



Nutritional status and associated factors among reproductive age women in Silte Zone, Southern Ethiopia: A community-based cross-sectional study

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Abstract

Malnutrition continues to be a major public health problem in both developed and developing countries. This study was aimed at assessing nutritional status and associated factors among women of reproductive age in the study area. A community-based cross-sectional study was employed from February to March 2023. About 845 study participants were selected by using a multi-stage sampling technique. Data was collected by using an interviewer-administered questionnaire. SPSS version 25 was used to analyze the study data. Multiple logistic regression was used to identify factors associated with outcome variables. This study found 7.4%, 54.7%, 20.3%, 16.2%, and 1.4% of the women were underweight, normal weight, at risk for overweight, overweight, and obese, respectively. Age between 21 and 30 years (AOR=2.839; 95% CI: 1.391-5.793) and age between 31 and 40 years (AOR=2.490; 95% CI: 1.125-5.513) and education above 12th grade (AOR=0.236; 95% CI: 0.080-0.697) and employed women (AOR=2.929; 95% CI: 1.530-5.608) and having good food security (AOR=1.581; 95% CI 1.007-2.483) were significantly associated with overweight, whereas age ≥ 40 years (AOR=0.28; 95% CI: 0.089, 0.878) and no ANC visit (AOR=3.068; 95% CI: 1.289-7.304) were significantly associated with underweight. This study found a significant prevalence of underweight among women. Older age, high educational level, employed women, and food security were positively associated with overweight, whereas lower age of the women and having no ANC visit were positively associated with underweight. Targeted nutritional interventions should address overweight among employed women, older, and educated, supporting younger women at risk of underweight is also essential.

Keywords: Underweight, Overweight, Obesity, Body mass index, Reproductive age women, Ethiopia

Highlights

- A dual burden of malnutrition was observed among reproductive-age women, with both underweight (7.4%) and overweight/obesity (17.6%) present.
- More than half of the women (54.7%) had normal nutritional status, while 20.3% were at risk of overweight.
- Older age, higher educational attainment, employment status, and household food security were positively associated with overweight.
- Younger age and lack of antenatal care visits were significant predictors of underweight.
- Targeted and context-specific interventions are needed to address both undernutrition and overnutrition.
- Integrated nutrition strategies are essential to tackle the double burden of malnutrition.

1. Introduction

Malnutrition is a health problem that results from an imbalanced diet in which one or more nutrients are either inadequate or too much, such that the diet causes health problems (Young, 2010). It may involve calories, protein, carbohydrates, fat, vitamins, or minerals (Fund, 2010; Young, 2010). Many developing countries are currently facing both under- and overnutrition—known as the double burden of nutrition (Abdullah, 2015). Taking not enough nutrients is called undernutrition or undernourishment, while too much is called overnutrition (Kennedy G, 2006 ; Popkin BM, 2004). Children, Women, and adolescents are more at risk of malnutrition than other population groups (Development Initiatives, 2018). Malnutrition not only affects health but also increases health care costs, reduces productivity, and slows economic growth, which can perpetuate a cycle of poverty and ill-health (Development Initiatives, 2018).

Many developing countries are increasingly challenged by the double burden of malnutrition, a condition characterized by the coexistence of under- and overnutrition. This trend is largely determined by rapid economic development, demographic changes, and growing urbanization (Abdullah, 2015). In addition, the growing intake of ultra-processed foods has further augmented this nutritional evolution (Baker P, 2014). At the global level, both undernutrition and overnutrition rank among the leading risk factors contributing to disease burden (World Health, 2016). According to the World Health Organization, overnutrition-related conditions account for about one million adult deaths annually, while undernutrition is responsible for about half a million deaths. Most importantly, undernutrition remains a major public health concern among women of reproductive age in developing countries (Shrimpton & Rokx, 2012).

The coexistence of overweight and underweight among women of reproductive age poses serious problems not only for women's health but also for child health consequences (Han Z, 2010). Studies suggest that underweight women face a higher likelihood of adverse pregnancy outcomes, including low birth weight, preterm delivery, and neonatal mortality (Han Z, 2010; Razak F, 2013). On the other hand, overweight and obese women bear higher risks for infertility and gestational complications such as hypertensive disorder, gestational diabetes, hemorrhage, and caesarean delivery, as well as higher risk factors for fetal and infant death, neural tube defects, and newborn macrosomia (Aune D, 2014 ; Papachatzis E, 2013).

Therefore, understanding the extent and distribution of both types of malnutrition and their determinants is critical, especially in low-income settings, so as to channel the public health resources appropriately (Shrimpton & Rokx, 2012). Overweight and obesity are regarded as one of the leading causes of mortality in the world (Shrimpton & Rokx, 2012). The prevalence rate of overnutrition has previously been higher in developed countries, but in recent years, the prevalence in many developing countries has been increasing (Finucane MM, 2011).

The medical, developmental, social, and economic impacts of the global burden of malnutrition are lasting for individuals and their families, for communities, and for countries (IFPRI, 2014). Globally, hunger and undernutrition reduce gross domestic product by US\$1.4–2.1 trillion a year (IFPRI, 2016). According to available evidence, Ethiopia could reduce losses by ETB 148 billion by 2025 if underweight rates were reduced to 5% (IFPRI, 2014). Eradicating undernutrition in Ethiopia would avoid losses of 8–11% per year from the gross national product (IFPRI, 2014).

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The prevalence of under- and overweight among reproductive-age women was reported at varying rates in different studies in different parts of Ethiopia. The levels of undernutrition among women are 22% in Halaba communities (Ersino G, 2018), 2% of women aged 15–49 years are undernourished at the national level (CSA and ICF, 2016) 17.4% in Arbaminch (Hadiya Hassen Tikuye, 2018), and 48.6% in Ziway (Ferede A, 2017). Regarding obesity, a 28.2% prevalence was reported in Hawasa city (Darebo, 2019) and 8% was reported from the EDHS 2016 survey (CSA and ICF, 2016) which increased by a 2% rate from the EDHS 2011 report (CSA and ICF, 2012). Despite a few local studies conducted in different parts of the country, no sufficient study has tried to identify risk factors of malnutrition among reproductive-age women in the study area. Furthermore, limited studies identify risk factors of malnutrition, but risk factors for malnutrition may not be the same across areas because of differences in socio-economic and cultural contexts. Therefore, this study was planned to assess nutritional status and associated factors among reproductive-age women in the study area.

2. Materials and Methods

2.1. Study design and context

A community-based cross-sectional study was used from February to March 2023 in the Silte Zone, central Ethiopia. It is one of the zones of central Ethiopia and is found 172 km away from Addis Ababa. Based on the last census conducted by the CSA, the zone had an estimated population of 1,017,557. The estimated urban inhabitants are about 13% of the total population. In the zone, there were a total of 221,208 households. According to the national estimation of reproductive-age women, they account for approximately 45% of the total population.

2.2. Study population

All reproductive-age women who are residing in the zone were the source population of the study. The study population of this study was selected reproductive-age women who resided for at least 6 months in the study area. Women who were seriously ill and women who had heart failure and kidney failure during the study period were excluded. The women with heart failure and kidney failure were excluded because it is difficult to measure actual BMI.

2.3. Sample size and sampling method

The required number of participants for this study was computed by using the formula for a single population proportion, with 48.6% underweight, based on a previous study conducted in Ziway (Ferede A, 2017). A margin of error of 5% and a confidence level of 95% were assumed. Since the study applied a multi-stage sampling method, a design effect of 2 was used for the final sample size. An additional 10% was also added to account for possible non-response. As a result, the final sample size was set at 845 women. A three-stage sampling method was used to select the 845 eligible participants. In the first stage, four districts were randomly chosen from a total of 10 Weredas and 3 administrative towns. In the second stage, 30% of kebeles were randomly selected from each of the chosen Weredas and administrative towns. In the third stage, 845 households were selected using systematic random sampling. The sample size was proportionally distributed among the selected Weredas and 3 administrative towns. When multiple study participants were found in a single household, a lottery method was used to select one participant.

2.4. Measurements and data collection instruments

Data for the study were collected by an interviewer-administered questionnaire. The first section of the questionnaire is socio-demographic

variables, including age, marital status, residence, occupation, maternal educational status, religion, income, husband or partner educational status, and residency setting. Socio-demographic questions were adapted from the Ethiopian demographic and health survey (EDHS 2016). The second section of the questionnaire assesses obstetric-related factors, including parity, birth interval, family size, contraceptive use, and ANC follow-up. Obstetric-related questions adapted from the literature (Hadiya Hassen Tikuye, 2018; Yuan He, 2016). The questionnaire also contains a 3rd section that assesses cognitive and behavioral factors that address nutrition knowledge, dietary intake practice, khat chewing, and the habit of hand washing. The 4th portion of the questionnaire is household-related factors that assess household food insecurity and drinking water sources. The final section assesses women's autonomy.

Nutritional knowledge was assessed using a 13-item scale, and knowledge levels were classified as adequate or inadequate based on the mean value, adopted from FAO, and general nutrition knowledge validated in Uganda (Bukonya R, 2017 ; Yvette Fautsch Macías, 2014). Body mass index (BMI) was used to classify the nutritional status of the women. A weight scale and a stadiometer were used to measure weight and height. The nutritional status of the women was classified based on the World Health Organization, such that BMI cutoff points are less than 18.5 kg/m² (underweight), 18.5 to 22.9 kg/m² (normal weight), 23 to 24.9 kg/m² (at risk for overweight), 25 to 29.9 kg/m² (overweight), and 30 kg/m² or more (obese). Undernutrition is defined as a BMI less than 18.5 kg/m² (World Health Organization, 1995). Food security was assessed using 8 items, and the mean was used as the cutoff value to categorize as poor and good (FAO, 2016). Women's autonomy was measured using a 3-item decision-making index adapted from a previous study; the highest score was taken as high autonomy, and the lowest score was taken as low autonomy status (Tiruneh, Chuang, & Chuang, 2017).

2.5. Data quality control

The investigators, trained supervisors, and data collectors were going to take part in a pre-test of the survey questionnaire among 5% of the study subjects, and the necessary modifications and corrections were made to standardize the instruments. In addition, the data was thoroughly cleaned and carefully entered into the computer for the beginning of the analysis.

2.6. Data processing and analysis

Data were entered into a computer using EpiData 3.1 and edited, cleaned, and analyzed using SPSS version 20. Different frequency tables and descriptive summaries were used to describe the study variables. Bivariate logistic regression analysis was used to see the significance of the association between dependent and independent variables. All explanatory variables with a p-value less than 0.25 in bivariate analysis were candidate for multivariable binary logistic regression models in order to assess the independent predictors of dependent variables such as underweight and overweight. Variables with P-value < 0.05 and 95% CI not including 1 were considered as having a significant association with the dependent variable.

3. Results

3.1. Socio-demographic Characteristics of Respondents

In this study, 780 study subjects participated, making response rate of 92.3%. The mean age of the participants was 28.35 ± 8 years, and the majority, 46.3% of the participants, were between 21 and 30 years. About two-thirds (60.9%) of the participants were married. About 382 (49.0%) of the participants had low educational status. About 65.4% of women were rural residents. (Table).

Table 1: Characteristics of respondents in Silte zone, Central Ethiopia, 2023, (n = 780)

Variables	Frequency	Percent
Age in years	Age≤20	146
	Age 21-30 years	361
	Age 31-40 years	222
	Age 41-49 years	51
	Total	780
Religion	Muslim	699
	Orthodox	57
	Protestant	24
	Total	780
Marital status	Single	274
	Married	475
	Divorced	20
	Widowed	11
	Total	780
Educational status	Illiterate	382
	Informal education	25
	Primary level (1-8 grade)	187
	Secondary level (9-12 grade)	125
	Above 12 grade	61
Occupational status	Total	780
	House wife	361
	Employed	139
	Merchant	130
	Farmer	20
	Student	119
husband employment	Others	11
	Total	780
	Employed	146
	Not Employed	329
	Total	475
Husband's educational status	Illiterate	138
	Informal education	49
	Primary level (1-8 grade)	145
	Secondary level (9-12 grade)	47
	Above 12 grade	96
Residence	Total	475
	Urban	270
	Rural	510
	Total	780

2.2. Obstetric and women's autonomy-related factors

About half (55%) of the participants had a history of ANC follow-up. Of the total of the respondents, 53% of women used contraceptives. In this study, the average number of children per woman was 3 ± 2 , mean birth interval between the current pregnancy and the previous pregnancy is 2.4 ± 1 . The average family size per woman was a majority; 216 (56.1%) of the women reported that they had a family size of ≥ 5 , which was 4. This study found that 37.8% of women make their own decisions about their health, while for 26.9% their husbands or partners make such decisions for them. Less than half of the women make their own decisions about major household purchases. Regarding who usually makes decisions about visits to their family or relatives, 31.2% of women reported that the decision was made by them, whereas 23.2% of women decided on visits to their family jointly.

2.3. Behavioral and household factors

This study observed that 33% of the respondents had ever chewed khat. In this study, also 73.6% of study subjects had adequate nutritional knowledge. The majority, 73.3% of them, had recommended meal frequency. Most (90.3%) of women were washing their hands after using the toilet. About half (49.5%) of the women reported that their food security was secured. About 40% of women reported that their household uses piped water as a main source of drinking water, followed by 26.7% of women who reported their main source of drinking water is a hand pipe. This study also found that 97.2% of the main source of drinking water is protected from animal contamination. Of the total, almost all households (98.8%) of the respondents had a latrine.

2.4. Nutritional status

This study also assessed the nutritional status of reproductive-age women (underweight, normal weight, at risk for overweight, overweight, and obese). As a result, the women were classified as underweight (7.4%), normal weight (54.7%), at risk of overweight (20.3%), overweight (16.2%), or obese (1.4%), respectively (Table 2).

Table 2: Nutritional status of the respondents in Silte zone, southern Ethiopia, 2021 (n=780)

Variable	Frequency	Percent
Nutritional status	Underweight (BMI<18.5 kg/m ²	58
	Normal weight (BMI 18.5-22.9kg/m ²)	427
	Risk for over weight	158
	Over weight	126
	Obese	11
	Total	780

2.5. Multivariable analysis results of overweight

A binary logistic regression analysis was used to identify the associated factors of overweight among the study population. Thus, on bivariate analysis, age of women, marital status, educational status, women's occupation, knowledge

about nutrition, food security, and khat chewing were associated with overweight, with a p-value of < 0.25. In multivariable analysis (multiple logistic regression analysis), age between 21-30 years (AOR=2.84; 95% CI: 1.391-5.793), age between 31-40 years (AOR=2.49; 95% CI: 1.13-5.51),

education above 12th grade (AOR=0.24; 95% CI: 0.08-0.69), and employed women (AOR=2.93; 95% CI: 1.53-5.61) and women who had good food security (AOR=1.58; 95% CI: 1.007-2.48) were significantly associated with overweight (Table 3).

Table 3: Factors associated with overweight among respondents in Silte Zone, Southern Ethiopia, 2023

Variables		Nutritional status		COR (95% C.I.)	Sig.	AOR (95% C.I.)
		Normal	Overweight			
Age	≤ 20 years	94	14			
	21-30 years	178	71	2.68(1.43,5.01)	0.004	2.84 (1.39,5.79)
	31-40 years	127	44	2.33 (1.21, 4.49)	0.024	2.49 (1.13, 5.51)
	≥41 years	28	8	1.92 (0.73, 5.04)	0.364	1.69 (0.55, 5.20)
Marital status	Single	160	36			
	Married	257	91	1.58 (1.02, 2.43)	0.165	1.52 (0.84, 2.75)
	Others	10	10	4.44 (1.72, 11.47)	0.076	2.78 (0.89, 8.58)
Educational status	No formal education	228	78			
	1-8 grades	92	37	1.18 (0.74, 1.86)	0.682	1.13 (0.64, 1.99)
	9-12 grades	74	16	0.63, (0.35, 1.15)	0.120	0.58 (0.29,1.16)
	Above 12 grade	33	6	0.53 (0.22, 1.32)	0.009	0.24 (0.08, 0.69)
Occupation	House wife	212	54			
	Employed	60	34	2.23(1.33,3.73)	0.001	2.93(1.53,5.61)
	Merchant	71	25	1.38(0.8, 2.38)	0.110	1.64(0.89,3.01)
	Student	73	14	0.75(0.395,1.44)	0.524	1.29(0.59,2.84)
	Others	11	10	3.57(1.44,8.84)	0.52	5.68(2.13,15.13)
Knowledge	Inadequate	124	29			
	Adequate	303	108	1.52(0.96,2.41)	0.16	1.92(1.13,3.27)
Food security	In secured	197	76			
	Secured	230	61	0.69(0.47,1.01)	0.046	1.58(1.007,2.48)
Khat chewing	None	308	83			
	1 to 3	60	10	0.62(0.30,1.26)	0.76	0.5(0.23,1.08)
	3 to 4	34	36	3.93(2.32,6.66)	0.120	3.94(2.20,7.05)
	≥ 5	25	8	1.19(0.52, 2.73)	0.921	1.05(0.43,2.57)

2.6. Multivariable analysis results of underweight

A multivariable analysis in the form of binary logistic regression was employed to identify the associated factors of underweight among reproductive-age women. Age of the women, educational status, occupational status, residency, number of children, history of ANC visit, current contraceptive use, knowledge

of nutrition, and khat chewing were associated with underweight, with $p \leq 0.25$ on bivariate analysis. All variables with a p-value of $p \leq 0.25$ were entered into a multiple logistic regression analysis (i.e., multivariable analysis). In multivariable analysis, age ≥ 40 years (0.28, 0.089, 0.878) and no history of ANC (3.068, 1.289-7.304) were significantly associated with underweight (Table 4).

Table 4: Factors associated with underweight among respondents in Silte Zone, Southern Ethiopia, 2023

Variables		Nutritional status		COR (95% C.I.)	Sig.	AOR (95% C.I.)
		Normal	Under weight			
Age	≤20 years	94	18			
	21-30 years	178	23	0.68 (0.35, 1.31)	0.975	1.01(0.48,2.14)
	31-40 years	127	9	0.37 (0.16, 0.86)	0.871	1.09(0.38,3.15)
	≥40 years	28	8	1.49 (0.59, 3.79)	0.029	0.28(0.09,0.88)
Educational status	No formal education	228	24			
	1-8 grades	92	21	2.17 (1.15,4.09)	0.952	1.04(0.28, 3.89)
	9-12 grades	74	9	1.16(0.51,2.59)	0.218	0.33(0.06,1.92)
	College and above	33	4	1.15(0.38,3.53)	0.410	2.65(0.26,26.81)
Occupational status	House wife	212	25			
	Employed	60	8	1.13(0.49,2.64)	0.519	0.53(0.08,3.59)
	Merchant	71	7	0.84(0.35,2.02)	0.703	1.26(0.39,4.12)
	Student	73	17	1.98(1.009, 3.86)	0.277	7.87(0.19, 3.96)
	Others	11	1	0.77(0.095, 6.22)	0.999	
Residency	Urban	147	27			
	Rural	280	31	0.60(0.35,1.05)	0.306	0.34(0.12,0.93)
Number of children	No children	168	32			
	1-3 children	145	14	.51(0.26,.99)	0.206	0.29(0.04,1.99)
	≥4 children	114	12	0.55(0.27,1.19)	0.299	0.31(0.04,2.79)
History of ANC visit	Yes	231	20			
	No	196	38	2.24(1.26,3.98)	0.011	3.07(1.29,7.30)
Current contraceptive use	Yes	220	21			
	No	207	37	1.87(1.06,3.31)	0.176	2.08(0.72,6.01)
Knowledge	Inadequate	124	12			
	Adequate	303	46	1.57(0.80,3.06)	0.626	1.31(0.45,3.84)
Khat chewing	No	298	46			
	Yes	129	12	0.60(0.31,1.18)	0.375	0.64(0.24,1.72)

4. Discussion

This study investigated the nutritional status of reproductive-age women and found that 7.4%, 16.2%, and 1.4% of the women were underweight, overweight, and obese, respectively. Concerning individual nutritional problems, the current study found a 7.4% (BMI < 18.5 kg/m²) prevalence of underweight. This result is nearly comparable with those of other studies carried out in South Asia (Biswas, Magalhaes, Townsend, Das, & Mamun, 2020) such as Indonesia (Septiani et al., 2021), Gambia (Petty et al., 2019), and Tanzania (Mtumwa, Paul, & Vuai, 2016) where 7%, 10%, 10.6%, and 11% comparable prevalence were reported respectively. A higher prevalence of underweight was reported in Bangladesh, where 19% (Kamal, 2021); in India, where 14.4% (T. L., Zachariah, Venkatesha, C., & Lakshmi, 2017); in Pakistan, 13% (Janjua, Mahmood, Bhatti, & Khan, 2015); and in Kenya, where 11.9% of reproductive -age women were underweight, respectively (Pengpid & Peltzer, 2020). Additionally, a higher prevalence of underweight was reported in other areas of Ethiopia, such as 17.9%, 48.2%, 31.9%, and 41.1% in Addis Ababa (Tebekaw, Teller, & Colón-Ramos, 2014), Ziway (Ferede, Lemessa, Tafa, & Sisay, 2017), Debre Markos (Hordofa, 2016), and in Afar, respectively (Abdu, Kahssay, & Gebremedhin, 2018). The discrepancy might be due to the difference in BMI categories of value between the study country and other countries. Furthermore, the variation might be due to differences in the socio-cultural distinctions between Ethiopia and the other countries. On the other hand, the finding of underweight in this study is higher than that of studies conducted in Cameroon, where 2.1% (M'bobda et al., 2020), in Mexico 1.3% (Jones, Mundo-Rosas, Cantoral, & Levy, 2017), in Iran 1% (Mohammadi et al., 2013), and in Uruguay 4.6% (Medina, Barreto, Natero, Moratorio, & Severi, 2020). Some women were underweight. The variation might be due to differences in the socio-cultural distinctions between Ethiopia and the other countries.

Our study also observed that 16.2% of women were overweight. Consistent findings were reported in other studies, such as 18.9% in Kenya (Pengpid & Peltzer, 2020), 16.21% in Uganda (Yaya & Ghose, 2019), and 15.8% in Indonesia (Septiani et al., 2021). This finding is higher than from EDHS 2016, which reported 4.7% of women were overweight in SNNPR (southern Ethiopia), and in southern Asia, 1% of women were overweight (Biswas et al., 2020). However, the current finding is lower than other studies conducted in Addis Ababa, where 20.6% (Tebekaw et al., 2014), 19% in Bangladesh (Kamal, 2021), 27.1% in south Africa (Akokuwebe & Idemudia, 2021), 30.8% in Cameroon (M'bobda et al., 2020), 27.2% in India (T. L. et al., 2017), and in Pakistan 25% (Janjua et al., 2015),

Regarding obesity status, our study found 1.4% of women were obese. This finding is consistent with the EDHS report of 2016, where 1.6% of women were obese. Nearly similar findings were reported in studies conducted in Bangladesh (4%) (Kamal, 2021). However current finding is lower than that of other studies finding such as 9.1% in Kenya (Pengpid & Peltzer, 2020), 34.5% in South Africa (Akokuwebe & Idemudia, 2021), 38.5% in Cameroon (M'bobda et al., 2020), 34.2% in Indonesia (Septiani et al., 2021), 30% in Mexico (Jones et al., 2017), 9.8% in Uruguay (Medina et al., 2020), and 16% in Brazil (Correia et al., 2011). The discrepancy might be due to differences in the socio-cultural variation between Ethiopia and the other countries.

This study also identifies the factors associated with the nutritional status of the women. Older age, high educational level, employed women, and food security were positively associated with overweight, whereas lower age of the women and a history of no ANC visit were positively associated with underweight. Thus, this study observed that women whose ages were between 21 and 30 years and 31–40 years were more likely to be overweight compared to women whose ages were under 20 years. The older the women, the higher the chances of being overweight, and the younger the women, the higher the probability of being underweight and thin (Griffiths & Bentley, 2001). Other previous studies also report similar findings (Akokuwebe & Idemudia, 2021).

Educational status was positively associated with the nutritional status of women. Women whose educational level is 12th grade and above were more likely to be overweight than women who have no formal education. This finding is similar to previous studies (Akokuwebe & Idemudia, 2021; Doku &

Neupane, 2015). A possible explanation for higher odds of women with higher education being overweight might be that women with higher education tend to be employed and urban residents, which may lead to less physical activity and consumption of high-energy foods. Furthermore, women with higher education are more likely to have a higher socioeconomic status and material resources and have ready access to energy-dense foods and more sedentary employment (for example, office work) (Abrha, Shiferaw, & Ahmed, 2016; Ziraba, Fotso, & Ochako, 2009).

The odds of overweight employed women being housewives were higher than the odds of non-housewives. This finding was consistent with previously published studies (Oddo et al., 2017). Formal employment could result in a positive energy balance and, subsequently, higher odds of being overweight, through several mechanisms. Increased economic resources, stemming from maternal employment, are associated with changes in food procurement behaviors, including increasing the purchase of high-energy foods as they become more accessible, which could lead to an overconsumption of energy (Engle, 1993; B. M. Popkin, 1980)

Women who had good food security were more likely to be overweight compared to those who had less food security. Household food security affects the quantity of food consumed and may lead to the consumption of energy-dense foods. This finding is supported by literature reporting increased food access is associated with increased overweight and obesity among women (Barry M. Popkin, 2001). We found that women's age was strongly associated with being underweight. Women aged 21–30 and 31–40 years had significantly higher odds of being overweight compared to younger women.

This finding aligns with evidence showing that weight gain tends to increase during early and middle adulthood due to reduced physical activity, metabolic changes, and lifestyle transitions (Ng et al., 2014). In contrast, women aged 40 years and above were less likely to be overweight but more likely to be underweight, which may reflect age-related physiological changes, cumulative nutritional deprivation, or chronic health conditions common in low-resource settings (Charlton & Rose, 2001). The highest prevalence rates of underweight were observed among younger ages (15–19) (15–19) (Tebekaw et al., 2014).

Having no history of ANC follow-up was strongly associated with underweight. Women who had no history of ANC follow-up were 3 times more likely to be underweight than those who had a history of ANC follow-up. Women who had taken ANC were well informed that dietary practice leads to good nutritional status. Thus, dietary practice is of indispensable importance to minimize underweight. The Opposite is true for women who had no history of ANC follow-up. This finding is supported by previous studies. Women who do not access ANC may miss essential health and nutrition interventions, increasing their vulnerability to undernutrition (Kuhnt J, 2017).

Our study had strengths and limitations. Our study has a large sample size and used a valid instrument to collect the data. The study had some limitations as well, which should be considered when interpreting the results. First, the cross-sectional study design makes it impossible to establish the causal relationship between independent variables and outcome variables, simply indicating association. Second, some important clinical (HIV/AIDS and intestinal parasites) factors that could explain the magnitude of underweight were not available due to feasibility issues.

5. Conclusion

This study found 7.4%, 16.2%, and 1.4% of the women were underweight, overweight, and obese, respectively. Older age, high educational level, employed women, and food security were positively associated with overweight, whereas lower age of the women and a history of no ANC visit were positively associated with underweight. Targeted nutritional interventions should address overweight among employed, older, and educated women; supporting younger women at risk of underweight is also essential. Strengthening ANC utilization is very important for early identification and intervention of nutritional problems.

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Declaration

Competing Interests: The authors declare that there is no conflict of interest

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Consent for publication: Not applicable

Ethical clearance: Ethical clearance was obtained from Werabe University. At the time of data collection, informed consent was taken from the study participants whose ages were greater than 18 and emancipated minors; otherwise, assent was obtained age less than 18 years old. Those not willing to participate are given the right to do so.

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