Prevalence and associated factors of undernutrition among pregnant women vising ANC clinic in Silte zone, southern Ethiopia

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Abstract

Background: Maternal undernutrition is highly prevalent in underdeveloped country. Hence, this study was intended to determine prevalence and associated factors of undernutrition among pregnant women visiting ANC follow up clinics of health facilities.

Method: Facility based cross sectional study was conducted from July to January 2019. Data was collected by using structured interviewer administered questionnaire. Mid upper arm circumference (MUAC) was measured by standard non stretchable MUAC tape. Systematic random sampling technique was used to select 422 study participants from 11 randomly selected health facilities. Sample size was allocated proportionately to each health facilities. Data was entered into a computer using Epi data 3.1 and edited, cleaned and analyzed using SPSS version 20. Both bivariate and multiple logistic regression analyses was employed to identify factors associated with maternal undernutrition.

Result: This study found 91 (21.8%) of study subjects were undernourished. Age greater than 31 years of women (AOR=0.15; 95% CI: 0.03, 0.93), Birth intervals > 2 years (AOR= 0.18; 95% CI: 0.04, 0.76), good nutritional knowledge (AOR=0.34; 95% CI: 0.17, 0.67), and having no dietary change as a result of current pregnancy AOR=6.02; 95% CI: 2.99, 12.14) were significantly associated with undernutrition.

Conclusion and recommendation: The prevalence of undernutrition among pregnant women was 21.8 % indicates little decrement. Age of women, Birth intervals, and Dietary change as a result of current pregnancy and Nutrition knowledge were important risk factors/ predictors of undernutrition (MUAC < 23 cm). Government, and other concerned bodies should strength nutritional counseling of pregnant women at health setting and in community level with giving special emphasis to adolescent pregnant women (Age ≤20 years old).

Background

Undernutrition and poor health from avoidable causes excessively affect the health of millions of people in the developing countries(1). Women and young children are the most affected(2). Child and maternal undernutrition is responsible for approximately 3.5 million deaths in children below the age of 5 years(3).Undernutrition during pregnancy physiologically demanding period would result in adverse pregnancy outcomes(4) Undernutrition makes the mothers more vulnerable to diseases, encounter more miscarriages and give birth to underweight baby whose survival is at risk(3, 5)

Nutritional status during pregnancy is directly linked to intrauterine growth retardation (IUGR) and birth weight (6-8). Babies with fetal growth restriction are at increased risk of death throughout infancy(9). Globally, about 23.8% of newborns affected by IUGR were born every year. Overall, about 75% of all affected newborns are born in developing countries(10).

Previous study showed that maternal undernutrition is one of the risk factors for under-five undernutrition(11, 12) which remains alarming rate: wasting still impacts the lives of too many young

children in developing countries (13-15). Immune dysfunction in malnourished mothers has a causal effect on infant's nutritional status because reduced transfer of protective maternal immune factors and increased exposure to pathogenic microbes and pro inflammatory mediators confer an elevated metabolic cost on developing infants and contributes to development of undernutrition(16).

Apart from the serious consequences on a person's health, the economy is also affected by undernutrition(17). High prevalence of undernutrition hinders economic development and preserves poverty both directly, through a loss of productivity due to poor physical condition, and indirectly, through deprived cognitive function and learning shortfalls(18). Undernourished children are more likely to become short adults, to have lower educational achievement, and to give birth to smaller infants(19).

In developing nations including Ethiopia, burden of maternal and child undernutrition is very high. The prevalence of maternal undernutrition in Africa including Ethiopia found between 11%-36% (20-27). The most acceptable explanation for this wide variation is likely to be the fact that contextual factors are major determinants of maternal undernutrition. Therefore a maternal undernutrition has to be understood in specific context to develop effective and tailored interventions.

In the year 2025, the WHO has planned to reduce anemia by 50% and low birth-weight by 30%(28). In Ethiopia, the government launches national nutrition program. Maternal and child nutrition is one of its targets which need updated data on the nutritional profile of the pregnant women which is essential to develop effective intervention strategies to prevent maternal and child undernutrition. However, there is limited data on prevalence and factors associated maternal undernutrition in the study area. Therefore, this study was aimed to determine the prevalence and associated factors of undernutrition among pregnant women visiting ANC follow up clinics of health facilities.

Methods

Study design, period and setting

Institution based cross sectional study was conducted to assess prevalence and associated factors of undernutrition among pregnant women visiting ANC follow up clinics of health facilities. It was conducted from July to January 2019 in Silte Zone .It is one of fourteen Zones of the southern region of Ethiopia and found 172 km away from Addis Ababa (the capital city of Ethiopia). The administrative center of the zone is Werabe town. This zone consists of an administration town, and 12 rural weredas. Based on last Census conducted by the central statistical agency of Ethiopia, in 2018 the Zone has estimated population of 1,017,557 of whom 156915 are under five children .About 13% of the total population is urban inhabitants. In addition there are 04 Hospitals and 33Health centers

Study Subjects

Sample size determination and sampling technique

The sample size (n) required for the study was calculated using a single population proportion formula. Considering the absence similar study conducted at similar context as per our search effort, we took p value of 50%, 5% marginal error, and 95% confidence interval were used to obtain the maximum sample size. With the addition of 10% contingency, initial sample size was increased to 422. In the study area, antenatal care service is provided in all health care facilities. In order to increase the generalizability of the results, health facilities were stratified based on the type of health facility, 1 hospital (Tora Primary Hospital) from the four hospitals and 10 health centers from the 33 health centers were selected randomly. Calculated sample size was allocated proportionately to selected health facilities. According to the health facilities report, on average, 20–35 pregnant women visit the ANC daily and 2066 pregnant women have been enrolled in ANC of selected health facilities. Since the sample size was determined as 422. Fifty two from Tora Primary hospital and 380 from 10 health centers were selected using systematic random sampling technique at interval of k = 5. Of the first five pregnant women, 3rd woman was randomly selected by using lottery method. Accordingly, every 5th pregnant women were selected to participate in the study until the required sample size of 422 pregnant women was obtained.

Measurements and data collection tools

Interviewer-administered questionnaire was used to collect the data which was adopted from articles published in peer reviewed journals. Knowledge questions were adopted from FAO knowledge, attitude and practice survey guideline [13]. Measurement of middle upper arm circumference (MUAC) was used to determine Nutritional status of the pregnant women. MUAC of the left arm was measured triplicate using a non-stretchable standard MUAC tape to the nearest 0.1 cm with no clothing on the arm. The mean of triplicate measurement was taken. Pregnant women having MUAC< 23 cm were considered undernourished and ≥ 23 cm well-nourished (23, 29, 30)

Data Quality Control

Trained data collectors collected the data. The instrument was pretested in 5% of the sample size. It was conducted on individuals with similar characteristics of the study population who were not a part of the actual study. Based on the pretest results, the instrument was modified and changed into local contexts. Trained supervisors supervise the data collection and check the completeness of the questionnaire on the daily base. In addition, principal investigators carefully cleaned and entered collected data into a computer. During the entry of data, double entry verification using Epidata 3.1 was applied.

Data processing and analysis:

Data was entered into a computer using Epi data 3.1, and edited, cleaned and analyzed using SPSS version 20. Bivariable and multivariable logistic regression was used to determine the degree of association between independent and dependent variables. Variables with p value of < 0.25 in Bivariable logistic regression analysis were candidates for multivariable logistic regression analysis. In multivariable logistic regression analysis, those variables with a p value ≤ 0.05 with adjusted odds ratio interval exclude one was considered as statistically significant.

Results

Socio-demographic Characteristics of Respondents:

From the 422 pregnant Women, 417 participated in this study, making response rate of 98.8%. Mean age of the participants was 26.6 ± 5 years and majority 39.1% of the participants was in age between 26-30 years. About three fourth (72.3%) of the participants were housewives/unemployed. From the total, 198 (47.5%) participants had low educational status. Majority 76.7% of women were rural residents. [Table 1 summarizes the socio-demographic characteristics of respondents).

Obstetric history of respondents

Average number of children per woman was 3 ±2. Mean birth interval between current pregnancy and previous last pregnancy is 2.7 ± 1. More than half (66.4%) of the pregnant women were in their third trimester of pregnancy. Majority 216(56.1%) of the women reported that they had >=5 family size. One hundred thirty (44.2%) of women gave birth with three year interval.

Knowledge, dietary practice and prevalence of under nutrition

This study found 91 (21.8%) of study subjects were undernourished. Majority 285(68.3%) of them had recommended meal frequency. Two hundred sixty four (63.3%) of women changed diet as a result of the current pregnancy. About half 213(51.1%) of women had good nutritional knowledge.

Factors associated with undernutrition

A multivariable analysis in a form of logistic regression was employed to identify the associated factors of undernutrition among pregnant women. The analyses rest on two outcomes of nutritional status of pregnant women: whether they are undernourished (MUAC< 23 cm) or not (MUAC≥ 23 cm). On bivariate analysis, Age of women, Birth interval, Daily meal frequency, Nutrition knowledge, Dietary change as result of current pregnancy were significantly associated with undernutrition. Variables with p value of < 0.25 in the Bivariable logistic regression analysis were entered in to multivariate logistic regression analysis. In multivariate analysis, Age greater than 31 years of women (AOR=0.15; 95% CI: 0.03, 0.93), Birth intervals > 2 years (AOR= 0.18; 95% CI: 0.04, 0.76), good nutritional knowledge (AOR=0.34; 95% CI: 0.17, 0.67), and having no dietary change as a result of current pregnancy AOR=6.02; 95% CI: 2.99, 12.14) were significantly associated with undernutrition. (Table 2)

Discussion

The aim of this study was to assess the prevalence and associated factors of undernutrition among pregnant women visiting ANC clinic in Silte Zone, southern Ethiopia. The current study found 1 in every five women was undernutrition. Age of women, Birth intervals, Dietary change as a result of current pregnancy and Nutrition knowledge were significant determinants of the undernutrition. In this study, about one fourth of women were undernourished. The current study found 21.8% (MUAC<23) prevalence

rate of undernutrition. Our result is consistent with those of other three studies carried out in other parts of Ethiopia 19.8%, 19.5% and 24% (23, 31, 32). It is also consistent with findings of a study done in south Sudan and a systemic review in Africa reported 18.9% and 23.5% respectively(20, 33) . On the other hand, our finding is higher than those of studies did in three areas of Ethiopia and Madagascar reported 16.2%, 14.4%, 9.2% and 9% respectively(22, 34-36). The variation might be due to distinctions in MUAC cut of value, and the socio-culture distinctions between Ethiopia and the other counties. The present study finding was lower than those of studies done in other areas of Ethiopia reported 72%, 34%, 31.8%, 31.4%, 30.3% and 28.6% (26, 27, 37-40). In the current study prevalence of maternal undernutrition shows a little decrement in compared to previous studies done in the study area. The discrepancy might be due to effective nutritional intervention. Another possible reason may be due to difference in season of studies conducted. In Ethiopia household food security varies with season.

Knowledge of pregnant women about nutrition was significantly associated with maternal undernutrition. It was negatively associated with maternal undernutrition. The odds of undernutrition among women with poor nutritional knowledge were higher than their counterparts. This finding is similar with previous study(23). This could be possibly due to that poor nutritional knowledge about basic nutrition usually results in poor dietary intake leading to undernutrition.

In the current study, the age of pregnant mothers was found to be negatively associated with the under nutrition of pregnant women. Pregnant women who are at age of between 31-35 years have decreased risk of undernutrition by 15% when compared to pregnant women of age less than 31 years. Consistent finding is reported in other studies (21, 22, 34, 41). This could be possibly due to early age women often have lack of awareness about their own health and nutritional status that leads to poor nutritional status. Adolescent women have no or little power in decision- making about food distribution in the household is another reason leads to poor nutritional status. It could also be due to less experience of maternity and related complications among adolescent women.

Dietary change as a result of current pregnancy was significantly associated with maternal undernutrition. Women who did not improve their eating habits as a result of current pregnancy had a 6 times higher odds having under nutrition when compared to their counterparts. Similar finding was reported in other studies (24, 42)

Interval between current and just previous pregnancy found inversely associated with the under nutrition of pregnant women. Pregnant women who had birth interval greater than 2 years had lesser risk of undernutrition compared to those who had birth interval of less than two years. Similar finding was reported in a study conducted in Bangladesh
(43). There are many reasons to suspect that a short birth interval could adversely affect nutritional status of the mother or the child. For the mother, a short birth interval may give her insufficient time to recover from the nutritional burden of pregnancy(44).

Limitations of the Study

The major limitation was the cross-sectional nature of its design as we can't establish causal relationships between the independent variables and dependent variable. Secondly, the study was institution based and the study subjects may not represent the general population.

Conclusion And Recommendations

The prevalence of undernutrition among pregnant women was 21.8 % indicating little decrement. Age of women, their birth interval, dietary change as a result of current pregnancy and knowledge on nutrition were factors significantly associated with maternal under nutrition on current study

Government, and other concerned bodies should strengthen nutritional counseling of pregnant women at health setting and strengthen involvement of pregnancy nutrition information in community level nutritional programs to overcome maternal under nutrition. Government, and other concerned bodies should encourage women to have appropriate child spacing through strengthening family planning intervention at community level and heath settings to reduce the occurrence of maternal undernutrition. Special focus should be given to less than 20 years old pregnant women.

Abbreviations

ANC: Antenatal care; EDHS:Ethiopia Demographic and Health Survey;FMOH:Federal Ministry of Health: IUGR: Intrauterine growth retardation;MCH:Mother and Child Health;MOH:Ministry of Health;NGO:Non-Governmental Organization; SNNPR: Southern Nations, Nationalities, and Peoples Region;SPSS:Statistical Package for Social Science; WHO:World Health Organization.

Declarations

Ethics approval and consent to participate

Ethical clearance was obtained from Werabe University before data collection was initiated. At the time of data collection, written consent was obtained from the participants whose age is greater than 18 and emancipated minors. For minors assent was obtained after three copy of written consent had been taken from their parents to confirm whether they were agreed to participate. We involve the witness when necessary. Those not willing to participate were given the right to do so. Confidentiality of response was also ensured throughout the research process.

Consent for publication

Not applicable

Availability of data and materials

Data sets used and analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that there is no conflict of interest

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Authors' Contributions

MM conceived the idea and had major roles in the proposal development. MY had a major role in methodology part and data interpretation. SK had a major role on data analysis and discussion. AM had contributed on writing, drafting, and editing the manuscript. All authors have contributed to the analysis, writing, drafting, and editing the manuscript. All the authors read and gave final approval of the final version to be published and agreed to be equally accountable for all aspects of the work.

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Tables

Table 1: Characteristics of respondents in Silte zone, Southern Ethiopia, 2019, (n=417)

Variables		Frequency	Percent
Age of the women	15-20	70	16.8
	21-25	117	28.1
	26-30	163	39.1
	31-35	52	12.5
	›=36	15	3.6
	Total	417	100
Religion	Orthodox	10	2.4
	Muslim	405	97.1
	Others	2	0.5
	Total	417	100
Marital status	Single	23	5.5
	Married	393	94.2
	Divorced	1	.2
	Total	417	100
Women's education status	Illiterate	198	47.5
	None formal education	92	22.1
	Primary level (1-8 grade)	100	24.0
	Secondary level and above	27	6.5
	Total	417	100
Women's occupational status	Unemployed	350	83.9
	Employed	67	16.1
	Total	417	100
Husband's employment	unemployed	288	73.3
	Government employee	80	20.4
	Private employee	25	6.4
	Total	393	100
Residency	Urban	97	23.3
	Rural	320	76.7
	Total	417	100

Table 2: Factors associated with nutritional status of pregnant women in Silte Zone, Southern Ethiopia, 2019, (n=417)

ɔles		Nutritional status(n)		P value	Crude odds ratio (95% C.I.)	P value	Adjusted odds ratio (95% C.I.)
		Well-nourished (>=23 cm)	Under nourished (<23 cm)				
	15-20	49	21		1		1
	21-25	94	23	0.109	0.57 (0.29,1.13)	0.102	0.26 (0.05,1.31)
	26-30	125	38	0.283	0.71 (0.38,1.33)	0.400	0.52 (0.11,2.4)
	31-35	46	6	0.019	0.3 (0.11,0.82)	0.041	0.15 (0.03,0.93)
	>=36	12	3	0.44	0.58 (0.15,2.28)	0.506	0.49 (0.06,4.01)
yment	Unemployed	222	66		1		1
of	Government employee	61	19	0.876	1.05 (0.58,1.88)	0.905	1.06 (0.44,2.56)
ıd	Private employee	23	2	0.101	0.29(0.07,1.27)	0.106	0.15(0.07,1.5)
nterval	One year	10	9		1		1
	Two years	86	19	0.00	0.25 (.009,0.69)	0.003	0.10 (0.02,0.44)
	Three years	101	29	0.02	0.32 (0.12,0.86)	0.020	0.18 (0.04,0.76)
	Four years	23	5	0.03	0.24 (0.06,0.91)	0.009	0.10 (0.02,0.57)
	Five and above years	11	1	0.04	0.10 (0.01,0.95)	0.045	0.07 (0.01,0.95)
ıional	1st trimester	5	3		1		1
	2nd trimester	111	21	0.133	0.32 (0.07,1.42)	0.505	0.42 (0.034,5.3)
	3rd trimester	210	67	0.396	0.53 (0.12,2.28)	0.717	0.64 (0.06,7.39)
neal	>=3	90	42		1		1
ncy	>3	236	49	0.001	0.45 (0.28,0.72)	0.739	0.87 (0.39,1.94)
.on	Poor	142	62		1		1
edge	Good	184	29	0.000	0.36 (0.22,0.59)	0.002	0.34 (0.17,0.67)
y	Yes	230	34		1		1
e as of	No	96	57	0.000	4.02 (2.47,6.54	0.000	6.02 (2.99,12.14)
t ıncy							

ers to frequency