

## Epidemiology of Malnutrition among Pregnant Women and Associated Factors in Central Refit Valley of Ethiopia, 2016

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### Abstract

**Background:** Pregnancy strongly depends on the health and nutritional status of women. High proportion of pregnant women affected with poor nutrition which leads them to unhealthy and distress condition. Nutritional problem alongside difficulty of ecological exacerbates public health problem. Determining the extent of problems and predicting marked health indicator require extensive studies to improve pregnant women health to reduce maternal in lowland distracts.

**Objective:** This study aimed to determine the magnitude of malnutrition among pregnant women and associated factors in the central rift valley of Ethiopia, 2016.

**Methods:** Community based cross-sectional study design was conducted using quantitative data collection method. Study area was selected using Handy ® GPS system. Systematic sampling was used to select 616 pregnant women. Nutritional status of study participants were identified using MUAC tape, Height and Weight measured using stand standard height and weight digital scale. Blood sample was taken using Hb 301 Microcuvettes and determined hemoglobin level with HemoCue Hb 301® Analyzer. Hb level was adjusted for Altitude and trimesters. The collected data was entered and analyzed by SPSS version 20.

**Result:** The prevalence of malnutrition among pregnant women was 31.8%. MUAC <21 cm had significant association with Hemoglobin <11 g/dl accounted for 42%. MUAC (AOR, 2.39; 95%CI (1.7, 3.5), Height (AOR, 3.55; 95%CI (2.14, 5.87), ANC services dissatisfaction (AOR, 1.66; 95%CI (1.18, 2.34) and utilized family planning method (AOR, 0.55, 95%CI (0.38, 0.81) were factors associated with maternal malnutrition. Moreover, hypertension 3.9%, severe anemia 0.8%, observed edema 1.9%, and reported infections 4.4 were prevalence in the study population.

**Conclusion:** Maternal malnutrition is highly prevalent in the study area. Anemia, short stature, MUAC<21 cm, ANC service dissatisfaction, not utilizing family planning, teen age pregnancy were the most occurring maternal malnutrition. Integrated programs works are needed to feel the gap for women focused intervention specifically for ecological affected districts.

**Keywords:** Central rift valley; Malnutrition in pregnancy; Anemia; Teenage pregnancy; food insecurity; ANC Services

**Abbreviations:** ANC: Anti Natal Care; BP: Blood Pressure; EDHS: Ethiopian Demography Health Survey; FP: Family Planning; GDM: Gestational Diabetes Mellitus; GPS: Global Positioning System; Hb: Hemoglobin; Ht: Height; MUAC: Mid Upper Arm Circumference; PMTCT: Prevention of Mother to Child Transition; Wt: Weight

### Background

The prevalence of maternal and newborn complications as well as death association with anemia and malnutrition is immense [1]. Among the most common causes of maternal mortality are Pre-existing conditions like under nutrition and anaemia are more common and accounted for 28% [2]. These most remarkable maternal health problems can be minimized and preventable with daily iron-folic supplementation for pregnant women to improve pregnancy

outcomes [3-5]. Antenatal care (ANC) services approach with appropriate information and evidence-based interventions enormous for a healthy pregnancy. For healthy pregnancy supply of nutrients and standard antenatal care (ANC) are essential [6,7]. Malnourished mothers with Mid Upper Arm Circumference (MUAC) below 21 cm have risk of unhealthy pregnancy which leads to prenatal complications [8-10].

Stunting is past growth failure due to insufficient protein and energy intake and manifested during adulthood notified with height of women <145 cm and increases the risk of obstetric complications [11]. Pregnant women with short stature have usually high rates of adverse pregnancy outcome such as perinatal mortality and prematurity. One of the determinant nutritional factors for pregnant women for satisfactory outcome is iron supplementation. Basically, iron deficiency anemia defined as hemoglobin concentration level <11 g/dl [12]. Anemia in pregnant women can occur as moderate to severe public health problem in most countries and estimated prevalence among pregnant women is 41.8% of worldwide and half of its burden justified

due to iron deficiency [13]. Evidences indicate that maternal anemia aggravates maternal mortality and prenatal problems [14].

In were 412 maternal deaths per 100,000 live births [15]. The prevalence malnutrition and anemia are high among pregnant women [16]. However, more explanations and analytic interpretation of other health problems related to pregnant women in Ethiopian situation is yet. Therefore, applications of extensive health and nutrition assessment methods to difficult ecology, exposed to reputed drought and history of high prevalence of malaria within different districts are important. This study provided relatively efficient and sufficient indicators ever seen before in the study area. The result normalizes gap of information for intervention in low land areas and risk groups resembling to pregnant women. Further, this study has helpful for Health program planners in similar study area population and nation enables health facilities to increase their care and service preparedness for pregnant women for more reducing maternal mortality.

## Methods

### Study area and period

Community based cross sectional study design was employed using quantitative data collection method. Study area was central refit valley selected at altitude bellow  $1680 \pm 10$  m using Handy \* GPS system found in Oromia region located in at 37 N, ranging from Easting 5000402-532670 and Northing 881700-952300. The mean altitude of study area was 1632 m, six districts from central refit valley were included. These were Ogocho, Arata, Dodota, Dera, Chefe Jilla and Awash which have two to 10 kebele administrative units (sub district catchment areas) were included. Total population of the study area was 224,040 (district health offices document, 2016) and the research was conducted between March to July 2016.

### Study population

All pregnant women who were inhabitant in central refit valley districts at study period.

### Sample size estimation

Sample size for this study was calculated using formula of single population proportion with the assumptions: a 95% confidence level, margin of error (0.036), prevalence of malnutrition among pregnant women of 20%; and adding 10% for non-response, a total of 616 were calculated.

### Sampling procedure

This study utilized Multi-stage sampling method picking a sample of districts found at altitude of  $1680 \pm 10$  m located in central refit valley cluster. In the first stage, six districts were selected randomly and two kebeles were selected from each district. Finally, 12 kebeles were included into the study and all study subjects arrived either at health center or health post were appointed on specific dates for interview and measurements.

### Instruments of data collection

Data were collected by trained data collectors using livelihood tools including questionnaire and checklists. Nutritional status of study participants were identified using adult MUAC tape and categorized

into Normal ( $>21$  cm) and Malnourished ( $<21$  cm). Hemoglobin level was determined using Hemo Cue Hb 301\* Analyzer with Hb 301 Micro cuvettes (Hemo cue safety lancets). Hemoglobin level was considered for unknown trimester  $-1$  g/dl and for altitude  $-0.5$  g/dl.

Hemoglobin level was categorized into no Anemia ( $Hb > 11$  g/dl) as normal, anemic ( $Hb < 11$  g/dl) as unhealthy. Clinical anemia (WHO, 2011) was observed with  $Hb < 7$  g/dl as sever. Blood pressure measurement was taken using blood pressure apparatus and stereoscopes for data collection. Blood pressures were taken twice under interpersonal and intrapersonal measurements over a single study subject to increase accuracy. Height and weight were measured using stand standard height and weight scale. MUAC was recorded to the nearest 0.1 cm and height was recorded to the nearest 1.0 cm and categorized into  $< 145$  cm too short which increases birth complication and  $< 150$  short as chronically malnourished which has risk of low birth weight and  $> 150$  Normal. Manifestations of gestational related and other health problem of pregnant women were assessed with check list and observed by maternity and reproductive professionals.

Collected data were entry and analyzed using SPSS version 20. Simultaneously data were described and analyzed and P-value was set at 5%. Bivariate and multivariate were done to determine the association of dependent and independent variables. All the assumptions of the analysis were checked to be satisfied using the appropriate methods.

### Quality control measure

The accuracy of data was achieved through intensive training for data collectors. The questionnaires were prepared in English and translated into Afan-Oromo (regional working language) and back translated to English by experts in both languages to compare the consistency before the actual data collection. Questionnaire was pre-tested on 5% of the sample on similar population at the nearby kebele, that are not part of the actual sample. The data collectors were closely supervised by the principal investigators and supervisors. To ascertain whether the questions were properly filled and necessary correction was made on the spot, each completed questionnaire was checked by supervisors. Largest acceptable differences between repeated anthropometric measurements tolerance levels have been set for 0.5 kg of Weight and 1.0 cm for height. Blood pressure (BP) was measured using a manual cuff and every study subject took two times measurement by two different health workers with two different manual cuffs. Blood pressure data was categorized into 140/90 or greater defined as Hypertension and below 140/90 no HTN As by WHO STEP manual.

A capillary blood sample was taken from the middle finger on the right hand using Hemo cue safety lancets (Hb 301 Micro cuvettes) to determine hemoglobin level. A laboratory technologist was trained on the procedures and guidelines outlined in the Hb 301 operating manuals (Hemo cue Hb; Angelholm, Sweden). Each participant's hand was warmed and relaxed. The finger was cleaned with 70% alcohol and was allowed to dry completely prior to the finger prick (Hemo Cue 20131). The finger prick was applied on the side of the fingertip (Hemo Cue 20131). The first two drop of blood was wiped away. Light pressure was applied to the fingertip; micro cuvette was filled from the third or fourth drop of blood (approximately 10 uL).

Data collectors maintained this principle during examining and recording original measurement values via data collection time. Routine calibration and checking of the Blood pressure apparatuses

was ensured and weight scale and height measurement equipment's were standardized and produced accurate measure. This principle was more developed during pre-testing of tools and followed by interpretation.

## Result

### Socio-demographic characteristics

Six hundred sixteen selected pregnant women from 12 kebeles of central refit valley were included in study. From this study subject, 71.6% were within reproductive age range and 26.3% were within teen age pregnancy. The mean (+SD) age of the respondents was 25.3 (+5.3) year range from 15 to 47 year. Among study subject 66.1% had less than four family members in their household (Table 1).

Variable		Frequency	Percent
Maternal Age	<20	156	26.3
	20-35	441	71.6
	>35	19	3.1
Religion	Muslim	519	84.3
	Orthodox	79	12.8
	Protestant	18	2.9
Ethnicity	Oromo	582	94.5
	Amhara	26	4.2
	Tigre	2	0.3
	Gurage	6	1
Education	Illiterate	358	58.2
	Read & Write	105	17
	Primary complete	89	14.4
	Secondary and above	64	10.4
Marital Status	Married	610	99
	Diverse	2	0.3
	Unmarried	4	0.6
Monthly Income	<500	192	31.1
	500-1000	349	56.7
In Ethiopian Birr	1001-1500	50	8.1
	>1500	25	4.1
Family Size	<4	410	66.6
	04-Jun	132	21.4
	07-Sep	66	10.7
	>9	8	1.3
Occupation	Civil servants	28	4.5
	Traders	41	6.7

	Informal laborers	33	5.4
	Farmers	494	80.2
	Living with parents/re relatives	20	3.2

**Table 1:** Socio-demographic information of the study participants in lowland districts, Arsi Oromia, Ethiopia, 2016.

### Reproductive history

The family planning service utilization was 36.3%. An access to ANC services for study subjects was 77.1% but their satisfaction was 49.4% (Table 2).

Variable	Sub category	Frequency	Percentage
<b>Child Spacing Utilization (FP)</b>			
	No	391	63.5
	Yes	225	36.5
<b>Family planning Acceptance</b>			
	Continue user	65	28.9
	Repeat user	123	54.7
	Sometimes	37	16.4
<b>Accesses and follow up to ANC</b>			
	No	141	22.9
	Yes	475	77.1
<b>Satisfaction for ANC followers in Health Services</b>			
	NO	312	50.6
	Yes	304	49.4
<b>Reason for dissatisfaction</b>			
	Lacked knowledge for services	143	45.8
	Insufficient services	161	51.6
	Distance of health facility	4	1.28
	family and healthy problem	4	1.28
<b>Receiving of Service for Birth Preparedness and Complication Readiness</b>			
	No	462	75
	Yes	154	25

**Table 2:** Maternal and prenatal health care of study participant in Central Refit Valley Oromia, Ethiopia, 2016.

### ANC services

Folic acid and iron supplementation to prevent and treat anemia among the study subjects were very minimal that was 30.4% and not resaved 69.6%. However, malaria was 382 (62.0%). HIV prevention from mother to child transmission (PMTCT) was 40.4%, 354(57.5%) of study subjects HIV Testing and Counseling resaved before having

current pregnancy. other services utilization Regular Weight measurement services 302 (49.0%), Regular Blood Pressure measurement services 315(51.1%) and Perform for prenatal consultations regularly 179 (29.1%) were among study subjects.

### Water sources and food security

Variable	Sub category	Frequency	Percentage
<b>Water sources</b>			
	Protected spring	167	27.1
	Unprotected spring	23	3.7
	Well	19	3.1
	Tap water	407	66.1
<b>Time taken to filch water</b>			
	<30 Minutes	571	92.7
	30-60mnits	35	5.7
	>60minuts	10	1.6
<b>Distance to water source in meter</b>			
	<500M	529	85.9
	500-1000M	40	6.5
	>1000M	47	7.6
<b>Effect of physical Environment &amp; Climate on Food insecurity</b>			
	No	393	63.8
	Yes	223	36.2
<b>Food in- secured Households</b>			
	No	421	68.3
	Yes	195	31.7
<b>Food security Intervention</b>			
	Did not obtain	5	0.8
	Obtained sometimes	15	2.4
	Fully supplied for blanket	183	29.7
	Fully supplied for targeted	413	67

**Table 3:** households water sources and food security intervention of the study participants' Central Refit Valley, Oromia, Ethiopia, 2016.

About 407(66.1%) of study subjects were accessible to tap water and 167(27.1) were accessible to protected spring water. For 596(96.75%) of study participant food supplementations were undertaken with targeted and blanket program. One hundred ninety five (31.7%) of the study participants reported that their households were exposed to food insecurity and they have being intervened with food supplementation as they were targeted (Table 3).

### Observed clinical condition

From this study, clinical condition such as severe anemia was 0.8%, hypertension was 3.9% with mean of 104 mmHg, observed edema 1.9% (Table 4).

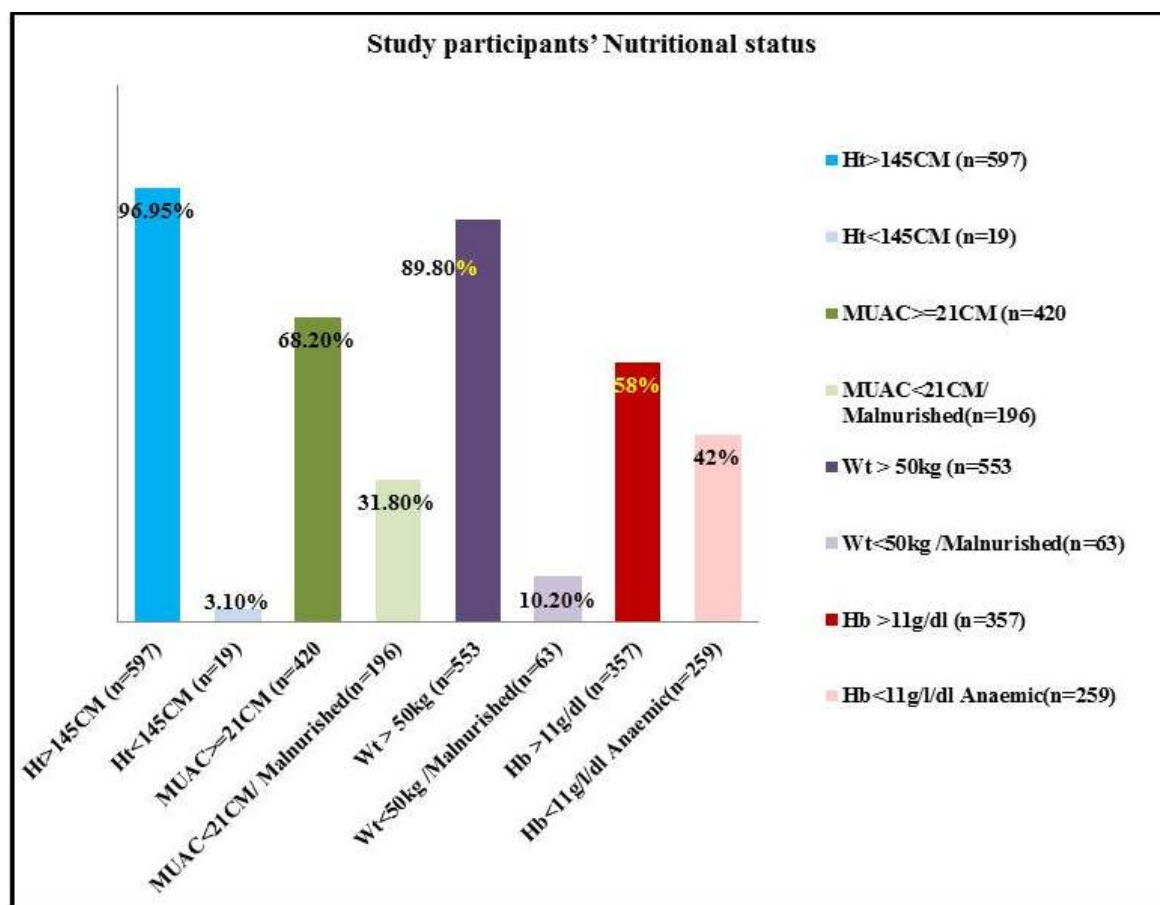
Variable	Sub category	Frequency	Percentage
<b>Observed Oedema</b>			
	NO	604	98.1
	Yes	12	1.9
<b>Reported Infections, : either of Vaginal discharge, Chills, fever or Pruritis</b>			
	No	589	95.6
	Yes	27	4.4
<b>Systolic Hypertension</b>			
	No (S.BP< 140 Hg)	592	96.1
	Yes(S. BP>140 Hg)	24	3.9
<b>Diastolic Hypertension</b>			
	No(D.BP<90 mmHg)	584	94.8
	Yes (D.BP>90 mmHg)	32	5.2

**Table 4:** Study subjects clinical condition during the study period in lowland districts, Arsi Zone Oromia, Ethiopia, 2016.

Other variable to describe nutritional status of study pregnant women was their height measurement. Ht mean=158, Median=160, SD=6.5, Minimum=120, Maximum=175 cm were recorded. Height of study participants cut-off chosen were two, in this study height <145 cm used as to reveal increased obstetric risk and height <150 cm cumulative effect of poor nutritional status of short pregnant women. The mean of study subjects' Ht was 158 cm and the shortest Ht<145 cm was 19 (3.1%) which at risk of obstetric complication and Ht<150 was 72(11.7%) where prolonged effects of poor nutrition. more of information illustrated on Figure 1.

The analysis of dependent and independent variables in present data were analyzed to determine their association. From maternal Ht (<145 cm) 3.1% had risk birth complication and Ht (<150) was short stature 11.7% had developed chronic maternal malnutrition which increases the risk of low birth weight. On bivariate analysis, both pregnant women with Ht<140 and had (AOR [95% CI]=3.06[1.21, 7.40]) and pregnant women were height<145 cm and pregnant women with Ht 150cm had (AOR [95%CI] =3.55[2.14, 5.87]) strong association with MUAC <21 cm. Specifically, pregnant women with Ht <145 had a risk of birth complication 3 times that of > 145 cm.

From independent variable, hemoglobin level had moderate association (AOR [95% CI]=2.40 [1.7, 3.5]) which means, pregnant women who had Hb level <11 g/dl had a risk prenatal malnutrition 2.4 times that of > 11 g/dl prenatal malnutrition. Table 5 provided with more information. ANC services dissatisfaction had (AOR [95% CI]=1.66[1.18,2.34]) that was pregnant women who did not satisfied with ANC services had 66% risk of developing prenatal malnutrition compared with those satisfied.



**Figure 1:** Study participants' Nutritional status in Central Refit Valley Oromia, Ethiopia, 2016.

Through experience of child spacing, pregnant women who used family planning methods had (AOR [95% CI]=0.55 [0.38, 0.81]) which means FP users had only 0.55 times the risk of developing prenatal malnutrition compared with nonusers. Additionally, those pregnant women who supplied with iron/folic intervention had (AOR [95% CI]=0.63[0.43, 0.93]). In expression, pregnant women who supplied

with Iron/folic intervention had 0.63 times the risk of developing prenatal malnutrition compared with not intervened. Weight of study subjects' had (AOR [95% CI]=0.14(0.08, 0.25) in which, weight greater than or equal to 50 kg had 14% of risk of prenatal malnutrition when compared to weigh less than 50 kg (Table 5).

Variables	MUAC		COR	AOR
	>21CM(%)	<21CM(%)	(CI 95%)	(CI 95%)
<b>Maternal Age in year</b>				
20-35	310(50.32)	131(21.27)	0	0
<20	95(15.42)	61(9.9)	2.40(0.76,7.59)	0.41(0.13,1.31)
>35	15(2.44)	4(0.65)	1.58(0.51,4.86)	0.63(0.20,1.93)
<b>Education</b>				
Illiterate	237(38.5)	121(19.6)	0	0
Read & Write	67(10.9)	38(6.2)	1.41(0.77,2.58)	0.7(0.39,1.28)
Primary complete	69(11.2)	20(3.2)	1.57(0.79,3.10)	0.63(0.32,1.26)



Secondary and above	47(7.6)	17(2.8)	0.80(0.38,1.68)	1.23(0.59,2.62)
<b>Family Size</b>				
<4	270(43.8)	140(22.7)	0	0
04-Jun	102(16.6)	30(4.9)	1.56(0.31,7.8)	0.64(0.12,3.22)
07-Sep	42(6.8)	24(3.9)	0.89(0.17,4.60)	1.13(0.21,5.90)
>9	6(0.98)	2(0.32)	1.71(0.32,9.97)	0.58(0.11,3.12)
<b>Child Spacing Utilization(Family planning methods users)</b>				
Not utilized	249(40.4)	142(23.0)	0	0
Utilized	171(27.8)	54(8.8)	1.80(1.24,2.61)	0.55(0.38,0.81)*
<b>Height of Pregnant women</b>				
>145CM	412(66.9)	185(30.0)	0	0
<145CM	8(1.3)	11(1.8)	0.018(0.13, 0.83)	3.06(1.21, 7.40)**
<b>Hemoglobin level</b>				
Hg >11g/dl	266(43.2)	91(14.8)	0	0
Hg<11g/dl	154(25.0)	105(17.0)	0.42(0.3, 0.6)	2.40 (1.7,3.5)**
<b>Weight in Kg</b>				
Wt>50kg	403(65.4)	150(24.4)	0	0
Wt<50kg	17(2.76)	46(7.50)	0.78(0.50, 1.20)	0.14(0.08, 0.25)
<b>Supplementation of Iron/folate during pregnancy</b>				
No	140(22.7)	47(7.6)	0	0
Yes	280(45.5)	149(24.2)	7.3(4.04,13.1)	0.63(0.43,0.93)*
<b>Satisfaction to ANC services in the health facility</b>				
Yes	224(36.4)	80(13.0)	0	0
No	196(31.8)	116(18.8)	0.61(0.43,0.85)	1.66(1.18,2.34)**

**Table 5:** Association of malnutrition with MUAC cutoff point of the study subjects with deferent variables, in lowland districts, Arsi Zone Oromia, Ethiopia, 2016.

On the other variables analyses, maternal age, education, family size, Systolic or diastolic hypertension, income, food supplementation and occupation had not association with prenatal malnutrition.

Multiple liner regression analysis was used to consider the effect of confounding variables that could influence both pregnant women malnutrition and independent variables. Multiple of independent variables testified the relationship between a set of independent variables and a dependent variable in sequential form based on their AOR results used after controlling for the effects of some other independent variables on the dependent variable.

Despite the fact that, many independent variables examined reputedly the only critical factors to pregnant women malnutrition and unhealthy state strongly statically associated with hemoglobin level <11 g/dl, Height<145 cm, age<20, weight<50 kg, did not accept family planning method, ANC services dissatisfaction.

## Discussions

In this study participant 66.6% had family size less than 4 members in their household and higher score of limited number of household members compared to study conducted in Ethiopia by Ethiopian Demographic Health Survey (EDHS) 2011 [17]. And, it was higher that 67% of study participants' household supplied with food from food aid program this shown how the study area population affected by reputed worst drought due to climatically condition and ecological hazards which lead the population into dependence on food aid.

FP users before became pregnant among study subjects were 36.5% relatively higher than Ethiopian Demographic Health Survey that FP utilizes in Ethiopia were 28% and similarly in Oromiya was 27.24%. However, this study FP utilizes was lesser than study conducted in North Shoa Zone, Amhara Region which was 46.9% [18]. In this study PW population were benefited from utilizing FP that only 8.8% of

these subjects malnourished while 23.0% of among none utilizes from the total malnourished pregnant women.

High proportion of study subjects not accessed and they missed ANC service elements. From these important service elements 51%, subjects did not have weight measurement, 22.9% subjects were lacked ANC follow up, and 42.5% did not have Provider Initiative HIV Testing & Counseling (PITC) service received, 59.6% of PMTCT. Further, 48% of subjects were not have their blood pressure measurement far less compared to EDHS-2011 which was 28%, 75% study subjects did not received services for Birth Preparedness and Complication Readiness which was less better report of EDHS 2011 that was 80% of pregnant women were ill-equipped to make appropriate choices especially when they are in danger.

Most of ANC services followers of study pregnant women all focused to health center. Supplies were limited in amount and type which responded high rate of dissatisfaction was 50.6% by subjects. From main paying attention area, iron supplemented study pregnant women was 30.4% and this not addressed the average study population while universal iron supplementation for pregnant women improves Hb level. In this study as stated on analysis part, iron supplementation for pregnant women had protective effect from malnutrition. If, pregnant women were supplied with iron the risk for developing highest iron deficiency anemia had reduced [19]. In the reverse, study pregnant women utilized INT (62%) which was important issue an area with lowland ecology and had history of high prevalence of malaria. ANC services beyond to these, very minute to study pregnant women (0.3%) with folic acid and deworm was (1.9%) with.

MUAC indication of acute malnutrition among study pregnant women and as shown in the data, 31.8 percent based on MUAC (<21 cm) subjects from lowland could be experienced with current malnutrition that was lower compared to study result (35.5%) conducted at Boricha district Sidama zone [20]. According to Assefa, et al. 2012 finding, pregnant women were MUAC<22 cm identified as indicative for high risk for baby born with LBW. In this study pregnant woman population had higher risk for giving baby with LBW.

Height determines previous growth experience in the prediction of chronic malnutrition and in pregnant women height <145 cm of study participants was 3.1 percent. Height <145 independently has adverse effects on current pregnancy with increased risk of complications in pregnancy.

In this study short stature (height <145 cm) was less prevalence among pregnant women compared to women in low-income countries of sub-Saharan Africa, with "critical" rates ( $\geq 40\%$ ) and from frequency range of 10% and 19% indicated in Ethiopia (WHO, 2012) and study conducted in rural India was 13.5% (Although, the prevalence of Ht<150 was 11.7% among study participants. Prolonged intergenerational under nutrition leads women become short and pregnant women who had height <150 cm more likely to have a child who is stunted at childhood growing period and as an adult.

This study should be used as prediction in lowland to various factors of pregnant study subject's nutritional status and contribution of ANC services. Based on hemoglobin level (<11 g/dl) as adjustment made for elevation and unknown gestation dating 42.0 percent were anemic and from this, 0.8 percent was severe (clinical) anemia indicated among pregnant women in study area. The data revealed that maternal malnutrition was significantly associated with Hb level and anemic pregnant women had 2.4 times malnourished when compared to none anemic. The likelihood of pregnant women risk from anemia was

higher compared to study result (20.9%) conducted at Boricha district Sidama zone [20] and very higher than study conducted in Mekelle town with prevalence of 19.7% [21]. according to study area as district location and elevation ground, severity anemia among pregnant women was higher.

In this study factor which had an influence over unhealthy pregnancy was teen age pregnancy was (26.3%) which expressed as teen age fertility accounted to 263 births per 1,000. According to World Bank data, adolescent fertility rate (births per 1,000 women ages 15-19) used as World Development Indicators. Based on these ground, in this study population was highest compared to international adolescent fertility rate and even the national data of Ethiopia was 57 births per 1,000 (World Bank, April 2013). Although, study of Trend of teenage pregnancy in East Africa was changed from 33.1% in 1992 to 16.1% in 2011, but in the present study teenage pregnancy was higher and the given argument could not much.

On multiple liner regression analysis age less than 20 year was significantly associated with maternal malnutrition. This study data explores how teenage was at risk of unhealthy pregnancy associated with risks of pregnancy and labor complications and adverse birth outcomes. According to UNFPA, about 70,000 adolescents in developing countries die annually of causes related to pregnancy and childbirth (UNFPA, 2013).

In the present study systolic and diastolic hypertension respectively were 3.9% and 5.2% which were comparable and found within the range of to a study with international trends in pregnancy hypertension (3.6% to 9.1%) western countries.

## Conclusion

The present study revealed that the prevalence of malnutrition among pregnant women was 31.7% and had significant association with the occurrence of anemia, teen age pregnancy, ANC services dissatisfaction and height less than 145 cm. However, the degree of malnutrition in the study population was relatively less compared to other studies conducted in our country these may perhaps associated with higher coverage of food aid programs in the study area.

Anemia and severe anemia were higher among malnourished pregnant women association with lowland ecology and history of high prevalence malaria and poor ANC which was less proportion of pregnant women supplied with iron/folic tablet and other services.

The extent of problems and predicting marked health indicators identified. This study laid foundation for districts affected with difficult ecological factors to improve pregnant women and other risk groups healthy.

This study finding will increase and strength integrates sustainable and accessible antenatal care services for all pregnant women with trained health workers and available resources without scarcity.

As a result, concerned national and local government and nongovernmental organization inspire and enforce the local administrative and health offices for the implementation of direction of WHO "Improving the health and nutritional status of women before conception and during pregnancy". This will increase and strength integrates sustainable and accessible antenatal care services for all pregnant women with trained health workers and available resources without scarcity.

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