

*Full Length Research Paper*

# Assessment of the impact of malnutrition on children at Dilla referral hospital and unity pediatric clinic, Ethiopia

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**Severe acute malnutrition (SAM) arises as a consequence of a sudden period of food shortage and is associated with loss of a person's body fat and wasting of their skeleton. Many nutrition are gained from foods, there are basic nutrient essential for the development of human body. Failing in human nutrition causes malnutrition. Malnutrition has great impact on children's physical and mental growth. Malnutrition is the major cause of mortality in infants. The impact has also long term and short term effects as well as the death of individuals due to malnutrition which decreased from 2001 to 2004 at Dilla referral Hospital and also slightly at Unity Pediatric Clinic. To decrease the rate of malnutrition we must create awareness among the population to change their attitude of feeding type by giving house to house manuals on descriptions about balanced diet.**

**Key words:** Children, Dilla referral hospital, Ethiopia, kwashiorkor, malnutrition, nutrition.

## INTRODUCTION

Malnutrition in the Ethiopian context has been described as a long-term year round phenomenon due to chronic inadequacies in food intake combined with high levels of illness (National Nutrition Policy Draft, 2003). Malnutrition is the most common health problem affecting both children and adults in Ethiopia. According to Benson (2005), malnutrition is a physical condition or process that results from the interaction of inadequate diet and infection and is most commonly reflected in poor infant growth, reduced cognitive development, anemia, and blindness in those suffering severe micronutrient deficiency, and excess morbidity and mortality in adults and children alike.

Malnutrition remains one of the most common causes of morbidity and mortality among children throughout the world (World Health Organization, 1999). Malnutrition is the underlying cause of one third of the 7.6 million child deaths each year before their fifth birthday. Meeting this challenge is doubly urgent because among children who

survive, chronic malnutrition causes devastating and irreversible damage (Chesire et al., 2008). Lack of nutritious food, coupled with infection and illness, means their bodies and brains do not develop properly and at least 170 million children are affected by stunting (Global Monitoring Report, 2012; Amuta et al., 2009; Garba and Mbofung, 2010; Reji et al., 2011). Well over two-thirds of these deaths, which are often associated with inappropriate feeding practices, occur during the first year of life (WHO, 2002). Community based studies done in Ethiopia showed that malnutrition is common (Yimer, 2000; Getaneh et al., 1998).

Ethiopia is the second most populous country in Africa, at nearly 84 million. Approximately 14% are children under five years of age Central Statistics Agency (2012). Population projection according to the Ethiopia Census 2007. These children and their mothers suffer disproportionately from the poor health and nutrition situation in the country. In fact, malnutrition is the

underlying cause of 57% of child deaths in Ethiopia (SCUK, 2009), with some of the highest rates of stunting and underweight in the world. Worldwide trends show that malnutrition and lack of sanitation contribute to over half of all under-five deaths (UNICEF, 2012). Nutrition is the provision of adequate energy and nutrient to the cells for them to perform their physiological function of growth, reproduction, defense and repairs (WHO, 1999). Diseases that are caused due to malnutrition include: Marasmus, kwashiorkor, anemia, goiter, hypernatremia, hypokalemia and vitamin deficiency (Grover and Eele, 2009).

Children malnutrition is the single biggest contribution to under five mortality due to greater susceptibility to infection and show recovery from illness. Children who do not reach optimum size as adult may have less physical capacity for works. Their brains are affected and they are at greater risk of infection which kills many children during their early years (Susskind, 2009).

Kwashiorkor is one of the most acute protein malnutrition disease in the world. It is also said to be a protein calories malnutrition similar to marasmus, but what sets it apart from marasmus is the presence of edema that is typically seen in the feet. Other signs of this disease include a distended abdomen, an enlarged liver, thinning hair which is normally end up (coarse) in texture, loss of teeth, skin depigmentation and dermatitis. Children suffering from this condition normally end up developing irritability and anorexia (Holmes, 2007).

Interventions could focus on helping households use their resources more effectively to improve the nutritional status of their children as well as on increasing a household's resources (Strauss and Thomas, 1995). A nutrition assessment carried out in 2007 at St. Peter's hospital in Addis Ababa where the hospital have been offering antiretroviral treatment (ART) indicated that 35 to 40% of registered pre-ART clients had a body mass index (BMI) of less than  $18.5 \text{ kg/m}^2$  (mild malnutrition) and 20% had a BMI of less than  $17 \text{ kg/m}^2$  (moderate malnutrition) ([www.fantaproject.org](http://www.fantaproject.org)).

A study done in Southern Nations Nationalities and Peoples Regional state attested that 45% of the children were stunted, 42% underweight and 12% wasted (Yimer, 2000). Similarly in Jimma town, the prevalence of underweight, wasting and stunting were 36, 9 and 36%, respectively (Getaneh et al., 1998). Malnutrition is an important public health problem in Ethiopia; however, little information is available on risk factors for severe acute malnutrition (SAM) (Amsalu and Tigabu, 2008). As Amsalu and Tigabu reported and confirmed in 2008 that the association of severe acute malnutrition to inappropriate infant and young child feeding practices and also to reduce childhood malnutrition, due emphasis should be given in improving the knowledge and practice of parents on appropriate infant and young child feeding practices.

From this point of view, the present study was designed to conduct at Southern Nations Nationalities and Peoples

Regional state particularly at Dilla referral hospital and Unity Pediatric Clinic, to obtain a better understanding of the key determinants of child malnutrition in Ethiopia and their relative importance, which is also of importance in its own right. This study was designed to determine the prevalence of malnutrition and its impact among children in Dilla town and surrounding and also to create awareness to the society that support to identify cultural setting and child care which are commonly practiced in Dilla town and surrounding. Additionally, this study was conducted to intimate families and children with the knowledge of malnutrition and its impact, that is, it causes and how to combat malnutrition.

## METHODOLOGY

### Description of study area and population

Description of the institution Dilla University is located at Dilla town, Gedeo Zone of the Southern Region of Ethiopia; it is 365 km south of the capital, Addis Ababa. The current Dilla University emerged from the Dilla College of Teacher Education and Health Science. The study was conducted at Dilla town, it is the capital city of Gedio zone situated 365 km south of Addis Ababa, Ethiopia. The city has longitude and latitude of  $6^{\circ} 24' 36'' \text{ N}$ ,  $38^{\circ} 18' 38'' \text{ E}$  with an elevation of 1,570 meters above sea level. It is lowland and greenish area with different fruit production, and it is also a rift valley zone.

### Data collection

#### Observation

In the area of Dilla town, so many children were observed under malnutritional status. From this point of view, the data was collected through observation.

#### Interview

The data was secondary collected through interview the parents. During the in-depth interview, a snowball sampling technique was used and the triggering points were included, such as mode of eating and balance diet knowledge.

**Questioner:** Structured and self administered questionnaire consisting of background information. The questions were prepared by the researcher for the fulfillment of the paper and the questions answered by professional experts.

**Ethical clearance:** The study protocol was reviewed and approved by Dilla University, Biology Department Staff members. Before data collection, an informed consent was obtained from respondents. Privacy and confidentiality were also maintained throughout the data collection, analysis, and manuscript preparation. The target of the research was in line with the objectives of research.

### Method of data analysis

Research design is mainly a qualitative data collection method complemented by quantitative data collection approach that

**Table 1.** Malnutrition cases in Dilla referral hospital

Year	Sex	Total patient children	Malnutrition case (%)	Child (%) under 5 year	Child (%) 6-10 year	(%) Unknown	(%) Death
2001	Male	508	207 (18.12)	90 (7.88)	60 (5.25)	50 (4.37)	38 (3.32)
	Female	564	151 (13.32)	118 (10.33)	98 (8.5)	49 (4.29)	19 (1.663)
	Total	1142	358 (31.34)	208 (18.21)	158 (13.83)	99 (8.66)	57 (4.99)
2002	Male	549	197 (20.18)	80 (8.19)	60 (6.14)	48 (4.91)	13 (1.33)
	Female	427	127 (13.01)	135 (13.83)	49 (5.02)	32 (3.27)	29 (2.97)
	Total	976	324 (33.19)	215 (22.02)	109 (11.16)	80 (8.19)	42 (4.303)
2003	Male	642	285 (23.98)	193 (16.24)	92 (7.74)	34 (2.86)	20 (1.68)
	Female	546	117 (9.84)	82 (6.9)	32 (2.94)	38 (3.19)	18 (1.51)
	Total	1188	402 (33.83)	275 (23.14)	127 (10.69)	72 (6.06)	38 (3.19)
2004	Male	504	191 (22.55)	148 (17.47)	43 (4.90)	21 (2.47)	8 (0.94)
	Female	340	128 (15.11)	103 (12.16)	25 (2.85)	39 (4.60)	14 (1.65)
	Total	847	319 (37.66)	251 (29.63)	68 (7.76)	60 (7.08)	22 (1.85)
Grand total number	Male	2203	880 (21.56)	511 (12.53)	255 (6.25)	153 (3.75)	79 (1.93)
	Female	1877	529 (12.96)	438 (10.73)	204 (5)	158 (3.87)	80 (1.69)
	Total	4080	1409 (34.53)	949 (23.25)	459 (11.25)	311 (7.62)	159 (3.89)

The number in the bracket is put in percent (%).

provides information about malnutrition. The collected data analyses and interpreted by statically tools through graphs, figure, percentage, and table.

## RESULTS AND DISCUSSION

A total of 4,463 and 4,080 patient in Unity Pediatric Clinic and Dilla referral hospital participated in the study, respectively. Majority of the patients were men followed by female. There are three children per family as ratios were observed, not all families have ability to fulfill their child needs. So, many children are faced with the impact of malnutrition. But these children are out patient. In the body of children were found big stomachs. The common lack of nutrition is as a result of protein deficiency due to difficult in the purchase of food items like, milk, egg and meat. So the reason why children suffer from malnutrition is due to protein and calcium deficiency.

### Socio-demographic factor associated with malnutrition in Dilla referral hospital

As indicated in Table 1, the malnutrition prevalence was 31.34% in 2001, 33.19, and 33.83% in 2002 and 2003, respectively. This is almost similar to 37.66% in 2004. Concerning sex, a greater number of malnourished subjects were found in the group of the male, 207 (18.12), 197 (20.18), 285 (23.98), 191 (22.55) and

followed by female, 151 (13.32), 127 (13.01), 117 (9.84), 128 (15.11) in Dilla referral hospital at 2001 to 2004, respectively. Regarding Child under 5 years, a greater number of malnourished subjects were found in the group of the female, 118 (10.33), 135 (13.83) followed by male 90 (7.88), 80 (8.19) at 2001 to 2002, respectively, while in 2003 to 2004, the greater number of malnourished subjects were found in the group of the male, 193 (16.24), 148 (17.47) followed by female, 82 (6.9), 103 (12.16) in Dilla referral hospital, respectively.

In the case of children between 6 to 10 years, the greater numbers of malnourished subjects were found in the group of the male, 60 (6.14), 92 (7.74), 43 (4.90), followed by female, 49 (5.02), 32 (2.94), 25 (2.85) between 2002 and 2004. On the other hand, female was greater than male, 98 (8.5), 60 (5.25) between 2001 at 2001, respectively. The incidence of underweight children has been consistently reported at about 45%, which compares with an average incidence of underweight children in Sub Saharan Africa in the nineties of 33 percent (World Bank, 2000). Similarly, surveys in Ethiopia have consistently found more than half the children fewer than five stunted, with stunting rates most often attaining more than 60% (Christiaensen and Alderman, 2001).

### Marasmus

As indicated in Figure 1, the child had marasmus



**Figure 1.** The child with marasmus malnutrition at Dilla referral hospital, 2013.

malnutrition in 2013 in Dilla referral hospital. So this child had very thin body and some spot like infection was observed on the skin due to deficiency of vitamins and other minerals. Marasmus is a form of protein-energy malnutrition occurring chiefly among very young children in developing countries, particularly under famine conditions, in which a mother's milk supply is greatly reduced

(<http://www.britannica.com/EBchecked/topic/363838/marasmus>). Marasmus is the most common form of acute malnutrition in nutritional emergencies, and in its severe form, can very quickly lead to death if untreated. It is characterised by severe wasting of fat and muscle which the body breaks down to make energy (<http://www.unicef.org/nutrition/training/2.3/4.html>).

Marasmus, on the children, for reasons not entirely understood, develops thinness without oedema. This condition is called marasmus ([http://conflict.lshtm.ac.uk/page\\_116.htm](http://conflict.lshtm.ac.uk/page_116.htm)).

#### **Socio-demographic factor associated with malnutrition in Unity Pediatric Clinic**

As indicated in Table 2 that malnutrition has 31.62% in grand total and death show 3.33% and unknown or Longley adverse effect show almost 7.81% in comparison and contrast in the years 2001 to 2004. There is only difference in 2001 it shows 33.02% a little bit higher than others. All others show similarity it is approximately 31%. With regard to sex, a greater number of malnourished

subjects were found in the group of the male, 241 (20.92), 230 (18.02) followed by the female, 150 (13.02), 230 (18.02) from 2001 to 2002 in Unity Pediatric Clinic, respectively. While from 2003 to 2004, the greater numbers of malnourished subjects were found in the group of the female, 200 (18.38), 171 (18.05) followed by male 123 (11.30), 124 (13.09) in Unity Pediatric Clinic, respectively.

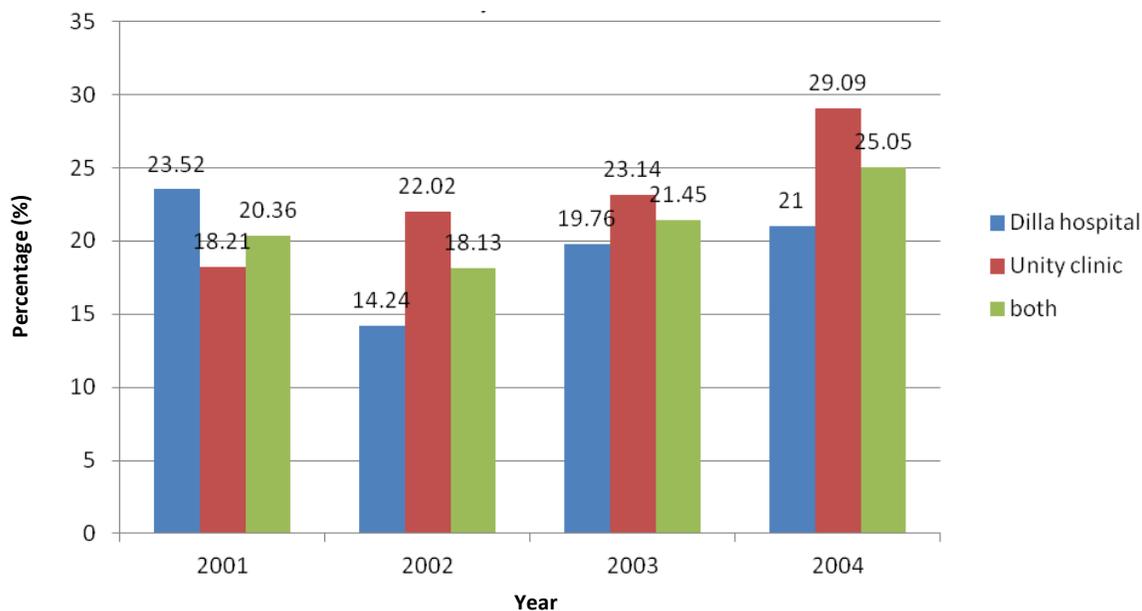
A community based study done in Jimma, Ethiopia showed that children with malnutrition lived in a household with low monthly income (Getaneh et al., 1998). As indicated in Figure 2, the highest number of malnutrition prevalence among under 5 year children in Dilla referral hospital was 23.52% at 2001 while the lowest number of malnutrition prevalence among under 5 year children was at 2002, 14.24%. The number of malnutrition prevalence among 6 to 10 year young children in Unity pediatric clinic from 2001 to 2004 were increasing, 18.21, 22.02, 23.14 and 29.09%, respectively. The cumulative number of malnutrition prevalence among under 5 year children was highest at 2004, 25.05%. While the lowest cumulative number of malnutrition prevalence among under 5 year children was 18.13% at 2002. As reported also, the effect of a large family size with overcrowding and inadequate spacing has been implicated as a risk factor for severe malnutrition in different studies as well (Haidar et al., 2005; Ighogboja, 1992; Henry et al., 1993; Odunayo and Oyewole, 2006).

As shown in Figure 3, the greatest number of malnutrition prevalence among 6 to 10 years old children were 17.39% in 2002 in Dilla referral hospital, and in

**Table 2.** Malnutrition cases in Unity Pediatric Clinic.

Year	Sex	Total patient children	Malnutrition case (%)	Child under 5 year (%)	Child 6-10 year (%)	Unknown (%)	Death (%)
2001	Male	588	241 (20.92)	130 (11.28)	61 (5.29)	41 (3.55)	13 (1.12)
	Female	564	150 (13.02)	141 (12.23)	69 (5.98)	18 (1.56)	15 (1.31)
	Total	1152	391 (33.02)	271 (23.52)	130 (10.41)	59 (5.12)	28 (2.4)
2002	Male	627	230 (18.02)	100 (7.8)	43 (3.36)	38 (2.97)	44 (3.44)
	Female	649	173 (13.55)	84 (6.58)	179 (14.02)	52 (4.02)	29 (2.27)
	Total	1276	403 (31.58)	184 (14.42)	222 (17.39)	90 (7.05)	73 (5.72)
2003	Male	542	123 (11.30)	100 (9.19)	49 (4.5)	55 (5.05)	9 (0.8)
	Female	546	200 (18.38)	115 (10.56)	59 (5.42)	52 (4.77)	14 (1.2)
	Total	1088	323 (29.68)	215 (19.76)	108 (9.92)	107 (9.83)	23 (2.11)
2004	Male	507	124 (13.09)	100 (10.55)	40 (4.22)	30 (3.16)	13 (1.36)
	Female	440	171 (18.05)	99 (10.45)	46 (4.85)	23 (6.65)	12 (1.26)
	Total	947	295 (31.15)	199 (21.01)	96 (10.13)	93 (9.8)	25 (2.63)
Grand total number	Male	2264	118 (16.08)	430 (9.63)	193 (4.32)	164 (3.62)	79(1.7)
	Female	2199	694 (15.55)	439 (9.83)	353 (7.90)	185 (4.14)	70(1.56)
	total	4463	1412 (31.63)	869 (19.47)	546 (12.23)	349 (7.81)	149(3.33)

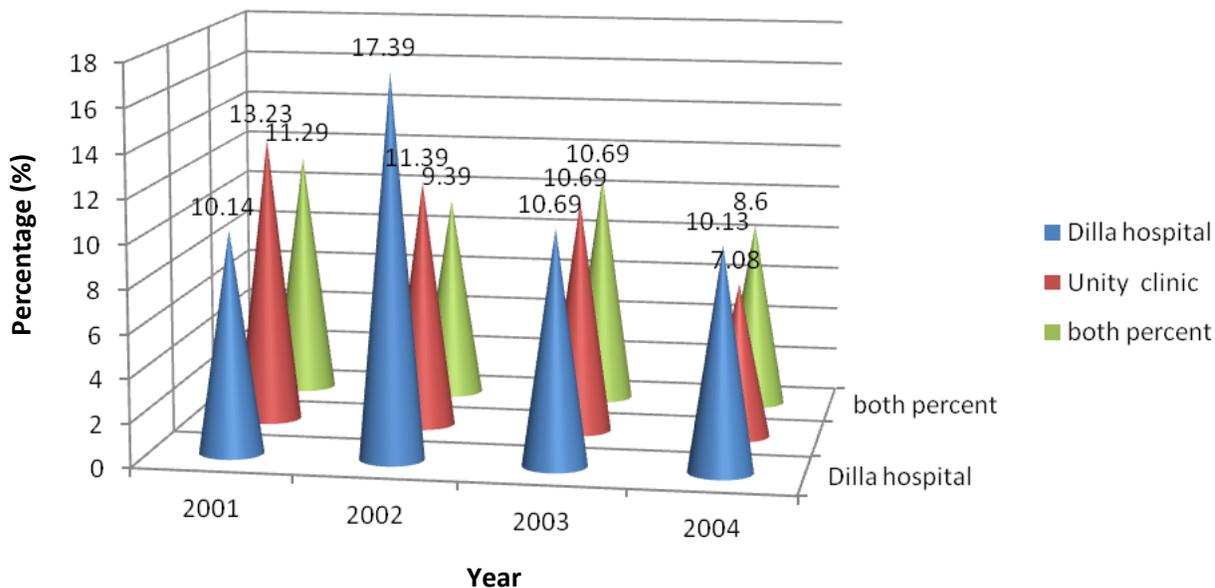
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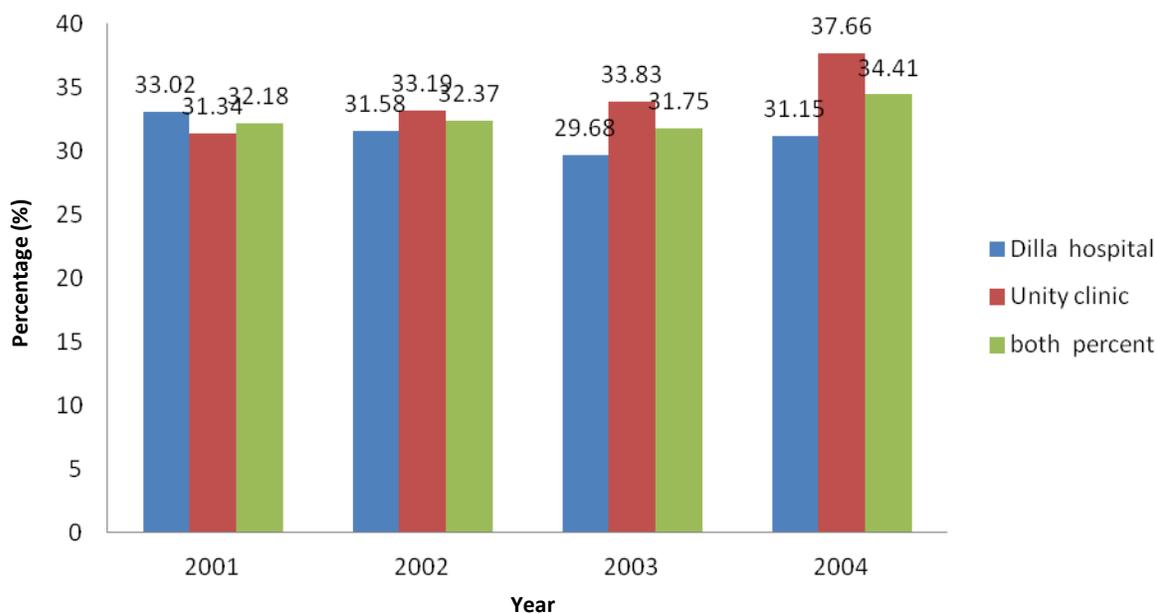
**Figure 2.** Malnutrition prevalence among under 5 year children in Dilla referral hospital and Unity pediatric clinic from 2001-2004.

2004 the number of malnutrition prevalence among 6 to 10 years old children was lowest in Unity pediatric clinic, 7.08%. The malnutrition prevalence among 6 to 10 years

old children in Unity pediatric clinic from 2001 to 2004 decreased, 31.23, 11.39, 10.69, and 7.08%, respectively. The cumulative number of malnutrition prevalence among



**Figure 3.** Malnutrition prevalence among 6-10 year young children in Dilla referral hospital and Unity pediatric clinic from 2001-2004.

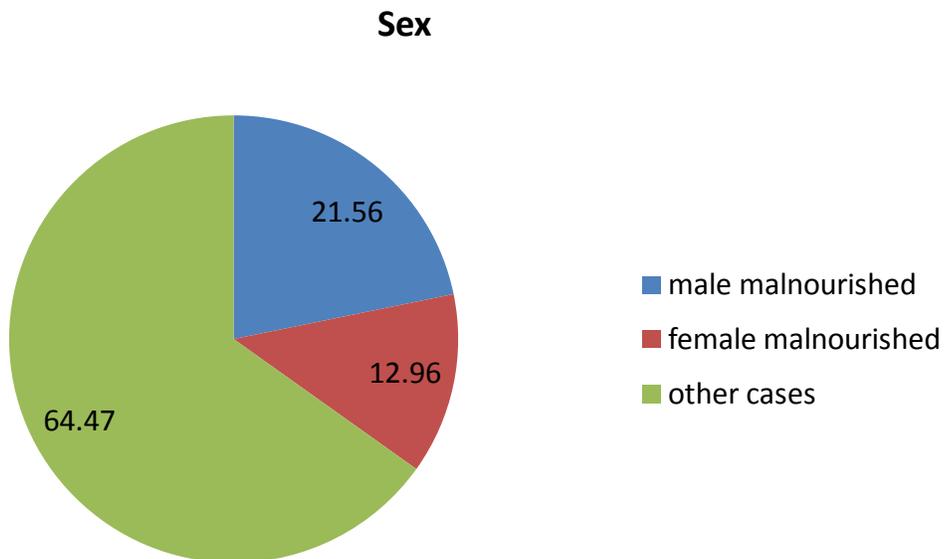


**Figure 4.** Malnutrition prevalence among 6 to 10 years in 2001 to 2004 between two areas, Dilla referral hospital and Unity pediatric clinic.

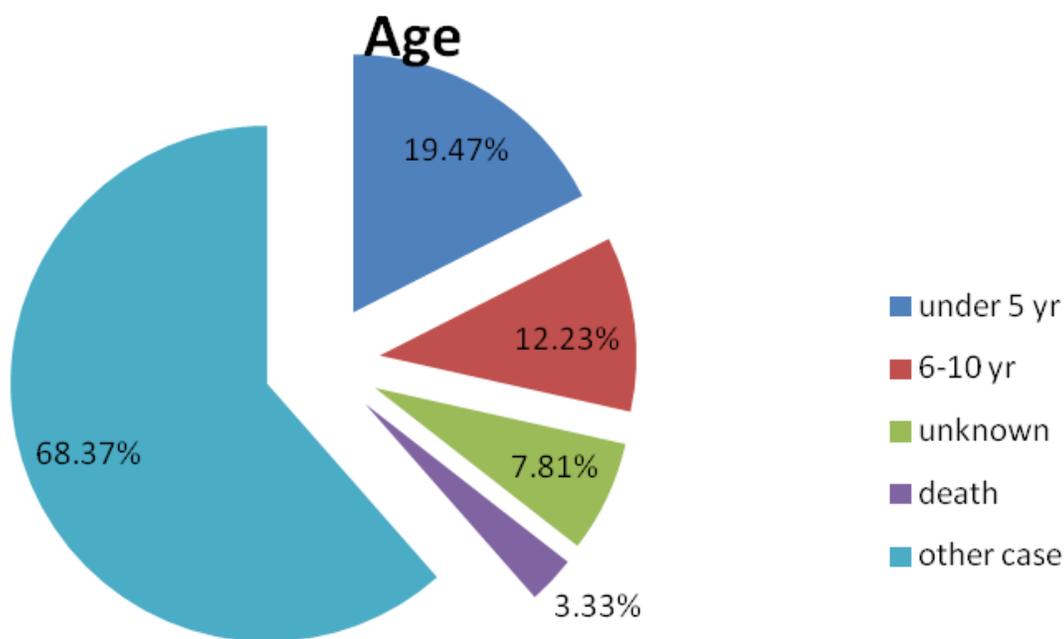
6 to 10 years old children were lowest in 2004, 8.60% while the highest cumulative number of malnutrition prevalence among 6 to 10 years old children were in 2003, 11.29%.

As indicated in Figure 4, the malnutrition prevalence in 2001 in Dilla referral hospital was greater than in Unity

pediatric clinic, 33.02 and 32.34%, respectively, while at 2002 to 2004, the malnutrition prevalence was found at Unity pediatric clinic followed by Dilla referral hospital, 33.19, 33.83 and 37.66% and 31.58, 29.68 and 31.15%, respectively. The greater malnutrition prevalence was in 2004, 34.41% while low malnutrition prevalence at 2003,



**Figure 5.** Estimation of malnutrition among other problems faced in children (from 2001 to 2004), and female to male comparison in unity pediatric clinic.



**Figure 6.** Estimation of malnutrition impact and age difference among malnourished children in Dilla referral hospital (2001 to 2004).

31.75%. Malnutrition is insufficient, excessive, or imbalanced consumption of protein, energy, or micronutrients (vitamins and minerals).

As indicated in Figure 5, the male showed a little bit greater than female, male, 21.56 and 12.96%, respectively. Similarly, malnutrition amongst boys is consistently larger than malnutrition amongst girls, that malnutrition in rural areas is higher than in urban areas

and that children in households with better educated women are better nourished (Christiaensen and Alderman, 2001).

As shown in Figure 6, unknown mean in these cases of long term effect of malnutrition was shown to be 7.81% and death was 3.33%. The highest number of malnutrition was found at under 5 years to be 19.47%, and other cases was 68.37% with other disease. On the



**Figure 7.** The child with oedema malnutrition at Dilla referral hospital 2013. Children with edema should always be classified as having severe acute malnutrition.

other hand, the challenges are many, 44% of children are stunted, 10% wasted and 29% underweight (Central Statistical Agency, 2011).

### **Kwashiorkor**

As indicated in Figure 7, the child was with edema on his leg, so this is a very serious problem at Dilla town as observed in the diseased child in 2013 in Dilla referral hospital. This indicates that children did not obtain the balance diet food and also consumed only type of food like carbohydrate, and were deficient of protein. Some children with acute protein-energy malnutrition develop oedema. Oedema is an accumulation of fluid in the tissue, especially the feet and legs. Such children may not lose weight when developing acute protein-energy malnutrition because the weight of this excess oedema fluid counterbalances the weight of lost fat and muscle tissue. These children may look fat or swollen. Such children have kwashiorkor. Oedema (also known as dropsy or fluid retention) is swelling caused by the accumulation of abnormally large amounts of fluid in the spaces between the body's cells or in the circulatory system. It is most common in feet, ankles, and legs. It can also affect the face and hands (<http://umm.edu/health/medical/altmed/condition/edema>).

### **Conclusion**

Based on results, it was concluded that the infant mortality and extended unknown adverse effect was

caused mainly by malnutrition. According to these results, malnutrition shows almost 34% among other problems faced in children. Infant mortality and long term effect (unknown) in children is a burning issue. From these two health centers, Dilla Referral Hospital and Unity Pediatric Clinic, child mortality was from 3.33 to 3.89%. So, looking at this research result, it is concluded that malnutrition have a role in child mortality. And also, it has extensive adverse effect of 7.62 to 7.81%, this has great impact in a country's economy. Furthermore, malnutrition from other diseases has high proportion.

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