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Nutritional status and its associated factors among elderly people in Ilu Aba Bor Zone, Southwest Ethiopia: a community-based cross-sectional study

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ABSTRACT

Objectives This study aimed to assess the nutritional status and its associated factors among elderly people.

Design A community-based cross-sectional study.

Setting The study was conducted in urban and semiurban areas.

Participants The study included 620 elderly community dwellers in Southwest Ethiopia from 3 October 2021 to 10 November 2021. Those who were seriously ill, could not get around or were on special diets were excluded from the study.

Outcome measure The Mini Nutritional Assessment was used to evaluate nutritional status and the STEPwise approach was used to collect data on backgrounds and lifestyle. SPSS V.22.0 was used for data analysis. Logistic regression was computed. The level of significance was set at 0.05.

Results Elderly people who were malnourished or at risk of malnutrition were found to make up 48.1% (44.1%) and 17.4% (14.5%) of the population, respectively. Those aged 80 years and older had a chance of being at risk of malnutrition (adjusted OR (AOR)=22.555; 95% CI: 7.963 to 63.881), while the odds of being malnourished were 11.5 times higher (AOR=11.755; 95% CI: 4.825 to 28.638). Informal education was a significant predictor of being at risk of malnutrition (AOR=6.102; 95% CI: 2.684 to 13.871). Urban dwellers were 8.9 times more likely to be malnourished. Inadequate financial resources make people 3.7 times more likely to be malnourished. A lower wealth index was a significant predictor of being at risk of malnutrition (AOR=4.156; 95% CI: 1.361 to 12.692). Single elderly people had a 3.4-fold higher risk of malnutrition. Elderly people with chronic pain, who were smokers and alcoholics, and who had depression were all at risk of nutritional problems.

Conclusion The risk of malnutrition and malnourishment was high. Age, urbanisation, finances, education, economics, being a woman, smoking and alcohol are associated factors. Interventional studies are warranted to minimise malnutrition challenges in the study population.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ This study used a stratified simple random sampling method with acceptable response rate.
⇒ This study provides preliminary data to help support future research.
⇒ Self-reporting was used to collect some data, which could contribute to bias.
⇒ This cross-sectional study did not establish a causal relationship.
⇒ The study's scope was limited to urban and semi-urban areas.

BACKGROUND

The number of elderly people is expected to rise from 900 million to 2 billion between 2015 and 2050 (from 12% to 22% of the total global population), with developing countries accounting for the majority of this increase. As a result, the elderly are the fastest growing population group.[1–3] These trends have a significant impact on the likelihood that many people will live longer in less-than-optimal health, be at risk of malnutrition and with various chronic conditions that can occasionally result in functional disability, anorexia, depression, social isolation and loneliness—all are quality of life aspects.[4]

Although Ethiopia is a young country, with 46% of the population under the age of 14 years, approximately 5% of the 81 million Ethiopians are 60 years or older. By 2050, this percentage of the population is predicted to nearly double to 9%. Older men should expect to live an extra 15 years after turning 60 years, and older women can expect to live an extra 16 years.[5] Nutritional status is an important component of physical and mental health for people of all ages. Due to increased vulnerability to degenerative diseases, the nutritional needs and health problems of the human body vary as it ages.

Changes in the secretion and action of hormones that govern hunger, changes in gastrointestinal motility, taste loss and the functional decline of many systems can all impact the nutritional status as people get older.[6 7]

Malnutrition is a state of being undernourished, which can be caused by an excess of nutrients (overnutrition) or a deficiency of nutrients (malnutrition/undernutrition). Undernutrition in the elderly is a serious problem observed in hospitals, nursing homes and the community.[8] Undernutrition is on the rise among the elderly, and it is linked to a drop in functional status, impaired muscle function, decreased bone mass, immune dysfunction, anaemia, reduced cognitive function, poor wound healing, delayed surgery recovery, higher hospital readmission rates, severe morbidity and mortality.[9]

The proportion of malnutrition among Ethiopia's old population ranges from 15% to nearly 50% in both rural and urban areas.[10–13] Adults 60 years of age and above require optimal nutrition as well. Nutrition has an impact on how a person ages, and ageing impacts a person's nutritional state. Good nutrition aids in the prevention of acute and chronic diseases, as well as the recovery from illness and the ability to function independently in older persons.[14] The Mini Nutritional Assessment (MNA) is a well-validated method for assessing elderly people who are malnourished or at risk of becoming malnourished.

The MNA Short Form or the full-length screening tool (18 items)[15–17] should be employed, as both have been validated for use in malnutrition screening among the elderly population. The MNA aids in the early detection of malnutrition before it progresses to severe malnutrition with protein depletion. The MNA is a universal screening tool in terms of sensitivity and specificity. The validated 15-item Geriatric Depression Scale (GDS-15) Short Form is used to improve its acceptability among older adults and make it a more convenient depression screening tool.[18]

There are no data in the research area among older persons who used the European Society for Clinical Nutrition and Metabolism-recommended MNA method, which is acceptable for Ethiopian elderly people.[10] Investigating the prevalence and determinants of malnutrition in a vulnerable group is critical for suggesting strategies to address the issue and providing holistic assistance for older persons. Few studies have looked at the nutritional status of Ethiopia's elderly population[10 15] and almost none were done in the study region to date. Studies of the elderly aged 60 years and older who live in urban and semiurban areas have shown that factors affecting nutritional status differ, indicating the need for greater research into the factors that contribute to underweight and overweight status in the elderly.[13]

Furthermore, most previous studies concentrated on rural communities and did not indicate whether study subjects from cash crop areas could influence nutritional status outcomes. Our study was conducted in an area where coffee production is widespread. Additionally, we conducted a study among urban and semiurban communities that explicitly show the nutritional status of communities residing in coffee-producing areas.

Hypothesis
The hypothesis was that social and economic factors such as low educational level, living alone, being single, low income level, gender, residence, employment status, lifestyle and depression are related to nutritional status of the elderly.

Objectives
General objective
To assess the nutritional status and its associated factors among elderly people dwelling in urban and semiurban communities of Ilu Aba Bor Zone, Southwest Ethiopia.

Specific objectives
- ► To determine the prevalence of nutritional status among elderly people.
- ► To evaluate factors associated with the nutritional status of the elderly people.

METHODS
Study setting and design
A community-based quantitative cross-sectional study design was conducted from 3 October to 10 November 2021 among the elderly aged 60 years or above in Ilu Aba Bor Zone, Oromia Regional State, Southwest Ethiopia. Ilu Aba Bor is a zone of the Oromia Regional State situated in Southwest Ethiopia. The zone is located at a distance of 600 km from Addis Ababa. All elderly people greater than or equal to 60 years of age in randomly selected clusters were included in the study. The elderly's nutritional status is a response variable, whereas socioeconomic factor, lifestyle and depression are predictive variables.

Eligibility criteria
Inclusion criteria
All elderly people greater than or equal to 60 years of age were included in the study.

Exclusion criteria
Elderly people who were severely ill, on special dietary intervention and unable to walk around were excluded.

Patient and public involvement
The current study's design, management, and execution included patients and members of the public. Participants over the age of 60 years provided feedback on the design of the study's materials, as well as management oversight through opinion and community leaders. The research team thoroughly considered the potential hardship of volunteers. We want to share the key findings with the participants and will enlist the help of the public and patients in developing a suitable distribution strategy.

Sample size and sampling procedure
The final sample size was calculated using the open-source calculator Open EPI V.3.01, using a two-sided significance level (1–alpha): the ratio of size, unexposed to expose: 1, per cent of exposed with the outcome: 44[19] and the percentage of unexposed with the outcome: 56,

power (1−beta, per cent chance of detecting): 80, power (1−beta, per cent chance of detecting): 95, power (1−beta, per cent chance of detecting): 80, power (1−beta, per cent chance of detecting). A final sample size of 645 was taken accounting for 10% non-response rate.

We calculated the sample size for different factors (body mass index (BMI), dietary diversity, central obesity, mid-upper arm circumference (MUAC), female gender and calf circumference (CC)) that were significantly associated with the nutritional status of the elderly. The factors considered were taken from a review that assessed the nutritional status and associated factors among older individuals in sub-Saharan Africa and a study conducted to assess dietary diversity among older adults in Zambia.[15] Accordingly, from the prevalence (645) and factors' (128) sample sizes, the largest sample size (645) was considered for the final. The study area was stratified into urban and semiurban areas. Sixteen clusters were chosen using a simple random sampling technique from 36 clusters. When there were more than one senior in a household, the lottery method was used to select one of them. The study participants were selected from both urban and rural areas.

Data collection tools

A pretested questionnaire was used to collect the data. The questionnaire was written in English, translated into the local language and then back into English by an experienced translator to ensure that the wording was consistent. Basic sociodemographic parameters, a modified WHO STEPwise methodology, GDS-15 and the full version of MNA were all part of the data collection.

Eight degree-holder data collectors and four degree-holder health worker supervisors gathered the data. Both data collectors and supervisors were fluent in English and local language, and had previous data collection expertise. There was a 2-day rigorous training session. The study's goal, as well as methodologies, sample strategies, a full description of questionnaire, interview techniques[18] and data cleaning, were all covered during the training. Background information, behavioural assessments and physical measurements were obtained using the full version of the MNA and modified WHO STEPwise approach as surveillance instrument.[20]

Assessment of geriatric depression

Depression was assessed using the GDS-15. The scores to be obtained from the scale are between 0 and 15. Scores 0–4 are considered normal, 5–8 revealed mild depression, 9–11 indicated moderate depression and 12–15 indicated severe depression.[18 21–23] The GDS was satisfactory (Cronbach's alpha=0.80) with test–retest reliability (r=0.73) as well as test reputation reliability, that is, mean difference between positive and negative responses.[23] Even though the GDS was not validated in Ethiopia, several studies were conducted using the translated GDS into Afan Oromo and Amharic.[24–26] In addition, we checked the suitability of GDS in the pretest of this study with a Cronbach's alpha value of 0.87.

Nutritional assessment

The MNA consists of 18 items covering four dimensions that indicate changes in dietary intake, weight loss, mobility, psychological stress or acute disease in the previous 3 months, dementia, BMI, lifestyle and pressure sores.[17 18] A score of less than 17 points indicates malnutrition; a score of 17–23.5 points means malnutrition risk; and 24 or more points indicates adequate nutrition.[16 27]

Anthropometric measurements

Each participant was measured twice, with the average of the two measurements being used for analysis. Height was measured to the nearest 0.1 cm (Seca 217 portable stadiometer). The following equation was used to estimate the stature of an elderly person who could not stand up straight: men=prediction height (cm)=[knee height (cm)×2.08]+59.01; women=prediction height (cm)=[knee height (cm)×1.91]−[age (years)×0.17]+75.0.[28] Participants were weighed while wearing light clothing and the scale was placed on a hard, flat surface. While the participant kept her/his forearm in a horizontal position, MUAC was measured to the nearest 0.1 cm at the midpoint between the tip of the acromion and the olecranon process on the back of the left arm.

The measurements were taken using non-stretchable MUAC tape with the participant's arm hanging freely along the trunk. For nutritional assessment of the elderly using the MNA tool, the MUAC cut-off points were established as a score of 0 (MUAC less than 21), 0.5 (MUAC 21–22) and 1 (MUAC greater than 22). Using non-stretchable tape, the broadest CC was measured in a sitting position with the leg bent 90° between the ankle and knee to the nearest 0.1 cm. The CC cut-off point was established as a score of 0 for a CC less than 31 and a score of 1 for a CC of 31 or greater. After gathering their underwear over the waist, crossing their arms and placing them on the opposite shoulders, the participants' pants and underclothing were lowered to slightly below the waist, and the waist circumference was measured. The tape's zero ends were located below the measurement value, and the plane between the umbilical scar and the lowest costal margin was used to determine the measurement. The waist circumference was used to identify those who could be at risk of health problems. BMI was calculated by dividing body weight in kilograms by square metres. According to the MNA, BMI was scored as '0' for BMI less than 19, '1' for BMI 19 to less than 21, '2' for BMI 21 to less than 23, and '3' for BMI 23 or greater.

Data quality assurance

The questionnaire was carefully designed, translated and pretested as part of the quality control process. During data collection, the data were often monitored, and the research team meticulously analysed the collected questionnaires. A questionnaire was pretested for

appropriateness and eligibility on a similar sample taken from the identified clusters. A language expert translated the questionnaire into the local language and then back-translated it into English. Ten study participants had their anthropometric reliability assessed, and interobserver variances were calculated.

Data analysis

After being checked for completeness and consistency, the data set was entered into EpiData V.3.1 before being exported to SPSS V.22.0 for cleaning and analysis. The data set was summarised using percentages, frequencies, means and SDs. The BMI was determined automatically after the weight and height measurements were taken. Based on the aggregate sum score of each subject, the outcome variable, malnutrition status, was classified as those with malnutrition, at risk of malnutrition and are normal. The entire MNA score (out of 30) was used to assess nutritional status points less than 17 (malnourished), 17–23.5 (at risk of malnutrition) and otherwise healthy. The link between nutritional status and the predictor variables was investigated using bivariate multinomial regression models.

In the final analysis, variables having a p value of less than or equal to 0.25 were included in the multinomial logistic regression. A p value of less than 0.05 was used to declare a statistically significant cut-off.

RESULTS

Sociodemographic characteristics

This study enrolled 620 persons, with a 96.1% response rate. Three hundred forty-six (55.8%) of the participants were female, whereas 274 (44.2%) were male. In terms of residential locations, 278 people (44.8%) lived in semiurban areas, while 342 (55.5%) resided in urban areas. About 200 (32.3%) were between the age of 70 and 79 years, with 240 (38.7%) and 180 (29.0%) being between the ages of 60 and 69 years and older than 80 years, respectively. Most of them were Orthodox Christians (359; 57.9%), followed by Muslims (106; 17.1%) and Protestants (155; 25.0%) (table 1). Regarding ethnicity, 257 people (41.5%) were Oromo, whereas 202 people (32.6%) and 161 people (26.0%) were Amhara and others, respectively. Regarding marital status, 272 were married persons (43.9%), and 156 (25.2%) and 192 (31.0%) people had never been married and were single (widowed, divorced or separated), respectively. Around 203 persons (32.7%) had five or more family members, whereas 417 (67.3%) had fewer than five family members (table 1). Three hundred and six (49.4%) had informal education, while 50.6% were literate. Three hundred thirty-four (53.9%) indicated they were employed, but 286 people (46.1%) said they were retired. In terms of wealth index, 137 (22.1%) persons were in the first quintile, while 162 (26.1%), 94 (15.2%), 96 (15.5%), and 131 (21.1%) of elderly people were in the second, third, fourth and fifth quintiles, respectively (table 1).

Table 1 Basic characteristics of elderly people residing in urban and semiurban areas of the Ilu Aba Bor Zone, Southwest Ethiopia, 2021 (N= 620)

Variables	Number	Percentage
Gender		
Female	346	55.8
Male	274	44.2
Age category (years)		
60–69	240	38.7
70–79	200	32.3
80 and above	180	29.0
Residence area		
Urban	342	55.2
Semiurban	278	44.8
Religion		
Orthodox	359	57.9
Muslim	106	17.1
Protestant	155	25.0
Ethnicity		
Oromo	257	41.5
Amhara	202	32.6
Others	161	26.0
Marital status		
Currently married	272	43.9
Never married	156	25.2
Single (separated, widowed, divorced)	192	31.0
Educational status		
Informal	306	49.4
Formal	314	50.6
Employment status		
Retired	286	46.1
Employed	334	53.9
Family size		
Less than 5	417	67.3
5 and above	203	32.7
Wealth index		
1st quintile	137	22.1
2nd quintile	162	26.1
3rd quintile	94	15.2
4th quintile	96	15.5
5th quintile	131	21.1

In terms of personal habits, 147 (23.7%) smoked cigarettes regularly, while 293 (47.2%) drank alcohol. However, 349 (56.3%) had a history of physical exercise. The majority (364; 58.7%) admitted to having had sleep problems in the past.

Additionally, 256 (41.3%) of the elderly had a history of chronic pain, and 358 (57.8%) of the elderly displayed indicators of depression (table 2).

Table 2 Distribution of basic characteristics of the elderly people in urban and semiurban areas of the Ilu Aba Bor Zone, Southwest Ethiopia, 2021

Variables	Category	N=620 n (%)	Nutritional status Malnourished n (%)	At risk of malnutrition n (%)	Normal n (%)	P value
Residence	Urban	342 (55.2)	63 (18.4)	189 (55.3)	90 (26.3)	<0.001
	Semiurban	278 (44.8)	45 (16.2)	109 (39.2)	124 (44.6)	
Gender	Female	346 (55.8)	75 (21.7)	185 (53.5)	86 (24.8)	<0.001
	Male	274 (44.2)	33 (12.0)	113 (41.2)	128 (46.7)	
Age (years)	80 and above	180 (29.1)	51 (28.3)	106 (58.9)	23 (12.8)	<0.001
	70–79	200 (32.2)	35 (17.5)	102 (51.0)	63 (31.5)	
	60–69	240 (38.7)	22 (9.2)	90 (37.5)	128 (53.3)	
Educational status	Informal	306 (49.3)	70 (22.9)	176 (57.5)	60 (19.6)	<0.001
	Formal	314 (50.7)	38 (12.1)	122 (38.9)	154 (49.0)	
Marital status	Currently married	272 (43.9)	39 (14.3)	102 (37.5)	131 (48.2)	<0.001
	Never married	156 (25.2)	25 (16.1)	83 (53.2)	48 (30.7)	
	Single	192 (31.0)	44 (22.9)	113 (58.9)	35 (18.2)	
Employment status	Retired	286 (46.1)	71 (24.8)	162 (56.6)	53 (18.5)	<0.001
	Employed	334 (53.9)	37 (11.1)	136 (40.7)	161 (48.2)	
Wealth index	1st quintile	137 (21.1)	30 (21.9)	83 (60.6)	24 (17.5)	<0.001
	2nd quintile	162 (26.1)	20 (12.3)	62 (38.3)	80 (49.4)	
	3rd quintile	94 (15.2)	22 (23.4)	55 (58.5)	17 (18.1)	
	4th quintile	96 (15.5)	18 (18.7)	51 (53.1)	27 (28.1)	
	5th quintile	131 (21.1)	18 (13.8)	47 (35.8)	66 (50.4)	

Nutritional status of the elderly

According to this finding, 108 (17.4%) and 298 (48.1%) people were malnourished (MNA score less than 17) and at risk of malnutrition (MNA score 17—23.5), respectively (figure 1). According to the MNA, malnutrition was more prevalent among elderly persons in urban areas, with 55.3% at risk and 18.4% malnourished (figure 2). The nutritional problem of the elderly would rise as age advanced (figure 3).

Associated factors

Nutritional difficulties affect both men and women, according to the current study. Approximately 185 (53.5%) and 75 (21.7%) women were at risk of malnutrition and have been malnourished, respectively. In 189 (55.3%) and 63 (18.4%) instances, respectively, the elderly in urban areas were at risk of malnutrition and were malnourished, whereas semiurban residents were at risk of malnutrition and were malnourished in 109 (39.2%) and 45 cases, respectively (16.2%).

Malnutrition was highly associated with age. Fifty one (28.3%) of those aged 80 years and above were malnourished, and 106 (58.9%) were at risk of malnutrition; whereas 35 (17.5%) and 102 (51.0%) of those aged 70–79 years were malnourished and at risk of malnutrition, respectively. Additionally, among elderly people aged 60–69 years, 90 (37.5%) and 22 (9.2%) were at risk
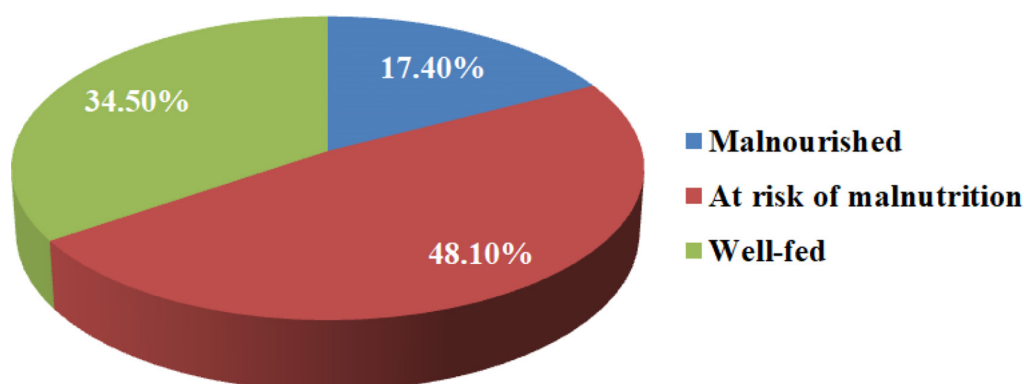

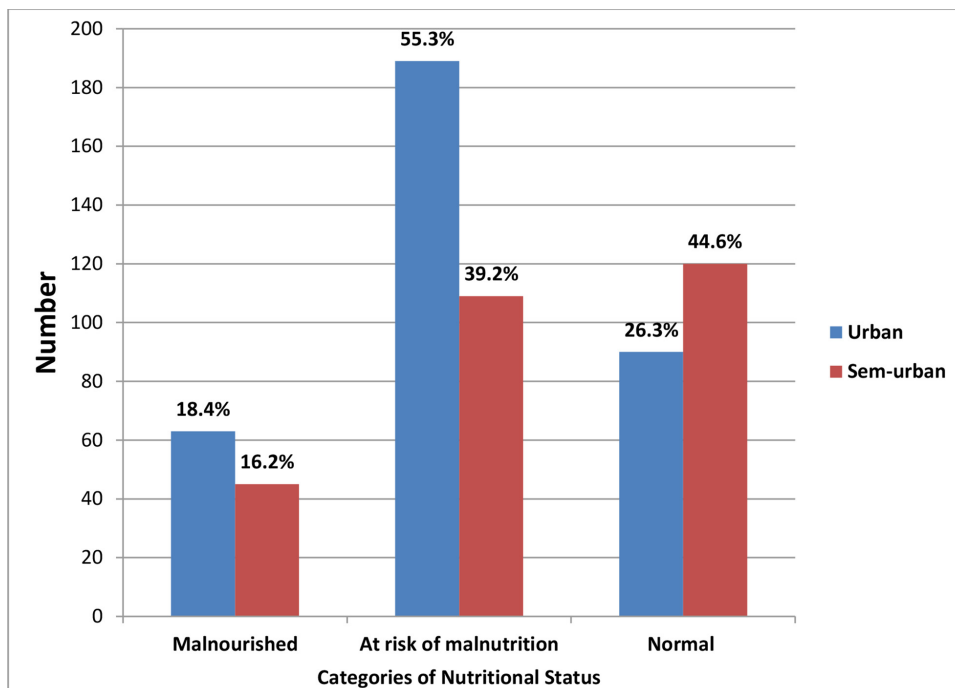**Figure 1** The proportion of elderly people's nutritional status.

Figure 2 Nutritional status of the elderly by residential place.

of malnutrition and were malnourished, respectively (p<0.001).

In the current study, elderly people with informal education were more likely than elderly people with formal education to have dietary issues. As a result, 176 (57.5%) and 122 (38.9%) individuals with no formal education and those with formal education were at risk of malnutrition, respectively (p=0.001). Malnutrition was more common in elderly persons with single marital status (separate, widowed or divorced), with 113 (58.9%) and 44 (22.9%) at risk of malnutrition and malnourished, respectively (p<0.001). Elderly people who were unemployed were more likely to have nutritional issues, with 138 (58.5%) and 50 (21.2%) at risk of malnutrition and malnourished, respectively (p=0.001).

According to this study, elderly people in the poorest quintile of the wealth index were more likely to be at risk of malnutrition and malnourishment (83 (60.6%) and 30 (21.9%), respectively), while only 35.9% and 13.7% in the wealthiest quintile were at risk of malnutrition and were malnourished, respectively (p<0.001) (table 2).

Elderly smokers were more likely to be affected by malnutrition. Hence, 33 (22.5%) and 86 (59.5%) were malnourished and at risk of malnutrition, respectively;
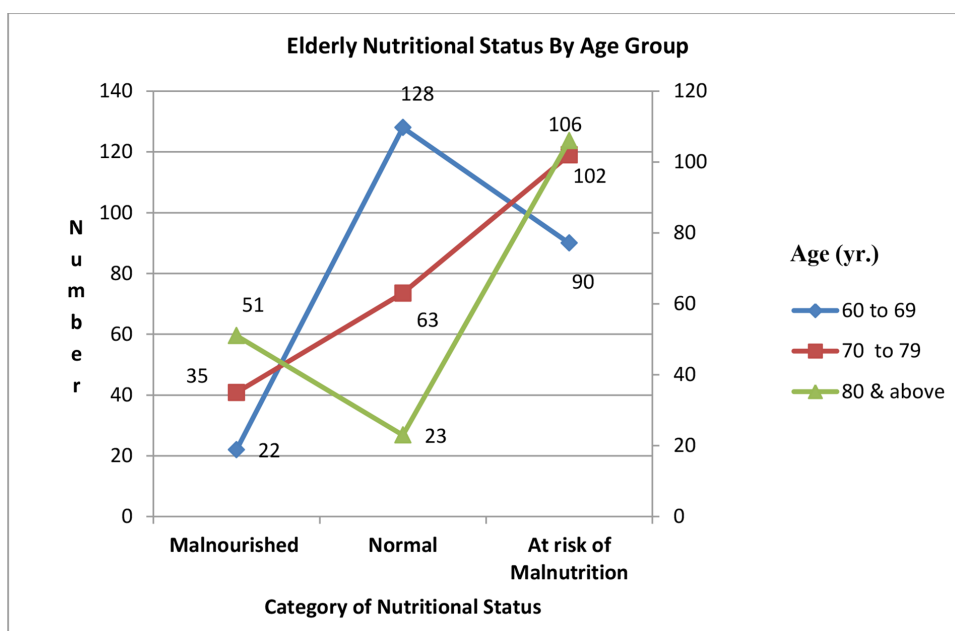

Figure 3 Nutritional status of the elderly by age group.

Table 3 Distribution of related factors among the elderly in urban and semiurban areas of the Ilu Aba Bor Zone, Southwest Ethiopia, 2021

| Variables | Category | N=620 n (%) | Nutritional status | | | P value |
			Malnourished n (%)	At risk of malnutrition n (%)	Normal n (%)	
Physical activity	No	349 (56.3)	74 (21.2)	196 (56.2)	79 (22.6)	<0.001
	Yes	271 (43.7)	34 (12.6)	102 (37.6)	135 (49.8)	
Cigarette smoking	Yes	147 (23.7)	33 (22.5)	86 (58.5)	28 (19.0)	<0.001
	No	473 (76.3)	75 (15.8)	212 (44.8)	186 (39.3)	
Insomnia	Yes	364 (58.7)	79 (21.7)	181 (49.9)	104 (28.6)	<0.001
	No	256 (41.3)	29 (11.3)	117 (45.7)	110 (43.0)	
Depression	Yes	358 (57.8)	78 (21.8)	193 (53.9)	87 (24.3)	<0.001
	No	262 (42.2)	30 (11.4)	105 (40.1)	127 (48.5)	
Chronic pain	Present	364 (58.7)	79 (21.7)	181 (49.7)	104 (28.6)	<0.001
	Absent	256 (41.3)	29 (11.3)	117 (45.7)	110 (43.0)	
Financial support	None at all	266 (42.9)	49 (18.4)	141 (53.0)	76 (28.6)	0.010
	Scarce	244 (39.4)	40 (16.4)	118 (48.4)	86 (35.3)	
	Excellent	110 (17.7)	19 (17.3)	39 (35.4)	52 (47.3)	
Social support	None at all	276 (44.5)	79 (28.6)	1324 (7.8)	65 (23.6)	<0.001
	Scarce	199 (32.1)	16 (8.0)	115 (57.8)	68 (34.2)	
	Excellent	145 (23.4)	13 (9.0)	51 (35.2)	81 (55.8)	
Self-health view	Dissatisfied	560 (90.3)	94 (16.8)	273 (48.7)	193 (34.5)	0.388
	Satisfied	60 (9.7)	14 (23.3)	25 (41.6)	21(35)	
Alcohol drink	Yes	293 (47.2)	62 (21.2)	181 (61.8)	50 (17.0)	<0.001
	No	327 (52.8)	46 (14.0)	117 (35.8)	164 (50.2)	

while alcoholic drinkers were at risk of malnutrition and were malnourished (61.8% and 21.2%; p<0.001). The elderly people with an absolute lack of financial support were more likely to be malnourished and at risk of malnutrition (p<0.001) (table 3).

Among the elderly who were not physically active, 102 (37.6%) and 34 (12.6%) were at risk of malnutrition and were malnourished, respectively (p<0.001). Additionally, those who had chronic pain (49.7%; p<0.001) were at a significant risk of malnutrition, while 21.7% were malnourished (p<0.001). Nutrition difficulties were severe in elderly people who received no or limited social assistance (p<0.001). Risk of malnutrition was found to be much more common among elderly persons who were unhappy with their health (48.75%). Another risk factor for elderly persons' malnutrition was insomnia (p<0.001). Depression was also found to increase the chance of elderly people being at risk of malnutrition and being malnourished by 53.9% and 21.8%, respectively (p<0.001) (table 3).

Factors associated with the nutritional status of elderly people

On multivariable logistic regression model after adjusting for background variables, nutritional status was associated with sex, age, residence, marital status, educational status, occupation, wealth index, physical inactivity, depression, history of chronic pain, smoking, financial support and alcohol consumption.

The chance of being at risk of malnutrition was 13 times more likely in old women (adjusted OR (AOR)=13.545; 95% CI: 5.855 to 31.334). Elderly women are also eight times more likely to be malnourished (AOR=8.237; 95% CI: 4.034 to 16.819). Malnutrition risk and being malnourished were significantly higher for urban people compared with semiurban dwellers (AOR=18.923; 95% CI: 7.429 to 48.201; and AOR=8.999; 95% CI: 4.325 to 18.724). Elderly individuals 80 years of age or older had a chance of being at risk of malnutrition that was more than 22 times greater (AOR=22.555; 95% CI: 7.963 to 63.881), and the odds of being malnourished were 11 times greater (AOR=11.755; 95% CI: 4.825 to 28.637). Moreover, the risk of malnutrition was four times higher among the elderly aged between 70 and 79 years (AOR=4.638; 95% CI: 1.882 to 11.430), while the odds of being malnourished were three times higher (AOR=3.265; 95% CI: 1.594 to 6.685) (table 4).

This study showed the odds of being at risk of malnutrition were six times higher (AOR=6.102; 95% CI: 2.684 to 8.387) for the elderly with informal schooling. Additionally, the likelihood of being malnourished was five times higher (AOR=5.146; 95% CI: 2.532 to 10.459) in the elderly without formal education. The current study found that older retirees had a higher risk of malnutrition (AOR: 3.671; 95% CI: 1.681 to 8.014; p=0.001) and the odds of being malnourished were two times higher

Table 4 Factors associated with nutritional status among elderly people in semiurban and urban areas of Ilu Aba Bor Zone, Southwest Ethiopia, 2021 (N= 620)

Variables	Nutritional status											
	At risk of malnutrition						Malnourished					
					95% CI						95% CI	
	B	Wald	P value	AOR	LB	UB	β	Wald	P value	AOR	LB	UB
Gender (female)	2.606	37.087	<0.001	13.545	5.855	31.334	2.109	33.520	<0.001	8.237	4.037	16.819
80 years and above	3.116	34.411	<0.001	22.555	7.963	63.881	2.464	29.423	<0.001	11.755	4.825	28.637
70–79 years	1.534	11.118	0.001	4.638	1.882	11.430	1.183	10.465	0.001	3.265	1.594	6.685
Residence (urban)	2.940	37.990	<0.001	18.923	7.429	48.201	2.197	34.534	<0.001	8.999	4.325	18.724
Marital status (single)	1.239	6.662	0.010	3.452	1.347	8.845	1.552	14.090	<0.001	4.722	2.099	10.619
Education (informal)	1.809	18.638	<0.001	6.102	2.684	13.871	1.638	20.494	<0.001	5.146	2.532	10.459
Employment (retired)	1.300	10.857	0.001	3.671	1.681	8.014	0.931	7.974	0.005	2.538	1.330	4.844
Lower wealth index	1.424	6.254	0.012	4.156	1.361	12.692	1.659	11.866	0.001	5.256	2.045	13.511
Finance												
None at all	1.097	4.513	0.034	2.995	1.089	8.241	1.328	9.358	0.002	3.774	1.612	8.836
Scarce							0.968	5.320	0.021	2.630	1.156	5.980
Physical activity (no)	1.758	16.153	0.001	5.801	2.461	13.674	1.539	17.700	<0.001	4.660	2.275	9.544
Depression (yes)	0.813	3.919	0.048	2.254	1.008	5.038	0.899	7.635	0.006	2.457	1.299	4.648
Chronic pain (yes)	1.448	13.065	<0.001	4.256	1.941	9.334	0.915	8.069	0.005	2.497	1.328	4.696
Smoking (yes)	1.392	9.325	0.002	4.023	1.646	9.829	1.268	10.235	0.001	3.554	1.634	7.727
Alcohol drink (yes)	2.270	31 348	<0.001	9.677	4.372	21.419	2.434	48.518	<0.001	11.404	5.479	22.621

AOR, adjusted OR; LB, lower bound; UB, upper bound.

(AOR: 2.538; 95% CI: 1.330 to 4.844). The odds of being malnourished were assessed to be five times greater (AOR=5.256; 95% CI: 2.045 to 13.511) than the odds of being at risk of malnutrition among elderly people with lower income indices (AOR=4.156; 95% CI: 1.361 to 12.692). The elderly with poor financial resources were two times more likely to be malnourished (AOR=2.995; 95% CI: 1.089 to 8.241). Additionally, those with limited financial resources were two times more likely to be malnourished (AOR=2.630; 95% CI: 1.156 to 5.980) (table 4).

The elderly who were physically inactive were 5.8 times more likely to be at risk of malnutrition (AOR=5.801; 95% CI: 2.461 to 13.674) and had more than four times the likelihood of being malnourished (AOR=4.660; 95% CI: 2.275 to 9.544).

Elderly adults who were at risk of malnutrition had two times increased risk of depression (AOR=2.254; 95% CI: 1.008 to 5.038), and the odds of being malnourished were higher (AOR=2.457; 95% CI: 1.299 to 4.648). Patients with chronic pain had a 2.2-fold increased risk of malnutrition and a 2.4-fold increased likelihood of being undernourished (AOR=2.497; 95% CI: 1.328 to 4.696). Furthermore, compared with non-drinkers, alcohol users had an 11-fold increased likelihood of being malnourished (AOR=11.404; 95% CI: 5.749 to 22.621) and at risk of malnutrition (AOR=9.677; 95% CI: 4.372 to 21.419). Elderly persons who used to smoke tobacco products were affected by nutritional issues and were at increased risk of malnutrition (AOR=4.023; 95% CI: 1.646 to 9.829)

and being undernourished (AOR=3.554; 95% CI: 1.634 to 7.727).

DISCUSSION

The major purpose of this study was to determine the prevalence of malnutrition among the elderly in Ilu Aba Bor Zone, Southwest Ethiopia as well as its associated factors. It was observed that 48.1% (44.1% to 52.1%) and 17.4% (14.5% 20.6%), respectively, were at risk of malnutrition and being malnourished according to the comprehensive MNA screening method. Our finding reveals that as many elderly people in developed and developing countries are facing a considerable number of malnutrition problems, Ethiopian elderly people are at greater risk of malnutrition.

A similar study in Nepal found that 45.7% of elderly persons were at risk of malnutrition, and 19.8% were malnourished.[29] A study conducted among elderly community dwellers in Egypt revealed that 26.5% were malnourished and 40.6% were at risk of malnutrition.[30] Another community-based study conducted among Ethiopian community dwellers indicated 15.7% were malnourished and 51.7% were at risk of malnutrition.[11] The results of the current investigation are roughly comparable and fall within the same range. The study's methodology and the sociodemographic makeup of the community could provide an approximation of the situation.

Our findings are almost similar with the reports of a study of elderly persons in India, which indicated that

malnutrition rates ranged from 14.3% to 18.7%, with 37.9%–50.3% of those at risk of malnutrition.[28 31] Studies conducted in different countries were close to our findings, with minor differences. This discrepancy could be due to both sociodemographic and methodological concerns. The studies of the elderly in Ethiopia, the Harari region and elsewhere are consistent with the findings of the current study.[11 32 33] It was also observed that elderly individuals were nearly two times more likely to be malnourished than working-age individuals. Elderly people who have a piece of work from which they earn a livelihood can afford food items required in their daily lives and the fundamental needs for improved health. The finding is consistent with previous studies.[21 30 32 34]

Women were found to be at higher odds of malnutrition than men in our study, which is supported by studies conducted in many nations that imply malnutrition is more widespread among women rather than men.[35–38] Economic dependency, gender inequality, education, sociocultural status, biological and physiological issues, and health status have all been linked to female malnutrition. Our research found that elderly people who never had formal schooling were much more likely to be malnourished. This could be due to a misunderstanding of the benefits of a well-balanced diet, which aids in the selection, purchase and serving of nutritious meals for better health. The current study supports a previous research report that showed that elderly adults with lower educational status were more likely to be malnourished.[38–41]

Our findings revealed that urban people were more likely than semiurban dwellers to be both at risk of malnutrition and being malnourished. Elderly people living in semiurban settings are partially involved in agricultural activities which could support them in providing them with diversified food items, thus help them reduce the risk of malnutrition than urban dwellers. This research is backed up by a global systemic review that found malnutrition is prevalent in socioeconomically disadvantaged urban settings because of accelerating urbanisation, which is accompanied by decreased food access in urban areas emerging from poverty, resulting in poor nutrition and health outcomes.[12 39 41–45] The current study discovered that the study subjects were single as their marital status and that they were at a significant risk of malnutrition and being malnourished, which is in agreement with other studies.[19 32 42] The likelihood of facing nutritional challenges among single elderly population might be related to feelings of isolation and lack of family support and encouragement, all of which can impact psychological contributions to better health. Similarly, the lack of a caregiver can have a significant impact on this demographic.[43]

Study participants in the households with wealth indices in the first quintile were found to have a likelihood of malnutrition. Our findings are consistent with those of research conducted in Ethiopia and elsewhere,[10 11 30 33] which showed an association between lower economic and nutritional status. One explanation for this would be because elderly individuals with lower standards of living have less access to food, which strains their food security and causes them to consume less food on a daily basis both in terms of quantity and quality, and receive poorer healthcare. We also found that financial support, whether completely missing or scarce, was a potential predictor of the prevalence of malnutrition among elderly people, implying a direct impact. Financial reliance and nutritional status were found to have a substantial relation in another investigation. Finance is a limiting issue regarding purchasing power. Furthermore, it assists with both quantitative and qualitative food consumption decisions. Some studies have linked poor nutritional status to a lack of appropriate income or the loss of regular financial support.[38 46]

Furthermore, lack of physical activity in their daily lives was another significant predictor for the elderly's malnutrition. As indicated by a number of studies, being physically inactive may promote the suffering of malnutrition in the elderly people.[47 48] There are many health advantages to physical activity, including the ability to regulate mood through treatments that affect mood states, which have shown promise in reducing the risk of depression and easing depressive symptoms. Therefore, combining physical activity with dietary control could perhaps result in good health and reduce problems associated with ageing in the elderly population. According to studies from other nations, depression is one of the independent factors contributing to nutritional challenges in the elderly population, and this study found depression to be a significant predictor of malnutrition.[49–52]

The elderly who experienced chronic pain in their lives are at risk of malnutrition; the present study revealed that chronic pain is another indicator of elderly malnutrition and supported by previous studies.[11 53–56] Other studies showed that cigarette smoking was strongly associated with the risks of malnutrition.[29 33 36 39] Many components are produced as gases and condensed tar particles that are reactive molecules with other cellular molecules and cause damage in the body and expose it to diseases. Vitamin C, vitamin E, beta-carotene and selenium all play a role in the overall cellular antioxidant defence against reactive oxygen species' harmful effects; smoking has been proven to reduce vitamin C and beta-carotene levels in the blood stream. Cadmium, a naturally occurring element in tobacco, reduces selenium availability for body functions and interacts negatively with some very important rare micronutrients such as zinc. Vitamin E, the most important micronutrient, can be deficient in the body as a result of tobacco smoking. Our research shows that alcohol users have a higher risk of malnutrition. Alcohol causes malnutrition by absorbing vital nutrients that the body needs for a variety of essential bodily functions and by substituting non-nutritive calories for nutrient-dense meal calories.[7 57–60] Ethiopia's population is getting older as a percentage. The findings have a considerable practical implication in this population group. Nutritional

challenges at this age are directly related to lower quality of life and boost ill-health, lifelong disabilities, and also accelerate premature death that is related to malnutrition; therefore, these must be considered while designing policies and programmes pertaining to the elderly's nutritional interventions. As the current study is cross-sectional, it did not establish a causal relationship. This study's scope was limited to urban and semiurban areas; therefore, generalising is limited.

CONCLUSIONS

Nearly half of the participants in our study were at higher risk of malnutrition, according to the results. The following factors are statistically significant predictors of nutritional issues: female gender, advanced age, urban residency, informal education, employment status, lower wealth index, being single, financial assistance, physical inactivity, chronic pain, depression, cigarette smoking and alcohol usage. These findings have significant implications for public health in relation to the management of geriatric nutritional difficulties, which have an impact on people, families and society as a whole.

Therefore, providing nutritional support for the elderly through various means is crucial, especially for those who are socioeconomically vulnerable, underprivileged, low-class urban residents, and without spouses or other caretakers. Additionally, as cornerstone elements of therapeutic interventions, regular nutritional monitoring, adequate and timely management, as well as behavioural therapies, should be improved. It is advised that future studies concentrate on nutritional intervention studies and the causes of malnutrition in the elderly population.

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