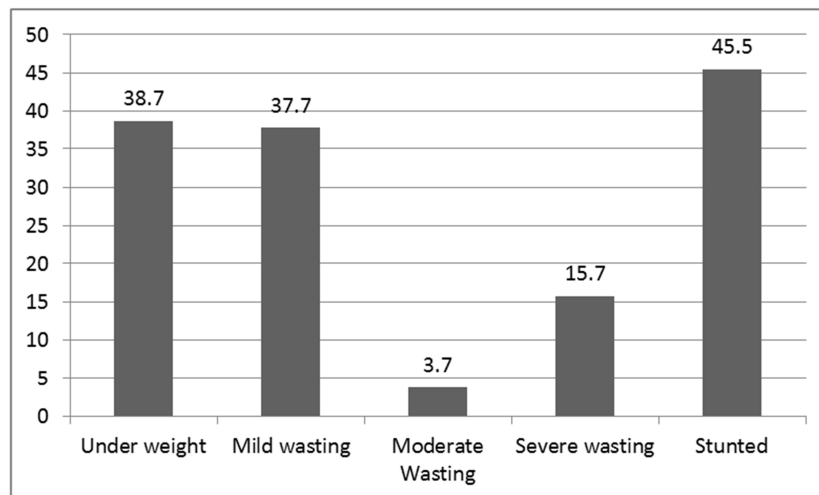
Figure 3. *Prevalence of Malnutrition in Wondogenet district, Sidama zone Southern Ethiopia April 2017.*

We assessed the association of dependent and independent variable using bivariate and multivariate logistic regression. Accordingly, we transfer those variables showing p-value of <0.5 in biviriate logistic regression model into multiple logistic regression model to rule out confounders. As a result, in multivariate analysis age of the children, Weight of children at birth and food distribution experience in the households were independent predictors of protein energy malnutrition in children aged 6-59 months. Accordingly, children with the age of 2 years and below were more likely to become malnourished [AOR =0.278 CI 95% 0.115-0.671] [17, 18] as compared to their counter parts. Similarly, children weighing 2.5 KGs and above at birth were less likely to become malnourished [AOR =0.213 CI 95% 0.063-0.720] than their counterparts, weighing higher than 2.5 KGs at birth. Moreover, children having given priority in food distribution were less likely to become malnourished [AOR =0.413 CI 95% 0.176-0.973] as compared to their country parts (Table 5).

Table 5. Independent Predictors of Malnutrition of Children Aged 6-59 Months in Wondogenet District, Sidama Zone Southern Ethiopia April 2017.

Variables		Nutritional status		AOR (95%CI)	P-value
		# and percent of normal children	# and percent of malnourished children		
Children age	<2 years	16 (13.2%)	105 (86.8%)	0.578 (0.115-0.671)	0.004
	>2 years	8 (4.1%)	189 (95.9%)	1	
Weight at birth (kg)	<2.5	4 (25%)	12 (75%)	0.213 (0.063-0.720)	0.013
	>2.5	20 (6.6%)	282 (93.4%)	1	
Food distribution in Household	No priority to child	10 (13%)	67 (87%)	0.413 (0.176-0.973)	0.043
	Priority to child	14 (5.8%)	227 (94.2%)	1	

5. Discussion

Failure to provide sufficient nutrients during rapid rates of growth results in malnutrition and it is complex in its etiology and cumulative in its manifestations. Communicable diseases and protein energy malnutrition represent the major health problems and children are the more vulnerable group to these problems in Ethiopia like other developing countries [2]. Moreover, malnutrition is considered as a public health challenge and prevalent in many regions of Ethiopia. According to EDHS 2014 report, the national prevalence of underweight and stunting were 9% and 6.8% respectively, and likewise the figure exceeded by three folds in southern region, where the prevalence was 25% underweight and 26.3% stunting on children aged below five years [19].

In this study, the prevalence of stunting and underweight was 45.5% and 38.7% respectively and it was yet very much higher than that of national and regional figure of EDHS 2014. In addition, the prevalence of underweight in the study is higher than reports from other studies in Bure town, northern Ethiopia and in Kenya, where the prevalence was 14.3% [20] and 26.5% [21] respectively. The possible explanation could be variation in study methods and sample size, and socioeconomic and cultural differences among the countries.

Furthermore, magnitude of stunting in this study was consistent with studies conducted in different parts of Ethiopia; wollo and Bule Hora districts, where the stunting was 44.5% and 47.6% respectively [22, 23] but it was slightly lower than the studies reported in India and Khartoum where there was 49.36% [24] and 51% [25] prevalence respectively. However, it was higher than the survey conducted in sub-Saharan Africa and south Asia [26] as UNICEF reported in the year 2013 where the prevalence was 40% and 39% respectively. In addition, the prevalence of stunting in this study is much higher than the report from Bure town, where it was 35.5% [20]. The possible explanation could be variation in mother's educational status and socio economic differences among the countries and urban and rural dwellers as well.

In this study, the prevalence of severe wasting was 15.7% which is higher than the survey report from Nigeria in 2014, which was 9.5% [27]. The possible explanation could be variation in sample size and study period. It might be also due to differences in socioeconomic status and feeding habit

between countries. In contrast to this, it is better than the finding in India where the severe wasting was 28.5% [24].

This study showed that weight at birth, child age and food distribution in the family were independent predictors of protein energy malnutrition. Other comparable report in butajira, south west Ethiopia showed that male sex, weight at birth, poor maternal nutritional status, and rural residence were factors affecting infant's nutritional status [28]. In addition, other study conducted in Somalia region, Eastern Ethiopia, age and sex of the child, mother's education and household's monthly income were factors associated with malnutrition [29]. According to reported from North wollo, Amhara regional state, age and sex of the children were found to be factors associated with protein energy malnutrition [22].

In the study, age of the child was found to be one of independent predictors of protein energy malnutrition. The finding is in line with studies conducted in Tigray region, North Ethiopia and Nigeria [13, 30], and this explains that as the age of child increases, the risk of being undernourished increases. One possible clarification could be because of the late introduction of supplementary food with low nutritional quality [31]. The other reason might be the large portions of caretakers neglect to fulfill optimal food requirements of their children as the child's age increases [32].

Low birth weight is also one of the predictors of protein energy malnutrition in this study. It was consistent with reports of other studies in butajira, south west Ethiopia [28], china [18] and Bangladesh [33]. According to the studies, there was a strong association between low birth weight and protein energy malnutrition. It was also sorted out that there is increased vulnerability of children with low birth weight to infections, such as diarrheal and lower respiratory tract infections and other increased risk of complications such as sleep Apnea, anemia and poor appetite as compared to children with normal birth weight. Greater morbidity among children with low birth weight resulted in poor physical growth and development that is perceived as protein energy malnutrition [18, 28, 33].

This study revealed that there is association between food distributions in the family with nutritional status of the children. In the study, children in a family with priority to the child on food distribution were less likely to be malnourished than children in a family with priority was set to heads of households or equal distribution for all family members. The finding is consistent with Ethiopian demographic and health

survey report in 2014 [19], where the food distributions within the family member is severely affecting children aged below five years and their mothers. Possible explanation for this could be Children are in a fast growth state and they need more balanced diets for body building more than older family members.

As a result, Ethiopian Ministry of Health considered the policy direction recommending for increased efforts to enhance good nutritional practices through health education and treatment for extremely malnourished children, and provision of micronutrients to the most vulnerable group of the population such as pregnant women and children aged below five years [34]. In addition, the Health Extension Program has included nutrition as part of the program packages [35].

6. Conclusions and Recommendations

In Conclusion, the study revealed that prevalence of malnutrition in children under five years of age found to be a major problem in the study community. Age of children, weight at birth of children and food distributions in the households with risks of house hold food insecurity found to be important independent predictors of malnutrition.

Thus, it is recommended that priority on provision of balanced diet needs to be considered to children aged 6-59 months. The parents have to increase the frequency on daily feeding practices and timely introduction of supplementary food with optimal nutritional quality. The caretakers must be provided with important home based training in order to avoid negligence, and to fulfill optimal food requirements of children as their age increases. The health institution should improve the proper identification of weigh at birth, and early diagnosis and timely management of neonatal and childhood illnesses related to malnutrition. Furthermore, the healthcare facilities should strive to equip the health facilities with standard resources. All responsible bodies and respective sectors like Health, Water, Agriculture, Environmental Sustainability and Trade and Industry should work hard to ensure food security in the households and to improve general socioeconomic development of the country.

Acknowledgements

Authors' Contributions

Herein mentioned authors, Rodamo KM, Fiche YA, Geleto FB, Abebe RF, Dangiso DD, have conceived the study and contributed in study design, analysis and writing the paper.

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