Research Article

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Depression and its associated factors among community dweller older adults in Gondar town, Northwest Ethiopia: A cross-sectional study.

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ABSTRACT

Background : Depression is one of the most frequent mental health disorders in the world among the elderly, and it is a serious public health concern because it affects so many people. The global rise in the aging population has sparked concerns about the mental well-being of older individuals. Most studies on mental disorders among older people have been conducted in high-income countries, with similar studies less common in developing countries. This study aimed to determine the prevalence and associated factors of depression among community-dweller older adults living in Gondar town, Northwest Ethiopia.

Method : A community-based cross-sectional study was conducted in Gondar town. Depression was measure by Geriatric Depression Scale-15. Eight hundred and twenty-five community dweller older adults were participated in this study. A multistage sampling technique was used to select the study participants. Statistical Package of Social Science version 25 software was used to analyze the data. In the multivariable logistic regression analysis model, adjusted OR (AOR) with a 95% CI and p value<0.05 were used to identify the associated factors with depression.

Results : The prevalence of depression was 53.4% (95% CI: 49.8, 57.0). Being female (AOR: 5.758, 95% CI: 1.078–30.765), having an elderly occupation like a housewife (AOR: 4.174, 95% CI: 1.539–11.319), and being retired (AOR: 2.532, 95% CI: 1.104-5.806). Older adults perceived poor social support (AOR: 11.3785, 95% CI: 0.01-25.835), moderate social support (AOR: 2.966, 95% CI: 1.454-6.051), and physical inactivity (AOR: 12.042, 95% CI: 1.580-31.959) as strongly associated with depression.

Conclusion : The prevalence of depression in Gondar town was high. Being female, divorce, housewives, retirees, poor social support, and low physical activity were significantly associated with depression. Depressive symptoms among the elderly must be diagnosed earlier, and proper treatment should be given to increase quality of life and prevent mental health disorders.

Keyword : depression, prevalence, older adults, associated factors, Ethiopia

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BACKGROUND

The aging of the world population has become a major demographic trend in the twenty-first century. This increase in the aging population presents challenges and opportunities for countries in terms of healthcare and overall well-being for older citizens (1). Depression is one of the most frequent mental health disorders among the elderly in the world, and it is a serious public health concern because it affects many people (2).

Depression in older adults often goes untreated because people typically think that it is a normal component of the aging process and a natural reaction to chronic diseases (3). The burden of depressive disorders affects 10 to 20% of older individuals globally, affecting over 300 million people in 2015, as reported by the World Health Organization (4). It also has an economic impact on older adults due to its significant contribution to the rise of direct annual livelihood costs (5) In addition, the aging population is rising in many countries around the world. By 2050, it is anticipated that 80% of the world's older adults will live in low and middle-income nations, with the number of individuals aged 60 and above reaching 390 million (6). The older population in Ethiopia also increased, approximately 6.1 million people are over the age of 60, and the country is projected to have a total population of almost 115 million in 2022 (7). Older people are more likely to face significant challenges in terms of financial loss, social deprivation, loss of self-worth, and functional limitations when compared to their younger counterparts (8). The usage of health services by older adults increases as a result of depression, putting additional strain on the already overburdened healthcare system.

The global rise in the aging population led to a higher prevalence of mental health disorders among the elderly (9). Research indicates that over 20% of adults aged 60 and above grapple with a mental disorder, including depression, dementia, and anxiety (10). Mental health issues in older adults are linked to higher mortality rates, increased suicide risk, and cognitive disorders, all of which have adverse effects on their overall well-being and quality of life (11). A European study found that the lifetime prevalence of any mental disorder among individuals over 65 years was 47.0%, with 35.2% experiencing a mental disorder within the past year (12). In Western countries, the prevalence of mental disorders among older adults was 16.5% (13), while a meta-analysis in China revealed a 38.6% prevalence of depressive symptoms (14).

Depression among elders causes significant problems it may accelerate the course of concurrent illness and amplify cognitive impairment and functional disability. The prevalence of depression in the Nepal systematic review reported a range of 25.5% to 60.6% among community-dwelling older adults (15). More recent cross-sectional studies also reported a higher prevalence of depressive symptoms (29%) in Europe (16), 41.8% in Ambo town (17), 45% in womberma district (18),57.9 in Bahir Dar city (19), in Nepal 49.2% (20), all using the GDS-15.

Various factors were reported to be associated with the development of depression. Being female, elderly, marital status, presence of a known chronic disease, poor social support, lack of formal education, lower income, substance abuse, employment status, physical inactivity, and overweight or obesity, were contributing factors for depression (18, 21, 22, 23, 24, 25).

According to a population-based study, depression amplifies the functional disabilities caused by physical illness, interferes with treatment and rehabilitation, and further contributes to a decline in the physical and cognitive functioning of a person (26). Studies conducted at the community level showed that older adults experienced depression-related complications, especially in low-income countries like Ethiopia (17, 18). Despite the priority of launching a national mental health policy in Ethiopia, interventions against the problem are still limited. In addition, compared with other health services, evidence of depressive disorders tends to be relatively poor. Thus, the level of its burden among older adults is not well addressed in Gondar town, Ethiopia. Lack of adequate evidence about depression in older adults may be a factor that contributes to poor or inconsistent mental health care at the community level (27). Therefore, this study was aimed at determining the prevalence of depression and identifying the contributing factors among older adults in Gondar town, Amhara Region, Ethiopia.

METHODS AND MATERIALS

Study design and setting

A community based cross-sectional study was conducted from April to June 2022. The study was conducted in Gondar town, Amhara regional state, Northwest Ethiopia. The city is located in the central Gondar zone of Amhara regional state, 748 kilometers northwest of Addis Ababa, Ethiopia's capital, and about 180 kilometers from Bahir Dar, Amhara regional state's capital. Gondar is one of the most ancient and largely populated cities in the country. It is at 12˚ 45˚ north latitude and 37˚ 45˚ east longitude, with an elevation of 6,998 feet above sea level. Gondar town has 25 urban kebeles (the smallest administrative units in Ethiopia). According to the Gondar Statistics Agency's 2021/22 projection from 2007 population census data, the total population of Gondar town was estimated at 390,00; more than half of the population were women, and more than 6879 were older adults (28). The town has one comprehensive specialized hospital, a general

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hospital, and eight health centers that provide health services to the population.

Study population, inclusion, and exclusion criteria

Older adults aged 60 years and older in selected kebeles during the study period were the study population. All individuals' older adults in the city aged 60 and above and residents of the city for at least six months were included, while older adults' people who were severely ill and unable to communicate were excluded from the study.

Sample size determination and sampling method

The sample size was calculated using a single population proportion formula with assumptions of a 57.9% prevalence (P) from a previous study (19) with a 5% confidence limit and a 5% marginal error. As a result,

$$n = \frac{\left(z\frac{\alpha}{2}\right)^2 p(1-p)}{d^2}, \qquad n = \frac{(1.96)^2(0.579)(0.421)}{(0.05)^2} = 374.57 \approx 375$$

We used multi-stage sampling with two stages, we considered the stage and multiplied the sample size by the number of stages. Therefore 375×2=750. Including 10% of the non-response rate, the final sample size was 750+75=825.

Gondar city administration has six sub-cities. A multi-stage sampling technique was used to select the required sample. Three administrative areas (sub-cities) were selected by using a simple random sampling technique from the total sub-cities. Five kebeles were selected from three sub-cities based on the population size, the final sample size was allocated proportionally to the selected kebeles. Participants included Kebeles, twelve (161), two (183), seventeen (136), fourteen (180), and four (165) older adults. The sample households were obtained from health extension workers, and the initial household was selected randomly. Then other households were selected at every 11th interval. Whenever more than one eligible older adult was found in the same selected household, only one of them was chosen using the lottery method for the interview. In case no eligible candidate was identified in a selected household or the selected household is closed even after revisit, the sampling process continues to the next household in a clockwise direction until an eligible person is identified.

Study variables

Dependent variable

Depression (Yes = 1, No = 0)

Independent variables

Socio-demographic characteristics: Age, Sex, Marital status, occupation, income, religion, educational status, Clinical, behavioral, and substance use-related factors: chronic medical illness/NCDs, social support, BMI, Consumption of psychoactive substances like alcohol drinking and cigarette smoking, Physical activity

Operational Definitions

Older adults : Participants who are older than or equal to 60 years were considered older adults (29).

Depression : It was measured by the geriatric depression scale (GDS). A score greater than or equal to five was defined as depression (30).

Social support : assessed by the Oslo Social Support Scale 3. scores of 3–8 poor social support, 9–11 moderate social support, and 12–14 strong social support (31).

Cigarette Smoking : Those who smoke any tobacco products daily are considered tobacco users (32).

Alcohol Drinker : A person who drinks beer, local beer, or areke, tela or tej every day or every other day (33).

Data collection tools and procedures

A structured interviewer-administered questionnaire was used to assess the sociodemographic characteristics, clinical, behavioral, and substance use-related factors through face-to-face interviews by trained data collectors. The dependent variable was the presence of depressive symptoms, which was measured using the Geriatric Depression Scale (GDS-15). On this scale, five of the 15 items are negatively worded questions. So, if participants respond yes, it is recorded as "0," and if they respond no, it is coded as "1." On the other hand, the remaining positive GDS item 15 questions were labeled as yes, "1," and no, "0." This tool has been validated and used in low- and middle-income countries, including Asia and sub-Saharan Africa, and has a sensitivity and specificity of 90% (34, 35).

A cutoff value of more than or equal to five was used to define depression (30). Social support was assessed by the Oslo Social Support Scale 3. The sum score ranges from 3 to 14. Scores of 3-8 poor social support, 9–11 moderate social support, and 12-14 strong SS (31).

Physical activity participants who achieved less than 600 MET-minutes per week or 150 minutes total physical activity level were classified as physically inactive or above 150 minutes p/weak considered physically active. The weight of the participants was measured using a light portable digital weighing machine (mini) to the nearest 0.1kg, and height was measured by non-flexible inch tapes to the nearest 0.1 cm while respondents were standing in upright positions.

Data quality control and data management

To control the quality, a questionnaire was translated into the local language (Amharic) by experts and translated back to English to ensure its understandability and consistency before data collection. The training was given to the supervisor

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and data collectors (five health professionals) for two days. A pretest was conducted on 41 (5%) to check the understandability of the questionnaires in order to detect potential problems and unanticipated interpretations, as well as to make an amendment and cultural issue to each question. The collected data were reviewed and checked for completeness before data entry.

Data processing and analysis

The collected data were checked, coded, and entered into EPI Info version 7 and exported to SPSS version 25 software. Descriptive statistics included frequency and percentages for categorical variables. The mean and standard deviation for the continuous variables in the study were presented using tables and figures. A binary logistic regression model was performed to identify factors associated with depression. Assumptions for the binary logistic regression model were checked, like the Hosmer-Lemeshow goodness of fit test (0.26) and multicollinearity. In bivariate analysis, variables with a p-value less than 0.25 were entered into multivariable analysis to control for a confounding effect between different independent variables. The result was considered statistically significant in multivariable analysis based on an adjusted odds ratio of 95% and a p-value less than 0.05.

RESULTS

Socio-demographic characteristics of participants

A total of 825 participants were enrolled in the study with a response rate of 92.1%. The mean age (SD) of the participants was 67.26 (±6.54), with the minimum age being 60 and the maximum age being 90. The majority of the study participants were male 574 (75.5%) and were between 60-64 years of age (44.6%). About 63.7% of the study participants were married, and 27.4% of them were in college and above levels of education. Almost two-thirds of the participants (66.6%) were Orthodox Christian followers, 416(54.7%) participants reported that their monthly income was 1001-3000 ETB, and 27.9% were employed (Table1).

Table 1: Socio-demographic characteristics of community dweller older adults in Gondar town, Northwest Ethiopia, (N=760)

Variables	Categories	Frequency (N)	Percentage (%)
Sex	Male	574	75.5
	Female	186	24.5
Age	60-64	366	48.2
	65-79	185	24.3
	70-74	111	14.6
	>=75	98	12.9
Religion	Orthodox	484	63.7
	Muslim	193	25.4
	Protestant	59	7.8
	Others	24	3.2
Marital status	Married	478	62.8
	Divorced	37	4.9
	Separated	62	8.2
	Windowed	183	24.1
Occupation	Employed (gov't & private)	199	26.2
	Merchant	154	20.3
	Housewife	124	16.3
	Retired	132	17.4
	jobless/ daily laborer	152	19.9
Monthly income (ETB)	>5000	65	8.6
	3001-5000	147	19.3
	1001-3000	416	54.7
	<1000	132	17.4

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Education level	College & above	208	27.4
	Secondary school	208	27.4
	Primary school	211	27.7
	No formal educated	133	17.5

ETB = Ethiopian Birr, others =catholic, Adventist, seven-day followers.

Clinical, behavioral and substance use-related factors of the participants

According to this study finding, 334 (43.9%) of participants had a history of non-communicable disease. More than 709 (93.3%) of participants were not currently cigarette smokers, 219 (28.8%) older adults were currently alcohol drinkers, 613 (80.7%) of the participants had normal body weight, and 498 (65.5%) participants reported a low level of physical activity. Among the respondents, 40.3% had poor social support (Table 2).

Table 2 : Clinical, behavioral and substance use-related factors of the participants among community dweller older adults in Gondar town, Northwest Ethiopia (N=760)

Variables	Categories	Frequency (N)	Percentage (%)
Having history of NCDs	No	426	56.1
	Yes	334	43.9
Cigarette smoking status	No	709	93.3
	Yes	51	6.7
Alcohol drink	No	541	71.2
	Yes	219	28.8
Body Mass Index	Underweight	17	2.2
	Normal weight	613	80.7
	Overweight	124	16.3
	Obese	6	0.8
Social support	Strong social support	130	17.1
	Moderate social support	324	42.6
	Poor social support	306	40.3
Physical activity	Active	262	34.5
	Low PA/inactive	498	65.5

NCD-Non communicable disease, PA-Physical Activity.

Prevalence of depression

In this study, the overall prevalence of depression among older adults in Gondar town was 53.4% (95% CI: 49.8, 57.0) (Fig. 1).

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Figure 1

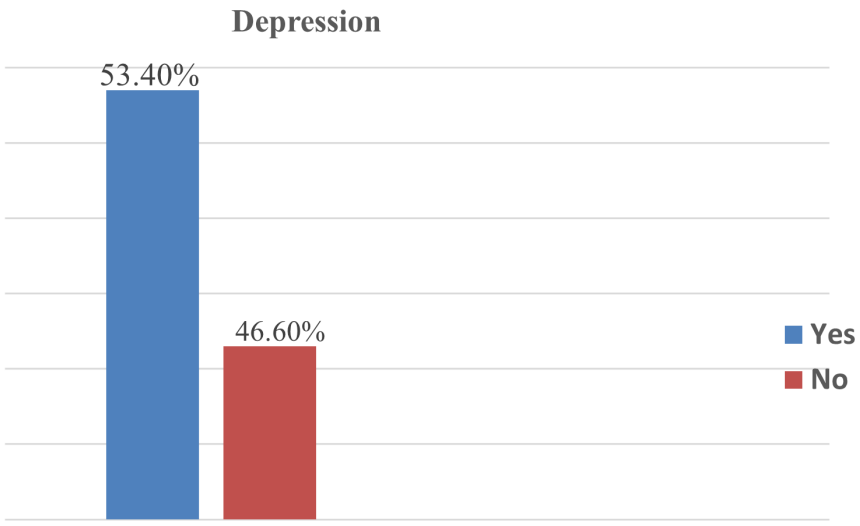

Fig. 1 Percentages of depression among community dweller older aduls in Gondar town, Northwest Ethiopia, 2022

Factors associated with depression among older adults

All variables were undertaken into bivariable analysis. Thus, nine variables were found to be significant at a p-value <0.25 in a bi-variable analysis. The variables, including sex, age, marital status, educational level, occupation, monthly income, social support, non-commendable disease, and physical activity, were fitted into a multivariable logistic regression analysis. Among these variables were sex (female), marital status (divorce), occupation (housewife and retired), social support (poor SS), and low physical inactivity, where we found factors significantly associated with depression among the older adults.

Elderly females were two times more likely to develop depression compared to males (AOR: 2.080, 95% CI: 1.1016-4.258). Divorced older adults were 5.758 times (AOR: 5.758, 95% CI: 1.078-30.765) more likely to develop depression compared to married ones. An occupation like housewife was 4.174 times (AOR: 4.174, 95% CI: 1.539-11.319) and retired were 2.532 times (AOR: 2.532, 95% CI: 1.104-5.806) more likely to develop depression than employed. Older adults who perceived poor social support were eleven times more likely to have depression compared to those who had strong social support (AOR: 11.3785, 95% CI: 0.01-25.835), and moderate social support was nearly three times more likely (AOR: 2.966, 95% CI: 1.454-6.051) than those who had strong social support. And those who had low levels of physical activity were also twelve times more likely to have depression compared to those who had active physical activity levels (AOR: 12.042, 95% CI: 1.580–31.959) (Table 3).

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Table 3 : Factors associated with depression among community dweller older adults in Gondar town, Northwest Ethiopia, (N=760)

Variables	Categories	Depression		COR (95%CI)	AOR (95%CI)
		No	Yes		
Sex	Male	282	292	1	1
	Female	72	114	1.529(1.091-2.143)	2.080(1.1016-4.258) *
Age	60-64	250	116	1	1
	65-69	57	128	4.84(3.303-7.091)	1.321(0.753-2.320)
	70-74	29	82	6.094(3.781-9.821)	1.195(0.588-2.431)
	>=75	18	80	9.579(5.489-16.714)	1.541(0.673-3.527)
Marital status	Married	283	195	1	1
	Divorced	3	34	16.448(4.982-54.307)	5.758(1.078-30.765)*
	Separated	29	33	1.651(0.971-2.809)	0.625(0.289-1.353)
	Windowed	39	144	5.359(3.599-7.979)	1.236(0.656-2.332)
Education level	>=College	144	64	1	1
	Secondary	106	102	2.165(1.450-3.232)	1.431(0.724-2.827)
	Primary	70	141	4.532(3.005 6.835)	0.796(0.374 1.692)
	No formal educates	34	99	6.55(4.020-10.676)	0.734(0.321-1.677)
Occupation	Employed	149	50	1	1
	Merchant	67	67	2.295(1.461-3.606)	1.779(0.831-3.809)
	Housewife	35	89	7.578(4.571-12.562)	4.174(1.539-11.319) **
	Retired	50	82	4.887(3.037-7.864)	2.532(1.104-5.806) *
	jobless/daily labour	33	118	10.656(6.453-17.596)	2.310(0.929-5.745)
Monthly Income	>=5000	52	13	1	1
	3001-4999	111	36	1.297(0.635-2.651)	0.619(0.212-1.807)
	1001-3000	165	251	6.085(3.213-11.525)	0.754(0.261 2.183)
	<1000	26	106	16.308(7.750-34.313)	0.723(0.212-2.461)
Social support	Strong SS	116	14	1	1
	Moderate SS	198	126	5.273(2.900-9.587)	2.966(1.454 6.051) *
	Poor SS	40	266	55.100(28.865-105.179)	11.379(0.01-25.835) **
NCDs	No	235	191	1	1
	Yes	119	215	2.223(1.656-2.984)	0.695(0.436-1.109)
Physical activity	Active	244	18	1	1
	Low PA/inactive	110	388	47.814(23.329-80.701)	12.042(1.580-31.959) **

* Statistically significant at p<0.05, **highly statistically significant at p<0.01, 1= constant, COR=crude odd ratio, AOR=adjusted odd ratio, CI =confidence interval, NCD= non communicable disease, SS. =social support, PA = physical activity.

DISCUSSION

This study aimed to determine the prevalence of depression and its associated factors among community dweller older adults living in Gondar town. The overall prevalence of depression among older adults was 53.4% (95% CI: 49.8–57.0%). This finding indicates that depression is a high public health burden and health problem among older adults living in Gondar town. This study revealed that being female, divorced, a housewife, retired, having poor or moderate social support, and having low

physical activity were factors significantly associated with depression among the elders.

This study finding was comparable with the prevalence of depression among older adults reported from India (52.5%) (36). The reason could be that these studies used the same assessment tool, which is the Geriatric Depression Scale (GDS-15), and the same age of participants. However, it was lower compared with studies conducted in Bahir Dar city (57.9%) (19), and in India (67.5%) (37). The reason could be that the discrepancy might be due to the variations in the study population and sample size. The study in India used a large sample size (7200), and the participants of the study were more female than male when compared to our study.

On the other hand, our study reported a higher prevalence of depression symptoms compared with studies done in the cities of Fuzhou, China (10.5%) (38), Egypt (44.4%) (22), Ambo Town (41.8%) (17), Womberma district (45%) (18), Nepal (49.2%) (20), and northern Tanzania (44.4%) (39). The disparity could be due to differences in sampling techniques, sample size, measurement tools, and other socio-cultural variations among participants. For example, the study done in Nepal used the purposive sampling method. This variation may be due to the differences in study areas and the socioeconomic status of participants.

According to this study, participants who were female were two times more likely to have depressive symptoms than males. This study is in line with studies done in India and Sri Lanka (40, 41). This could be the reason that most elderly women lost their spouses, were widowed, and were exposed more to health problems and adverse life events due to their longer life expectancy. Moreover, in developing countries, the situation is even worse, as most elderly women are financially dependent on their spouses and are from lower socioeconomic groups. In addition, females take on the majority of household responsibilities affected by pregnancy, and they depend on men economically, particularly in poorer settings (42).

This study showed that elderly subjects who were divorced were more than five times more likely to develop depression than those who were married. This finding was consistent with the studies done in Harer and Sri Lanka (36, 43) respectively .This could be because divorce may cause feelings of loss, uncertainty about the future, and sadness, which can contribute to the emotional distress and stress associated with the divorce process, leading to depressive symptoms. Additionally, partners of individuals with depression might feel a sense of responsibility and may become more like caretakers in the relationship, which can also take a toll on their mental well-being, which might be attributed to the perceived loneliness sensation and loss of social support (44). Older adults with occupations like retirement and housewives were significantly associated with depression in older adults. Retired older adults were 2.5 times more likely to have depression compared to their employed counterparts. While housewives were more than four times more likely to be depressed than those who were employed. This study is supported by the findings of a household survey in Sudan (45) and Korea (46). This may be because retired individuals may not have adequate opportunities to interact with other people to share ideas and feelings. Elderly people may feel like they are isolated and have no support. Furthermore, such feelings might contribute to the development of depression.

In reports from this study, we found that poor and moderate social support were the contributing factors to depression among elderly populations. This study was in line with studies from Sri Lanka (36) and India (44). The reason could be that low levels of perceived social support can lead to poorer mental health outcomes, such as depression. That means the availability of social support tends to alleviate depressive symptoms by providing emotional relief and acting as a buffer of distress (47).

Furthermore, this study revealed that people with low levels of physical activity were more than twelve times more likely to develop depression than those who were physically active older adults. This study is supported the study done in São Paulo (48). The reason could be that regular physical exercise is important to improvesymptoms related to mood disorders and reduce symptoms of depression in adults and the elderly, which increases norepinephrine neurotransmission in the central nervous system, serotonin synthesis, and secretion of atrial natriuretic peptide, all of which are plausible biological explanations for its association with depression (49).

Strengths and limitations of the study

The strength of this study was that it was conducted in new area, Gondar town, and the large sample size makes it more generalizable than any other study. However, the questions regarding depression were self-reported due to their private and sensitive nature and possible association with social stigma and discrimination. Additionally, some questions assessed history, which is subject to recall bias. Since the study was cross-sectional, a cause-and-effect relationship was challenging to establish.

CONCLUSION

The prevalence of depression in Gondar town was high. Being female, divorce, housewives,' retirees, poor social support, and low physical activity were significantly associated with depression. Depressive symptoms among the elderly must be diagnosed earlier, and proper treatment should be given to increase quality of life and prevent mental health disorders.

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List of Abbreviations

AOR, Adjusted Odd Ratio; **BMI,** Body Mass Index; **CI,** Confidence Interval; **CM,** Centimeter; **COR,** Crude Odd Ratio; **ETB,** Ethiopian Birr; **GDS,** Geriatrics Depression Scale; **GPAQ,** Global Physical Activity Questionnaire; **KG,** Kilogram; **NCDs,** Non-Communicable Diseases; **OSSS,** Oslo Social Support Scale; **PA,** Physical Activity; **SPSS,** Statistical Package of Social Science, **WHO,** World Health Organization.

Declaration

Ethical consideration

All methods were conducted according to the ethical standard of the declaration of Helsinki. Ethical clearance was obtained from the Ethical Review Committee of the University of Gondar. The purposes and importance of the study were explained to the participants, and written informed consent was obtained from each participant. All participants' privacy and confidentiality were kept confidential at all levels. Those older adults who reported depression were advised to go near hospitals/ health centers for further evaluation and management.

Consent for Publication

Not applicable

Statement of Data Sharing and Availability

The manuscript contains all of the data that is crucial to our findings. Requests for additional information on the dataset and questions about data sharing will be treated by a reasonable request.

Competing interests

All authors declare no conflict of interest.

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Authors' contributions: KBS conceptualized the study and was involved in the design, analysis, interpretation, report, and manuscript writing. GAZ & STC were involved in proposal writing, and drafting the manuscript, MMY participated in proposal preparation and data collection, MF & AZ was involved in proposal preparation and data analysis and ESY made a substantial contribution to the conception, analysis, and interpretation of data, drafting the manuscript and critical revision for important intellectual content. All the authors read and approved the final manuscript.

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