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Undernutrition and associated factors among pregnant women attending ANC follow up in Alamata general hospital, Northern Region, Ethiopia, 2017

Abstract

Background: Maternal nutritional problems remain as one of the public health problems in Ethiopia and it affects all child bearing age group females' especially pregnant women and this can cause low birth weight baby, preterm birth, and it increases pregnancy risk problems. The aim of this study was to assess the prevalence of under nutrition and associated factors among pregnant women.

Method: An institution based cross sectional study was conducted on 321 pregnant women attend ANC follow up in Alamata General Hospital, Northern Region, Ethiopia from April 1st to June 20th 2017. Study subjects were selected using systematic random sampling technique based on the annual patient flow. Data were collected by using a pre-tested, structured, and standardized and interviewer administered questionnaire and wasting was assessed by using anthropometric measurement MUAC of pregnant women. Descriptive statistics, bivariate analysis to identify associated factors and multivariable logistic regression analysis were employed to control the effect of potential confounders. Variables with p value < 0.05 in the multivariable model were identified as predictors of under nutrition.

Result: The overall prevalence of under nutrition among pregnant women was 22.3%. Multivariable logistic analysis showed that age group of 15-24years old (AOR: 0.19, 95% CI: 0.57, 0.638), pregnant women with educational level of university (AOR: 0.25, 95% CI: 0.079, 0.789) and supplemented iron foliate during pregnancy (AOR: 0.356, 95% CI: 0.140, 0.906) were negatively associated with under nutrition. Whereas pregnant women with husbands of primary education (AOR: 17.461, 95% CI: 3.401, 89.634), took anti- malarial drug during pregnancy (AOR: 4.298, 95% CI: 1.314, 14.063) were positively associated with under nutrition.

Conclusion: This study revealed that the prevalence of under nutrition was relatively high based on WHO standards. Therefore, nutrition intervention targeting illiterate and age of pregnant women is highly recommended. Further study should be under taken to explore other determinant variables.

Keywords: Under nutrition, pregnant women, Woldia Town, North East Ethiopia

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Abbreviations: AGH, Alamata General Hospital; ANC, Antenatal Care; AOR, Adjusted odd ratio; BMI, Body Mass Index; CI, confidence interval; COR, crude odd ratio; EDHS, Ethiopian Demographic Health Surveillance; ETB, Ethiopian Birr; IUGR, Intra Uterine Growth Retardation; LBW, Low Birth Weight; MCH, Maternal and Child Health; MUAC, mid upper arm circumference; PTB, Preterm Birth; SNNPR, Southern Nations, Nationalities People Region; SPSS, statistical package for social science; WHO, World Health Organization

Background

The wellbeing of a mother is influenced by their feeding habit. The pros –cons of poor dietary habit have a significant impact to the women and their offspring in their next life.[1] WHO define "malnutrition as the cellular imbalance between supply of nutrients and energy and the body's demand for them to ensure growth, maintenance and specific functions".[2]

Pregnancy is an anabolic process and the demand of a pregnant women exceeds as compared to non pregnant ,possibly due to the growing cell in the uterus . a woman who have adequate amount of essential nutrient in the body ,they will be fit physically,psychologically,physiologically and mentally to lead their life and their baby.[3] Pregnant women need additional macro and micronutrient for better outcome of pregnancy.[4] under nutrition (low BMI) and low weight gain during pregnancy lead to increased risk of delivery complication, tissue depletion in mothers and Intra Uterus Growth Retardation (IUGR), still birth and LBW in baby.[1,5–9] Several studies conducted across the developing nations revealed that the prevalence of under nutrition ranges from 13% to 38%.[8,10–13] Moreover, the prevalence of under nutrition in Ethiopia varies across different region and ranges from 9.2% to 47.9%.[14–18]

Studies conducted in different countries have identified different factors that contributes for under nutrition. The identified factors includes; behavioral factors, Socioeconomic status, Sociodemographic

characters, limitted access to improved water and or toilet, and dietary habits.[13,15–20] Different strategies, policies and programs have been tried in the last decades to solve the problem of under nutrion at global, regional and national levels.[3,6,20–22] How ever, the prevalence of under nutrition among pregnant women does not shows significant decreasment. The prevalence and determinant factors also varies from place to place and most of the previous studies were used BMI as indicator of pregnant women under nutrition even though MUAC have high reliability as Compared to BMI as evidenced from systemic review done elsewhere showed that.[1,23,24] Therefore, this study aimed to determine the prevalence and associated factors of under nutrition among pregnant women.

Methods

Study area and period

This study was conducted in North part of Ethiopian in Alamata General Hospital which is 600 kilometer from Addis Ababa (capital city of Ethiopia) from April 1st to June 20th 2017. The Hospital provides different services. The services are divided in to four major departments that are medical, surgical, pediatrics and Obstetrics & Gynecology, with a total of 100 beds for inpatients. It also provides outpatient service like emergency, ophthalmology, ART and MCH. The total patient flow rate on MCH clinic is annually 1224 and 102 monthly (data from AGH MCH clinic).

Study design

Institution based quantitative cross-sectional study was employed to assess prevalence and associated factor of under nutrition among pregnant women attending anti natal care in Alamata General hospital , Maychew Zone, Northern Ethiopia, 2017.

Sample size determination

The sample size of the study was calculated using the formula for estimation of single population proportion by the assumption of : P= proportion of women with under nutrition were 50%, margin of error 0.05 at 955 confidence interval and 10 % non- response rate, using sample size reduction formula, the final sample size was 321.

Sampling procedure

The total patient flow in the year is 1224 and in month 102. The study participants were recruited by using systematic random sampling technique based on patient flow rate in the MCH clinic. The interval K value was determined by dividing the number of units in the population (N) by the desired sample size (n). The first respondent was selected by lottery method, and then continuing to every respondent based on the interval until the desired sample size was attained.

All pregnant women who were attending anti natal care during the study period were included in the study. Those pregnant women who were seriously ill during the study period, those who were not permanently resident in the study area were excluded from the study.

Study variables

In this study, the dependent variable was under nutrition among pregnant women attending anti natal care. Under nutrition was defined as pregnant women with MUAC less than 22.5 cm. The independent variables were sociodemographic variables and dietary pattern.

Operational definitions and definition of terms

Underweight mother: mother with a low mid-upper arm circumference (MUAC) of below 22.5 cm.

Maternal health and safety information: pregnant women who have got any kind of information during her pregnancy period about health and safety to pregnant mothers.

Optimal maternal and perinatal outcome: the overall appropriate and healthy conditions of the mother and her baby during and after pregnancy.

Cultural inhibition of foods: cultural belief of the society that affects women's food intake during pregnancy.

Data collection procedure and quality control

Translation and back translation was made from English to Amharic. As a data collection instrument Amharic language was used. Interviewer administered questionnaire were used, MUAC used as an anthropometric measurement tool. The questionnaire have three parts; sociodemographic variables, Obstetrical history and other medical conditions and dietary pattern variables.The data collectors were trained for two days about the techniques of data collection and anthropometric measurement. The questionnaire was pretested, and amendments were made accordingly. Data were collected by three BSc nursing health professionals who had experience of anthropometric measurement were recruited. The supervisors had checked the day to day activity of data collection regarding to clean up muscularity cases and to brief the challenges raised by data collectors.

Data management and analysis

The data were checked for completeness and consistencies. It was also cleaned, coded and entered in to Epi data, then exported to SPSS version 22 statistical package for analysis. Multivariable logistic regression analysis was performed. Variables with p-value<0.2 in the bivariate logistic regression analysis were further analyzed in the multivariable logistic analysis. Adjusted Odds Ratio (AOR) with 95% confidence interval was applied to measure an association.Variables p-value <0.05 in the multivariable logistic regression analysis were considered as significant.

Result

Socio demographic characteristics

Overall 306 pregnant women were involved in this survey with response rate of 95.32%. From the total participant 156 (50.9%) of mother were age group between 25-34 years old. Majority of study participants around 253(82.7%) were married. Regarding educational level 79(25.8%) respondents were illiterate. Concerning occupation, more than half 216(70.5%) were employed (Table 1).

Obstetrical history and other medical conditions

More than half of the respondents 195(63.7%) were started ANC follow up with in first three months of gestation. Around 84(27.5%) of participant experiences problem during pregnancy and majority of pregnant women 244(79.7%) took anti helmenthic drug during pregnancy (Table 2).

Dietary pattern

Based on our finding, daily intake of cereals, non-green

leafy vegetables, legumes and nuts, oil and fats, iodized salt was 288(94.1%), 191(62.4%), 172(56.2%), 213(69.5%), 285(93.1%) respectively. Around half of the respondent takes vitamin A rich vegetables, fruits, white roots, green leafy vegetables, milk and milk products and eggs 2-3 times a week and fish and meat irregularly. Majority of the respondent gets their food source from plant than animal sources (Table 3).

Table 1 Socio demographic characteristics of pregnant women attending anti natal care in Alamata general hospital, Northern Ethiopia, 2017 (n= 306)

Demographic characteristics	Frequency	Percentage
Age group		
15-24	77	25.1
25-34	156	50.9
35-49	73	23.9
Marital status		
Single	29	9.5
Married	253	82.7
Divorced	19	6.2
Widowed	5	1.6
Religion		
Orthodox Christian	192	62.7
Muslim	79	25.8
Protestant	35	11.4
Ethnicity		
Tigray	210	68.6
Amhara	90	29.4
Afar	4	1.3
Others	2	0.7
Educational status		
No formal education	79	25.8
Primary education	53	18.7
Secondary education	49	17.3
College	51	18.0
University	76	26.8
Number of children		
No children	12	6.4
1-3	112	59.9
4-6	45	24.1
7-9	17	9.1
>9	1	0.5
Occupation		
Teaching	31	14.4
Trading	77	35.6
Farming	37	17.1
Civil servant	60	27.8
Other	11	5.8
Husband occupation		
Teaching	38	13.7
Trading	78	28.1
Farming	72	25.9
Civil servant	78	28.1
Others	12	4.3
Income(ETB birr)		
<1000	49	16.0
1000-1500	26	8.5
>1500	231	75.5

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Table 2 Obstetrical history and other medical conditions among pregnant women attending ANC in Alamata General Hospital, Northern Ethiopia, 2017

Characteristics	Frequency	Percentage
Gestational age at the start of ANC		
1-3 months	195	63.7
4-6 months	110	35.9
7-9 months	1	0.3
Reason for the start of ANC		
Not sure of pregnancy	126	41.2
Previous experience of miscarriage	39	12.7
Family belief	14	4.6
Peer influence	10	3.3
Advice from health professional	117	38.3
Problem During pregnancy		
Yes	84	27.5
No	222	72.5
Type of problem		
Bleeding	30	34.9
Dizziness	22	25.9
Abdominal pain	13	15.1
Others*	21	24.4
Iron supplementation during ANC		
Yes	236	77.1
No	70	22.9
Take anti helmenthic during ANC		
Yes	62	20.3
No	244	79.7
Take anti- malarial drug during ANC		
Yes	51	16.7
No	255	83.3
Sleep under treated bed net		
Yes	203	66.3
No	103	33.7
Reason for not to use treated bed net		
Financial constraint	7	6.8
Cumbersome to use	49	47.9
Do not know the importance	28	27.2
Others	19	18.4
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Table Continued

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Others	19	18.4

Table 3 Descriptive Statistics on Dietary Habits among Pregnant women attending ANC in AGH, northern Ethiopia, 2017

Dietary habit	Frequency	Percentage
Cereals		
Daily	288	94.1
2-3 times per week	10	3.3
4-6 per week	8	2.6
Fruits		
Daily	31	10.1
2-3 per week	97	31.7
4-6 per week	49	16.0
Irregularly	95	31.0
Never use	34	11.1
Green leafy Vegetables		
Daily	69	22.5
2-3 per week	129	42.2
4-6 per week	27	8.8
Irregularly	70	22.9
Never use	11	3.6
Non green leafy vegetables		
Daily	191	62.4
2-3 per week	70	22.9
4-6 per week	24	7.8
Irregularly	20	6.5
Never use	1	0.3

Table Continued

Dietary habit	Frequency	Percentage
Vitamin A rich vegetables and fruits		
Daily	40	13.1
2-3 per week	150	40.0
4-6 per week	42	13.7
Irregularly	63	20.6
Never use	11	3.6
White roots and tubers		
Daily	34	11.1
2-3 per week	167	54.6
4-6 per week	43	14.1
Irregularly	52	17.0
Never use	10	3.3
Fish and meat		
Daily	9	2.9
2-3 per week	87	28.4
4-6 per week	60	19.6
Irregularly	124	40.5
Never use	26	8.5
Milk and milk products		
Daily	62	20.3
2-3 per week	103	33.7
4-6 per week	64	20.9
Irregularly	44	14.4
Never use	33	10.8
Egg		
Daily	29	9.5
2-3 per week	143	46.7
4-6 per week	53	17.3
Irregularly	63	20.6
Never use	18	5.9
Legumes, nuts and seeds		
Daily	172	56.2
2-3 per week	73	23.9
4-6 per week	42	13.7
Irregularly	16	5.2
Never use	3	1.0
Oils and fats		
Daily	213	69.5
2-3 per week	47	15.4
4-6 per week	19	6.2
Irregularly	19	6.2
Never use	8	2.6
Iodized salt		
Daily	285	93.1
2-3 per week	13	4.2
4-6 per week	4	1.3
Irregularly	1	0.3
Never use	3	1.0

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Prevalence of under nutrition

The prevalence of under nutrition among pregnant women in Alamata general hospital was 23.2 % (95%CI: 18.5, 27.8).

Factors associated with under nutrition

Findings from the bivariate regression analysis found associations between age of respondent, marital status, educational status, educational level of husband, employment status, head of household, start time of ANC follow up, taking iron folate, anthelminthic, antimalarial drug during pregnancy and sleep in treated bed net with being under nutrition at p value <.025. However, results of the multivariate analysis indicated that being under nutrition was only significantly associated with age, Educational status of mother, Husband's educational status, taking iron folate during pregnancy and taking anti-malarial drug during pregnancy. Based on the result, being age group of 15-24, decreases the risk of under nutrition by 81 % as compared with age group of 35-49 (AOR: 0.19, 95% CI: 0.57,0.638).

The result also shows that as compared with pregnant women with educational level of university, women with no formal education reduces chance of being under nutrition by 75 % (AOR: 0.25, 95% CI: 0.079, 0.789). Pregnant women with illiterate husband had nearly 9 times more likely to be under nutrition than women with husband educational level university (AOR: 8.827, 95% CI: 1.859, 41.922). Pregnant women with husbands of primary education had 17 times more likely to be under nutrition than that of husbands with university educational level (AOR: 17.461, 95% CI: 3.401, 89.634).Being women with husbands educational level secondary had 10 times more likely to be under nutrition than women with husbands educational level university (AOR: 10.066, 95% CI: 2.051, 49.413). Pregnant women with husbands educational level of college had 6 times more likely to be under nutrition than pregnant women with husbands educational level university (AOR: 6.080, 95% CI: 1.122, 32.939).

Pregnant women who were supplemented iron folate during pregnancy reduces the risk of under nutrition by 64.4% than pregnant women who doesn't take iron folate (AOR: 0.356, 95% CI: 0.140,0.906). Another variable associated with pregnant nutritional status was taking anti- malarial drug during pregnancy. Taking anti-malarial drug during pregnancy had 4 times more likely to be under nutrition as compared to pregnant women that doesn't take anti-malarial drug (AOR: 4.298, 95% CI: 1.314,14.063) (Table 4).

Table 4 Multivariable logistic regression analysis showing factors associated with under nutrition among pregnant women attending ANC in Alamata general hospital, Northern Ethiopia, 2017

	Nutritional status				
Explanatory Variables	Normal	Under nourished	COR(95% CI)	AOR(95% CI)	P value
Age					
15-24	46(19.6%)	31(43.7%)	0.429(0.238,0.775)	0.766(0.352,1.666)	0.501
25-34	121(51.5%)	35(49.3%)	0.109(0.040,0.301)	0.19(0.57,0.638)	0.007
35-49	68(28.9%)	5(7.0%)	1	1	
Maternal education					
No formal Education	66(28.1%)	13(18.3%)	1.146(0.500,2.631)	0.25(0.079,0.789)	0.018
Primary	62(26.4%)	14(19.7%)	3.931(1.769,8.735)	0.853(0.268,2.710)	0.787
Secondary	31(13.2%)	24(33.8%)	1.095(0.453,2.646)	0.312(0.090,1.087)	0.067
Collage	51(21.7%)	11(15.5%)	1.828(0.695,4.805)	0.379(0.086,1.661)	0.198
University	25(10.6%)	9(12.7%)	1	1	
Husband education					
No formal Education	52(22.9%)	3(5.3%)	4.540(1.189,17.334)	8.827(1.859,41.922)	0.006
Primary	42(18.5%)	11(19.3%)	6.933(1.855,25.916)	17.461(3.401,89.634)	0.001
Secondary	35(15.4%)	14(24.6%)	6.559(1.759,24.460)	10.066(2.051,49.413)	0.004
College	37(16.3%)	14(24.6%)	4.262(1.169,15.540)	6.080(1.122,32.939)	0.036
University	61(26.9%)	15(26.3%)	1	1	
Iron folate supplementation					
Yes	177(75.3%)	59(83.1%)	0.621(0.312,1.235)	0.356(0.140,0.906)	0.035
No	58(24.7%)	12(16.9%)	1	1	
Take anti- malarial drug					
Yes	42(17.9%)	9(12.7%)	1.499(0.691,3.253)	4.298(1.314,14.063)	0.017
No	193(82.1%)	62(87.3%)	1	1	

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Discussion

Although the concepts of mother's health and nutritional status have become a major concern, not enough studies have been conducted in this alarmed area on identifying of maternal nutritional problems. This study was carried out to identify the prevalence and factors associated with under nutrition among pregnant women in Alamata general hospital, North Ethiopia. In this study, based on the anthropometric measurement of MUAC, 76.8% of pregnant women had normal nutritional status, MUAC of ≥22 cm and 23.2% of women were under nourished, MUAC of <22cm. The result was lower than the study conducted in different part of Ethiopia, Addis Ababa and Tigray[16,19] and rural India.[10,13] These differences may be due to variations in socioeconomic characteristics, culture and periods of study as compared with present study. The other possible reason might be improvement of Human development and community awareness toward nutrition in recent times. The result of our study was consistent with the study done by EDHS 2016 in Ethiopia, in which 22% of women were underweight.[20] But the present study was higher than the study conducted in Wondogenet, South Ethiopia,[17] Nigeria,[25] Sirlanka,[11] Indonesia,[12] India,[8] China[26] and USA.[27] The possible reason may be variations in socio demographic, economic characteristics and dietary habits. The other possible reason might be the difference in indicators that use to assess the nutritional status of women. Except in Wondogenet, others use BMI.

The result also shows that as compared with pregnant women with educational level of university, women with no formal education reduces chance of being under nutrition by 75 % (AOR: 0.25, 95% CI: 0.079, 0.789). Contradict finding was reported from Addis Ababa[14,19] and EDHS 2016.[20] This difference might be due to sample size and method variation. Based on this study age was another predictor of pregnant women under nutrition. Age group of 15-24, decreases the risk of under nutrition by 81 % as compared with age group of 35-49 (AOR: 0.19, 95% CI: 0.57,0.638). similar finding from Addis Ababa,[14,19] Tigray[16] and EDHS 2016.[20] Here it might be possible to suggest that as age increases parity increases and the women might be exposed to recurrent blood loss during delivery and there might be food share with among family members. Pregnant women who took anti- malarial drug during pregnancy were 4 times more likely to be under nourished than pregnant women that didn't take anti- malarial drug (AOR: 4.298, 95% CI: 1.314,14.063). Pregnant women who were supplemented iron folate during pregnancy reduces the risk of under nutrition by 64.4% than pregnant women who doesn't take iron folate (AOR: 0.356, 95% CI: 0.140, 0.906). The possible reason might be pregnant women who take iron will increase red blood cells, increases resistance to infection and improve appetites of the pregnant women. The finding of the present study identified that pregnant women with an illiterate husband were 8 times more likely to be under nourished than literate (AOR: 8.827, 95% CI: 1.859, 41.922). There is no other relevant study with this finding. But, the possible reason could be explained as husband with no formal education has less awareness than those who have education of how to utilize available resources for the improvement of their wives nutritional status and that of their families.

Conclusion

In conclusion, our study clearly indicated that the nutritional status based on MUAC, of pregnant women was found to be high. Factors which were significantly associated with underweight among pregnant women were age of the mother, educational level of mother, educational status of husband and taking of iron folate during pregnancy. There for nutrition intervention targeting age of pregnant women, illiterate husband and iron supplementation is recommended. Further study should be conducted on other variables which are not explored in this study.

Ethics and consent to participate

Letter of permission was obtained from Woldia University research community service office and support letter were obtained from Alamata General Hospital before the data collection and the purpose and objective of the study was explained to the respondents. In addition to this, the objectives and purposes of this study were explained to the respondents. In order to take consent verbal type was applied since it is inclusive for both literate and illetriate. And also verbal assent and verbal consent from the guardian was taken for those women whose age is under eighteen in Ethiopia context.

Consent for publication

Not applicable.

Availability of data and materials

The data underlying this study are available from the corresponding author on reasonable request', as long as this is appropriate.

Competing interest

The authors declare that they have no competing interests.

Funding

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Authors' contribution

Achan Didimu Adar, Hilina Teshome Demeke, Mesafint Tewabe and Neima Mohammed Hagos involved in the proposal writing and in the whole thesis work. Samuel Dagne and Melese Linger Endalifer participated by reviewing papers in the whole process and in manuscript preparation.

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Conflicts of interest

The author declares that there is no conflict of interest.

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