Assessment of Nutritional status and Associated factors of children under 5years of age in Dabat Town, North Gondar, Ethiopia.

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Abstract: Malnutrition is one of the leading causes of morbidity and mortality in children under the age of five in developing countries. Ethiopia being one of these countries, malnutrition is an important public health problem. However, little information is available on risk factors for under nutrition. To assess the nutritional status and associated risk factors in children under the age of five, a community based cross-sectional survey was under taken in Dabat, North West Ethiopia. Weight, Height and Middle upper arm circumference (MUAC) of the study children were measured and the socio- demographic characteristics of the study children were collected using a well structured questionnaire. The overall prevalence of malnutrition in the Dabat community was high with 55.56% of the children being stunted, 35.20% being underweight, 11.70% being wasted and 2.70% being marasmic. Among the socio-economic variable, educational status of the mother, age of the mother, plate sharing of the subject child, age at initiation of complementary feeding, educational status of the father, marital status of the mother & father, and monthly income of the parents were significantly associated with malnutrition. The mean age of the study subject was

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31.8($\pm$14.6).The nutritional status of children in the Dabat community is affected by low family income and inappropriate child feeding practices. To reduce child hood malnutrition due emphasis should be given in improving house hold income and proper child feeding practice.

Keywords: malnutrition, risk factor, socio-economic status, stunted, marasmic, underweight community, feeding practice.

Introduction:

Malnutrition affects physical growth, morbidity, mortality, cognitive development, reproduction and physical work capacity and it consequently impacts on human performance, health and survival. Nearly one in seven people worldwide suffer from under nourishment compared with 28 million in semi-developed countries and 9 million in developed countries. Nearly 6 million children die each year from hunger and malnutrition and 1 in 3 people in sub-Saharan Africa is malnourished. The six million children who died each year mostly fall victim to treatable disease such as diarrhea, pneumonia, malaria and measles which they would survived if their bodies had not been weakened by malnutrition. As Food and Agricultural Organization of United States (FAO) General Director, Dr. J. Diouf, stated that, reducing the prevalence of malnutrition by just 5% would save the lives of 30% under 5 children who die annually from hunger related diseases.

Ethiopia is located in the Eastern Horn of Africa with total population of 84.80 million and annual Gross Domestic Product (GDP) of 136.63 US dollar according to International Monetary Fund (IMF) data with life expectancy of 53 and 54 years, male & female respectively. Ethiopia's economy depends on agriculture which accounts for more than 45% of GDP, 80% of exports and 80% of total employment. The biggest trades are coffee, flowers and oil seeds. Yet in spite of high rates of growth, most Ethiopians live in poverty and malnutrition. Generally the prevalence of underweight, stunting and wasting based on the World Bank indicators (2004 – 2008) was >34%, >50% and about 12.3% respectively.

Dabat is located in the Amhara region in North Gondar zone 75 km North to Gondar town with the general population of 155,604 with 4 urban kebeles and 26 rural kebeles. Orthodox Christian accounts 88% of the population and 12% are Muslims, Majority of the population (82.3%) lives on agriculture and 12.7% depends on trade and other activities. 80% of the Woreda is Woindega and 20% is Kolla.

The most important forms of malnutrition in Ethiopia are protein energy malnutrition (PEM), vitamin A deficiency, iodine deficiency disorders and iron deficiency anemia[1].The study done in Gumbrit in North west Ethiopia indicates the level of underweight, wasting and stunting were 28.5%, 17% and 24.0% respectively [2]. Family / household income was significantly associated with nutritional status of the under five children under age five [2]. The socio economic risk factors for severe acute malnutrition were maternal illiteracy, paternal illiteracy, monthly family income of less than 50 USD and large family size with the number of children greater than 3. Inappropriate infant and young child feeding practices were commonly seen in children with severe acute malnutrition. The identified in appropriate feeding practices were supplementation

with pre-lacteal feeds, lack of exclusive breast feeding in the first six months of age, late initiation (at 12 months of age or beyond) of complementary diet, and bottle feeding, similarly there was a significant difference between the parents / care givers of the cases and the controls in their knowledge for infant and young child feeding practices. Relatively a small proportion (40.2%) of the care givers in cases knew that complementary diet should be started at the age of 6 months compared to 66.7% in the controls and pre-lacteal feeds were thought to be important in 28.4% of the cases compared to 8.8% of the controls [3].

Study done in West Gojjam indicated that 43.2 percent of the children under five were suffering from chronic malnutrition, 14.8 percent were acutely malnourished and 49.2 percent were found to be under weight. The main contributing factor for under five stunting found to be sex of the child, child age, diarrheal episode, deprivation of colostrums, duration of breast feeding, pre-lacteal feeds, type of feed, age of initiation of complementary feeding and method of feeding [4]. A study done in Nigeria using a cross-sectional community survey design from 344 households 420 children were studied. Using the modified Wellcome classification, the prevalence of underweight, wasting and stunting using the WHO / NCHS standards were 21.1%, 9% and 26.7% respectively [5]. The present study was conducted to assess the nutritional status and associated factors among less than five years age of children in Dabat, Ethiopia. The study also assessed the level of under nutrition, factors related with malnutrition of the above said groups.

Materials and Methods

Study design and area of study: Community based cross sectional (Descriptive survey) was under taken by using a well structured questionnaires consisting of four components. They are Demographic, Socio-economic, child information about nutrition, vaccination and illnesses and anthropometric measurements. The study was conducted in Dabat, which is located in Amhara region 75km North from Godnar Town. The Study population were under five children ranging from 6 to 59 month living in Dabat Kebele [1,2,3].

Study variables:

Dependent variables: Weight, Height and Middle upper arm circumference (MUAC).

Independent variables:

i). Parental: Parental age, religion, educational status, marital status, age and sex of the child, number of family members, occupation and monthly income.

ii). Child: Gestational age, birth weight, position, age deference with previous child, pre-lacteal feeding, breast feeding practice, plate sharing, sun light exposure, vaccination and illnesses.

Sample size: Convenience sampling technique was applied and sample size was estimated by using simple proportion and study population which is 155,604.

The formula we used was n $= \frac{z^2 P(1-b)}{w^2}$

Where n= the minimum sample size, P = Population proportion, W = margin of sampling error, Z= Confidence level.By assuming a 60% as a prevalence of malnutrition, margin of sampling error 5% and confidence level of 1.96, our sample size is 369.

Operational definition

1. Adequate sun light exposure – early morning sun light for about 20-30 minutes in 1st yr of life
2. Complete vaccination – Complete all the 5x vaccination according to Expanded Programme on Immunization (EPI).
3. Under weight -Weight or age (60%- 80% on Harvard curve)
4. Wasting – Weight for age below 90% on National center for health statistics (NCHS) curve
5. Stunting - Height for age below 95% on National center for health statistics (NCHS) curve
6. Marasmus - Weight for age below 60% on Harvard curve.
7. Severe acute malnutrition- Middle upper arm circumference (MUAC) < 11.0 cm
8. Term – A baby born at gestational age of 37 – 42 weeks
9. Preterm -   baby before 37 weeks of gestational age(GA)
10. Post term – baby born after 42 weeks of gestational age(GA)
11. Birth weight – weight of baby while he/she is born
12. Low birth weight – weight below 2500 gram
13. Over weight – weight below > 4000 gram
14. Exclusive breast feeding – only breast milk given without water or cheese
15. Prelactant feeding- something other than breast milk during the 1st 3 days of life.
16. Complementary feeding – food stuffs added to breast milk.

Data collection, processing and analysis: We have collected the data by using structured questionnaire and anthropometric measurements. The data was processed and analyzed by SPSS 13 after checking for its completeness. The research was conducted after approval of the proposal by University оf Gondar and willingness of children's parents. The questionnaire was developed after reviewing different relevant literatures. It was first developed in English and translated to Amharic and then back to English to improve consistency of materials. Pre-test was conducted for 5% of our sample at different village from our study villages in Dabat town. This was not included in our research result. After the pretest vague terms were corrected. The functionality and accuracy of instruments (beam balance, length measuring board, & tape meter) were checked by comparing with other instruments which were used by Dabat research center. Since the data was collected by ourselves, we didn't face any "no response" or "missed responses". To check the

accuracy of data collected, we did inter-group checking method. During data entry any error was rechecked with the questionnaire and corrected.

Result: The nutritional status of less than five years age children was assessed. We found the impact of the magnitude and severity of malnutrition in our clinical practices. We also aspired to see the real magnitude of malnutrition and the nutritional status of less than 5 years age children. Further we analyzed some concomitant activities like health education and de-warming. The study included 369 children out of which 175 (47.4%) were males and 194(52.6%) were females. Their age distribution was from 6 months to 59 months with mean age of 31.8 months with the standard deviation of 14.598. The age of the children's' fathers were ranging from 22 years of age to 70 yeas of age with mean age of 35.626 years and standard deviation of 8.32. Concerning the religion of the fathers 94% were Christians and 6% were Muslims. The age of the children's mother were ranged from 18 years to 57 years with mean age 27.686 and Standard deviation of 6.414. The other socio-demographic characteristic of the parent is Summarized in the table 1.

Table 1. Socio – demographic characteristics of the study subjects' parents, Dabat Town, March 2011 (GC-Gregorian calendar).

S.No	Variable	Father		Mother	
		Frequency	Relative freq	Frequency	Relative freq
1	**Religion**				
	Christian	347	94%	348	94.3
	Muslim	22	6%	21	5.7
2	**Educational status**				
	Illiterate	50	13.6%	86	23.3
	Literate	319	86.4%	283	76.7
3	**Marital status**				
	Unmarried	6	4.6%	5	1.4
	Married	312	84.6%	312	84.6
	Divorced	44	11.9%	48	13.0
	Widowed	7	1.9%	4	1.1
4	**Occupation**				
	Governmental worker	228	61.8%	117	31.8
	Merchant	58	15.7%	32	8.7
	Farmer	45	12.2%	2	0.5
	Daily labourer	38	10.3%	43	11.7%
	House wife	-		175	47.4%

Regarding monthly income of the subjects' care giver, it was found that 59.9% had monthly income of less than 1000.00 Ethiopian birr and 33.6% had monthly income less than 500.00 birr. The remaining 40.1% had monthly income more than 1000 Birr. During our assessment of the number of family members, it was found that 35.8% of the subject children's' live in a family size ≤ 3 family member and 64.2% of the children live in a family having greater than 3 family members.

Among our study subjects 97.8% were born at term, 1.4% was born preterm and 0.8% was post term. Among the 369 children care givers only 31 knew the birth weight of their child. Among these 31 children, only one had low birth weight, one was overweight at birth and the remaining 29 had normal birth weight. Among the 338 children whose birth weight were not known was estimated by parents as medium (76.0%), low (16.0) and high (8.0%). Regarding the position of the child in the family sequence 43.1% were first child, 27.4% were the second, 13.3% were the third and the rest were the fourth and above up to the ninth. During the assessment of the age difference of the subject child with his/her elder or successor, 50.4% had an age difference of $\geq$ 2years, 39.0% had no successor or elder, 8.5% had age difference < 2 years and 2.4% had age difference <1 year.

Prelactant feeding history was found among 16.8% of the study children. Regarding frequency of breast feeding, 63.7% of the mother gave breast milk as the child wants, 14.6% of the mothers gave breast milk 8-12x/day, 11.9% of the mothers gave breast milk 4.8 x/day, 8.7% of the mothers gave breast milk more than 12x/day and 1.1% of the mothers gave breast milk 2.4x/day. Bottle feeding practice was found among 70.2% of the study children. Plate sharing practice was found among 43.9% of the study children. Regarding age at initiation of complementary food, 58.3% were initiated at 6 months of age, 25.2% were initiated at age less than 6 month, 16.5% were initiated at age greater than 6 months 16.5% were initiated at age greater than 6 months.

Concerning sun light exposure, 96.7% were exposed adequately. Among our study subjects, 98.1% were vaccinated and 1.9% was not. According to the EPI, 45.5% of our study, children completed the schedule, 34.4% had 4 x vaccinations and 20.1% had vaccination less than 4x. About assessment of illness among study subjects, 15.4% of the study children had recent attack of diarrhea, 6.0% had history of attack of acute febrile illnesses, 3.3 % of the study children had attack of measles and only one child had attack of chicken pox. Among our study children, 35.2% were found to be underweight and 2.7% were marasmic on weight for age on Harvard curve.
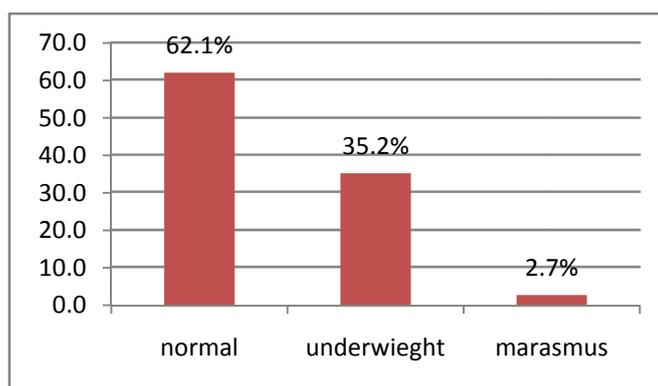

Fig 1. Bar graph for weight –for-age

Among the study children, 11.7% were wasted on NCHS curve of weight – for – height for each specific age and sex.
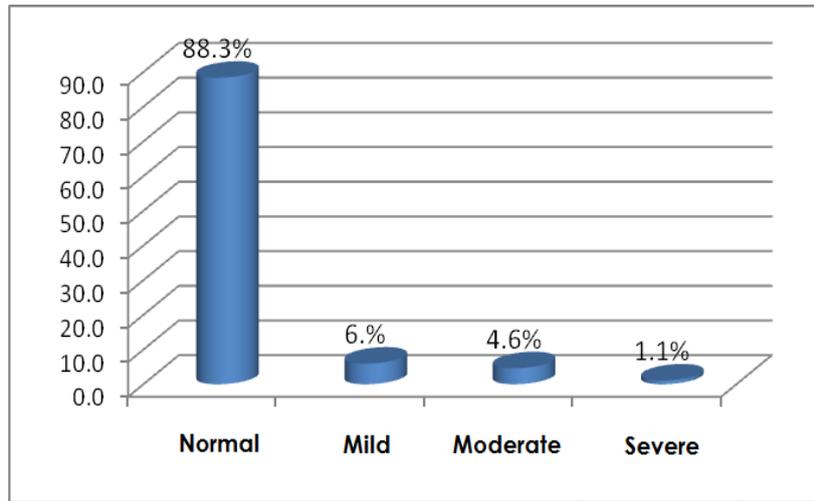

Fig 2. Bar graph for weight – for - height

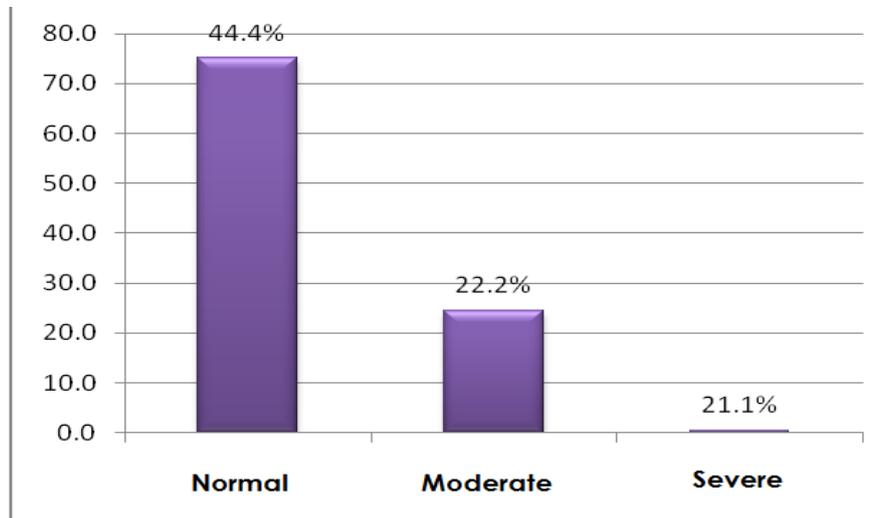Among the study children, 55.56% were stunted on height for age on NCHS curve for the specific age and sex.

Fig 3. Bar graph for Stunting

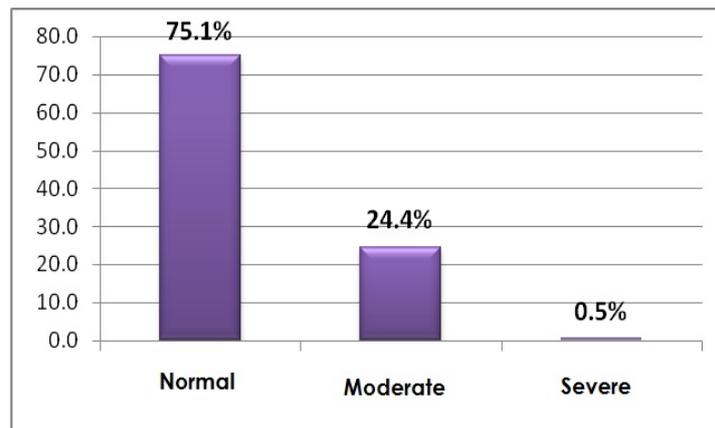During our assessment of MUAC, 24.4% had moderate malnutrition and 0.5% had severe malnutrition (SAM).

Fig 4. Bar graph for MUAC

SPSS 13 data analyzer was used to assess the association of socio-demographic, socio-economic status of children, illnesses and anthropometric results. Educational status of the mothers was found to have association with underweight (P=0.033). Age difference of the subject child with his/her elder or successor was found to have significant association with underweight (P=0.056). Plate – sharing was found also to have significant relationship with weight for – age (P=value 0.041). Frequency of vaccination was also found to have significant association with weight for age (P=value=0.0)

Table 2. Cross tab table for amount of vaccination verses Weight- for- age

amount of vaccination	1x	Count	1	1	2	4
		% within amount of vaccination	25.0%	25.0%	50.0%	100%
	2x	Count	3	8	0	11
		% within amount of vaccination	27.3%	72.7%	0.0%	100%
	3x	Count	29	19	5	53
		% within amount of vaccination	54.7%	35.8%	9.4%	100%
	4x	Count	79	46	2	127
		% within amount of vaccination	62.2%	36.2%	1.6%	100%
	5x	Count	113	54	1	168
		% within amount of vaccination	67.3%	32.1%	0.6%	100%
	0x	Count	4	2	0	6
		% within amount of vaccination	66.7%	33.3%	0.0%	100%
Total		Count	229	130	10	369
		% within amount of vaccination	62.1%	35.2%	2.7%	100%

Recent diarrhea was also found to have association with underweight (p=0.003). Other variables like religion, educational status of father, marital status, age of the child, sex of the child, number

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of family members, occupation, gestational age of the child, birth weight of the child, position of child, prelactant feeding, frequency of breast feeding, bottle feeding, age at initiation of complementary food, other – diseases and child hood illnesses were found to have insignificant association. Monthly income of care givers was found to have insignificant association with underweight (P=0.057). Age of the subjects' mother was found to have association with wasting (p=0.009). Sex of the child also has association with wasting (p=0.001). Age at initiation of complementary food was also found to have association with wasting (P=0.006).

Table 3. Cross tab table for age at initiation of complementary food verses wasting

			Wasting				
			normal	mild	Moderate	Severe	Total
Age at initiation of complimentary food	<6 m	Count	79	4	9	1	93
		% within age at initiation of complimentary food	84.9%	4.3%	9.7%	1.1%	100%
	6-8m	Count	192	15	7	1	215
		% within age at initiation of complimentary food	89.3%	7.0%	3.3%	0.5%	100%
	9-11m	Count	21	0	1	2	24
		% within age at initiation of complimentary food	87.5%	0.0%	4.2%	8.3%	100%
	>12	Count	34	3	0	0	37
		% within age at initiation of complimentary food	91.9%	8.1%	0.0%	0.0%	100%
Total		Count	326	22	17	4	369
		% within age at initiation of complimentary food	88.3%	6.0%	4.6%	1.1%	100.0%

Plate sharing of the study children has insignificant association with wasting (P=0.057). Frequency of vaccination had significant association with wasting (P=0.003). Recent diarrheal attack of the study children has also significant association with wasting (P=0.026). Other variables, like religion of the father, educational and marital status of the father and mother, age of the child, number of family members, occupation. Monthly income, gestational age of the child, birth weight of the child, position of the child, position of the child, age difference of the child, prelactant feeding, frequency of breast feeding, bottle feeding, child hood illnesses and other diseases were found to have insignificant association with wasting.

Marital status of the father and mother were found to have significant association with stunting (P=0.014 and P=0.002 respectively). Educational status of the father had significant association with stunting (p=0.003). Monthly income of parents had significant association with stunting (P=0.016).

Table 4. Cross tab table for monthly income versus stunting

			Stunting				Total
			Normal	Mild	Moderate	Severe	
monthly income	<500	Count	38	38	25	23	124
		% within monthly income	30.6%	30.6%	20.2%	18.5%	100%
	500-1000	Count	47	16	22	12	97
		% within monthly income	48.5%	16.5%	22.7%	12.4%	100%
	1000-1500	Count	29	11	11	3	54
		% within monthly income	53.7%	20.4%	20.4%	5.6%	100%
	1500-2000	Count	21	5	9	1	36
		% within monthly income	58.3%	13.9%	25.0%	2.8%	100%
	>2000	Count	29	12	11	6	58
		% within monthly income	50.0%	20.7%	19.0%	10.3%	100%
Total		Count	164	82	78	45	369
		% within monthly income	44.4%	22.2%	21.1%	12.2%	100%

Frequency of vaccination was found to have significant association with stunting (P=0.004). Other variables like, age of the mother, religion, educational status of the mother, age of the child, sex of the child, number of family members, occupation of parents, gestational age of the child, position of the child, age difference of the child, prelactant feeding, frequency of breast feeding, bottle feeding, age at initiation of complementary food, plate sharing, recent diarrheal attack, child hood illness and other diseases have in significant association with stunting.

Age of the child was found to have significant association with MUAC (P=0.0). Monthly income of parents had significant association with MUAC (P=0.005). Parental estimation of birth weight has also significant association with MUAC (P=0.012). Other diseases like (Acute Febrile illness(AFI) had significant association with MUAC (P=0.004).

Other variables like age of parents, marital status, age of the child, educational status, sex of the child, number of family member, occupation, gestational age, position of the child, age difference, prelactant feeding, frequency of breast feeding, bottle feeding, age at initiation of complementary food, plate sharing, vaccination status of the child, recent diarrhea, child hood illness and religion had insignificant association with MUAC.

Discussion:

The present study reports on the level of nutritional status and impact of some socio-economic and demographic characteristics of children less than 5 years of age in Dabat Town, North Gonder, Ethiopia. The study may be regarded as a reasonable reflection of nutritional status of children less than five years of age. A number of similar studies have been conducted in various parts of the world [7,8,9,10,11]. The questionnaire used in the present study was valid and reliable tool covered demographic information, breastfeeding practices, socio-cultural and economic factors and anthropometric data. Although more objective measurements may be recommended, questionnaires can be good instruments for measuring the perceived environment in larger samples of young children.

The overall under nutrition was 25%. The levels of underweight, marasmus, wasting, stunting, moderate malnutrition and severe malnutrition were 35.2%, 2.7%, 11.7%, 55.56%, 24.4% and 0.5% respectively. The prevalence reported in this study is lower than the 2011 EDHS report, of which 44% was stunting and 29% was underweight[12]. A cross sectional study done on factors affecting prevalence of malnutrition among under 3 yrs of age in Botswana showed the prevalence of wasting, stunting and underweight is 5.5%, 38.7%, 15.6%, respectively [6]. A similar research done in rural Nigeria revealed that 23% of under 5 children were under weight 9% of them were wasted & 26.7% were stunted [5], also in Gumbrit[2] was 24%, in China[13] was 20%, and in Pakistan[14] was 21%. Our results showed that, the prevalence of stunting in Dabat town is higher than in Botswana & Nigeria and other parts of the world and also higher than the UNCEF report, in which the prevalence was 40% and 39% in sub-Saharan Africa and in South Asia respectively [15]. This is also higher than studies reported in Khartoum, Sudan(51%)[16], India(49.36%)[17], Vietnam(36.3%)[18], Bule Hora, Ethiopia(47.6%)[19], Somalia region, Ethiopia(34.4%)[20], and North Wolla, Ethiopia(44.5%)[21]. These might be due to difference in maternal education status and economic development.

A study also conducted in West Gojjam found that 43.2% of children under 5 years age were suffering from stunting, 14.8% were acutely malnourished (wasted) and 49.2% were found to be under weight (4). This result was slightly higher as compared to our results. According to our nutritional assessment in Dabat town, stunting is the serious problem of under 5 children while severe malnutrition has no substantial impact. According to 2005 DHS data 47% of children under 5 years of age were stunted, 24% were severely stunted, 11% were wasted, 2% were severely wasted, 38% were under weight, while 11% were severely underweight [22]. This indicated that the rate of stunting in Dabat is higher than the national figure while the rate of wasting and underweight are almost similar.

Educational status of parents showed significant association with nutritional status of children under 5 years of age in our study area. We found that, our finding is similar to the results of other studies conducted elsewhere in this country but varied to the results of study conducted in Gumbrit[2]. According to our study, the marital status of the parents also plays an important role in nutritional status of children. Unmarried parents have a large number of malnourished children. Age of the mothers also have significant association with malnutrition. In addition to the above mentioned variables, age & sex of the child have significant relation with nutritional status. On account of this, females are slightly more malnourished. Moreover, monthly income of care givers also has determinant effect on being malnourished and accordingly most case gives who gain < 1000 birr per month have malnourished children.

Plate sharing, age difference of the child with his/her elder or successor, frequency of vaccination, recent diarrheal attack, age at initiation of complementary feeding and estimated birth weight of the child was shown to affect nutritional status of the children in the study. Even if most of the children (98.1%) were vaccinated, most of them didn't complete the EPI schedule. It was shown that children with incomplete vaccination status have a negative impact on their nutritional status. This is because vaccination is important to protect children against diseases which otherwise

affect their general health & nutritional status. The other thing to be mentioned is, most of the children were estimated to have medium birth weight (76%). It was shown, as it had no impact on the nutritional status of children. This might be because of inaccurate estimation of children's birth weight by their parents.

Conclusion:

From our study we concluded that, our study area was one of the areas which was highly affected by malnutrition. Socio-economic, socio-demographic, vaccination status & diarrheal disease were shown to affect the nutritional status of the children in the study area.

Acknowledgment:

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