Research Article

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Factors Associated with Depression among Elderly in Mahalaxmi Municipality, Lalitpur, Nepal

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Abstract

Depression is a common mental health problem among the elderly, and its prevalence is increasing. This cross-sectional study aimed to assess the level of depression and the factors that contributed to depression. The study was conducted among 370 respondents aged 60 years and above obtained through multistage proportionate random sampling in Mahalaxmi Municipality, Lalitpur. Information was collected using a semi-structured questionnaire on socio-demogprahic factors, lifestyle factors, socio-economic factors, comorbid conditions, and depression using GDS-SF (Geriatric Depression Scale Short Form). Data were analyzed using descriptive and inferential methods (chi-square, binary logistic regression, and multiple logistic regression). The results showed a high prevalence of depression (53.2%). Multiple logistic regression identified several statistically significant factors. The elderly in the 70-79 age group were 2.05 times, and those aged 80 years and above were 1.81 times more likely to have depression than those aged 60-69 years. Similarly, low social support (AOR = 13.86, CI: 5.81-33.08), and low quality of life (AOR = 5.65, CI: 3.06-10.41) were statistically significant factors associated with depression. Hence, this study highlights the need for addressing depression among the elderly through targeted effective interventions and prioritizing elderly mental health care by policymakers.

Keywords: Depression, Elderly, Quality of life, Social support

What was known

- Depression is the most common mental disorder among the elderly.
- The elderly population is increasing, and the proportion of depressed elderly is also increasing.

What's New and Next

- Depression is a substantial health problem among the elderly.
- Improving the social support and increasing their quality of life can help reduce depression among the elderly.

Introduction

According to the World Health Organization (WHO), "Old age denotes the decrease in an individual's environmental compliance ability that is out of his/her control and chronologically defines individuals aged 65 years and older"[1]. Developed countries recognize 65 years as the official definition of elderly, whereas developing countries use a lower age range. The Senior Citizens Act of Nepal 2006 defined senior citizens or elderly people as "people who are 60 years or above"[2]. In 2019, Nepal had over 2 million people who were 60 or above which was almost 9% of the total population[3].

Depression is characterized by prolonged grief, feelings of worthlessness, anxiety, reduced focus, negative thoughts, and suicidal or self-harm tendencies[4]. According to the WHO, depression is the most common mental disorder in the elderly affecting approximately 7% of the world's elder population[5]. In South Asian countries, the overall pooled estimate of the prevalence of depression among the elderly was 42%. The prevalence of depression among the elderly was found to be slightly higher in the community setting (44%) compared to old age homes (42%)[6]. The prevalence of depression in Nepal is found to be varying widely ranging from 25.5% to 60.6% in the community, 17.3% to 89.1% in aged-care facilities and 53.2% to 57.1% in hospital settings[7]. Depression develops in the elderly at later ages. There have been reports of more than half of the elderly with depression having the first episode after the age of 60 years[8].

Studies have revealed various factors to be associated with depression among the elderly. Among them, most of them have reported depression to be associated with increasing

age, female sex, comorbidities, illiteracy, living alone, divorced, low social support, substance abuse (tobacco, alcohol) [6,9], quality of life[10,11], which have been considered in this study.

Mahalaxmi Municipality is a growing urban municipality situated in the northeastern part of the Lalitpur district. There are people of all castes and people of both urban and rural communities who live in Mahalaxmi municipality[12]. The trend of youths going abroad for education and employment has been increasing in the country, so, the elderly need to spend their life on their own resulting in a decrement of care and support making them vulnerable to depression[13]. Though there have been various literatures on depression among the elderly in Nepal, they have prioritized geriatric homes or clinical settings as the study area[14,15]. Moreover, there has been no known published study regarding depression among the elderly in Mahalaxmi municipality.

Thus, this study aimed to assess the prevalence of depression and its associated factors in a community-based setting which provides the actual scenario among the elderly. Identification of depression and its various factors associated with it can help develop strategies to reduce its prevalence in this population; and can also inform further research.

Materials and Methods

Study Area, Population, Design and Sample Size:

The study was conducted in Mahalaxmi Municipality of Lalitpur district in Province 3 of Nepal. The study population consisted of individuals aged 60 years or older, residing in the study area for at least one year and willing to participate in the study. Those with cognitive impairment (e.g. diagnosed with Alzheimer's disease or dementia, stroke, or traumatic brain injuries) and currently under treatment for depression were excluded from the study.

The sample size was calculated based on the formula for a cross-sectional study taking the prevalence of depression as 65.2%(16). At a 95% confidence level and 5% error, the sample size was adjusted for a finite population of 7,780 and estimated to be 336. Adding a 10% non-response rate, the final sample size was 370 for the study. The sample was obtained using a multistage proportionate random sampling technique in Mahalaxmi municipality. In Nepal, each municipality is divided into various wards, which is the smallest independent unit of local government in Nepal. In Mahalaxmi municipality, there are 10 wards. Among them, 5 wards were

selected randomly in the first stage using the lottery method. In the second stage, a household list of the elderly in each of the wards was obtained, and a proportionate number of participants were selected from each ward randomly using computer-generated random numbers.

Data Collection and Instrument, Variables, and Validity and Reliability:

Data collection was conducted by the researcher along with three trained research assistants who had bachelor's degrees with experience in data collection. The research assistants had been oriented for two days by the researcher. Data were collected by visiting the participants at their homes, through face-to-face interviews, using a semi-structured questionnaire, in Nepali language to which the participants were comfortable. Informed consent was obtained from each of the participants before data collection. The data were collected from 10th April 2022 to 20th May 2022. The questionnaire consisted of variables in five sections – sociodemographic characteristics, lifestyle characteristics, socioeconomic characteristics, comorbid conditions, and Geriatric Depression Scale (GDS) short-form to assess the level of depression.

The outcome variable was depression which was assessed using the GDS-short version[17], which consisted of 15 items. The total score was calculated to categorize participants as having no depression (0 to 4 points), mild depression (5 to 8 points), moderate depression (9-12 points), and severe depression (13-15 points).

The independent Variables were Socio-demographic variables which consisted of respondents' age, sex, educational status, marital status, occupation, ethnicity, and family income, Lifestyle variables which consisted of respondents' alcohol use and smoking behavior, Socio-economic variables which consisted of living arrangement (based on whom the respondent stayed with), current employment status (currently working or not), social support (measured using Multi-dimensional Scale of Perceived Social Support – MSPSS[18], quality of life (measured using WHOQOL-BREF tool[19]. Social support was categorized as low, moderate, or high based on the scores being less than 3, 3 to 5, or more than 5 respectively. Quality of life was categorized as high quality of life if the score was equal to or above the median score, and low quality of life for lower scores, and Co-morbid conditions variables which consisted of

comorbidities based on the presence or absence of diseases such as hypertension, diabetes, asthma, arthritis, and others.

Standard and validated research tools were used to design the questionnaire. Consultations with the advisor, co-advisors as well as a psychiatrist from Nepal who has been involved in various similar studies, were done to finalize the questionnaire. Pre-testing was also conducted among 35 elderly people in Kathmandu, and the scales used were found to be reliable with Cronbach's alpha coefficient of 0.91 for social support, 0.85 for WHOQOL BREF, and 0.71 for GDS. The tool was then finalized.

Data processing and analysis:

Data entry and analysis were conducted using SPSS software version 18. For descriptive statistics, the categorical data were presented in frequency and percentage, while the continuous data were presented in mean and standard deviation. Inferential statistics consisted of using a chi-square test to identify the association between categorical independent variables and the dependent variable. The odds ratio was calculated using binary logistic regression. Those independent variables with *p*-value <0.20 were considered for multivariate analysis using multiple logistic regression, and the adjusted odds ratio was obtained for them. A *p*-value of <0.05 was considered statistically significant.

Results

The data were collected among 370 elderly respondents from Mahalaxmi Municipality, Lalitpur. All the respondents consented to participate in the study.

The respondents had a mean age of 69.9 years with a standard deviation of 8.3 years. The majority were females (60.5%). More than 2/3rd of the respondents (67.3%) were married, with 13% widowers among males, and 43.3% widows among females. Two-thirds (62.7%) of the respondents were illiterate with only 1/3rd illiterate among males, while more than 4/5th of females were illiterate. More than half (52.2%) belonged to the Brahmin/Chhetri ethnicity. Of all respondents, 10.3% consumed alcohol, while 21.9% had smoking behavior. Comorbidity was present in half of males, and 2/3rd of females, making a total of three-fifths (59.2%) of the respondents in total. Of all respondents, less than a quarter (22.7%) had high social support, while more than half (54.9%) had higher quality of life. The prevalence of depression among the

elderly participants was 53.2% consisting of 3.2% having severe depression, 23% having moderate depression, and 27% having mild depression. The prevalence of depression was 60.3% in females and 42.5% in males. (Table 1).

Table 1 Distribution of general characteristics of the participants by sex (n = 370)

Variable		Sex of participant		Total
		Male	Female	
Age (years)	60 – 69	70 (47.9%)	121 (54%)	191 (51.6%)
	70 – 79	51 (34.9%)	67 (29.9%)	118 (31.9%)
	80 or above	25 (17.1%)	36 (16.1%)	61 (16.5%)
	Mean ± SD	70.4 ± 8.1	69.6 ± 8.4	69.9 ± 8.3
Marital status	Married	123 (84.2%)	126 (56.3%)	249 (67.3%)
	Widowed	19 (13%)	97 (43.3%)	116 (31.4%)
	Unmarried	2 (1.4%)	1 (0.4%)	3 (0.8%)
	Divorced	2 (1.4%)	0 (0%)	2 (0.5%)
Education	Illiterate	49 (33.6%)	183 (81.7%)	232 (62.7%)
	Primary	54 (37%)	32 (14.3%)	86 (23.2%)
	Secondary	33 (22.6%)	6 (2.7%)	39 (10.5%)
	Bachelor degree	8 (5.5%)	3 (1.3%)	11 (3%)
	Master degree or higher	2 (1.4%)	0 (0%)	2 (0.5%)
Ethnicity	Chhetri	37 (25.3%)	51 (22.8%)	88 (23.8%)
	Brahmin	46 (31.5%)	59 (26.3%)	105 (28.4%)
	Magar	2 (1.4%)	5 (2.2%)	7 (1.9%)
	Newar	34 (23.3%)	50 (22.3%)	84 (22.7%)
	Others	27 (18.5%)	59 (26.3%)	86 (23.2%)

Occupation	**Unemployed**	59 (40.4%)	112 (50%)	171 (46.2%)
	Agriculture	25 (17.1%)	72 (32.1%)	97 (26.2%)
	Small business	23 (15.8%)	10 (4.5%)	33 (8.9%)
	Government service	10 (6.8%)	6 (2.7%)	16 (4.3%)
	Private service employee	9 (6.2%)	1 (0.4%)	10 (2.7%)
	Labor	5 (3.4%)	1 (0.4%)	6 (1.6%)
	Others	15 (10.3%)	22 (9.8%)	37 (10%)
Family's average income (NRs)	**Up to 50,000**	116 (79.5%)	178 (79.5%)	294 (79.5%)
	Above 50,000	30 (20.5%)	46 (20.5%)	76 (20.5%)
Sufficient family income	**Enough with saving**	35 (24%)	40 (17.9%)	75 (20.3%)
	Enough without saving	92 (63%)	126 (56.3%)	218 (58.9%)
	Not enough but no debt	15 (10.3%)	44 (19.6%)	59 (15.9%)
	Not enough with debt	4 (2.7%)	14 (6.3%)	18 (4.9%)
Consumption of alcohol	**Yes**	21 (14.4%)	17 (7.6%)	38 (10.3%)
	No	125 (85.6%)	207 (92.4%)	332 (89.7%)
Smoking	**Yes**	34 (23.3%)	47 (21%)	81 (21.9%)
	No	112 (76.7%)	177 (79%)	289 (78.1%)

Living arrangements	**Family members**	129 (88.4%)	199 (88.8%)	328 (88.6%)
	Living with spouse	16 (11%)	13 (5.8%)	29 (7.8%)
	Alone	1 (0.7%)	12 (5.4%)	13 (3.5%)
Currently working	**Yes**	25 (17.1%)	28 (12.5%)	53 (14.3%)
	No	121 (82.9%)	196 (87.5%)	317 (85.7%)
Quality of life	**Low**	47 (32.2%)	120 (53.6%)	167 (45.1%)
	High	99 (67.8%)	104 (46.4%)	203 (54.9%)
Social Support	**Low**	6 (4.1%)	19 (8.5%)	25 (6.8%)
	Moderate	97 (66.4%)	164 (73.2%)	261 (70.5%)
	High	43 (29.5%)	41 (18.3%)	84 (22.7%)
Comorbidities	**Yes**	72 (49.3%)	147 (65.6%)	219 (59.2%)
	No	74 (50.7%)	77 (34.4%)	151 (40.8%)
GDS	**Normal**	84 (57.5%)	89 (39.7%)	173 (46.8%)
	Mild	38 (26%)	62 (27.7%)	100 (27%)
	Moderate	19 (13%)	66 (29.5%)	85 (23%)
	Severe	5 (3.4%)	7 (3.1%)	12 (3.2%)
Total		146 (39.5%)	224 (60.5%)	370 (100%)

Of all socio-demographic and lifestyle variables, depression was found to be significantly associated with age, sex, education level, marital status, occupation, current employment status, and presence of comorbidities (p <0.05). The association between social support and the quality of life with depression was also found to be statistically significant (p-value <0.001) (Table 2).

Table 2 Association of different factors with depression among the elderly in Mahalaxmi Municipality, Nepal, May 2022 (n=370)

Variables		Depression		Total	*p*-value
		Yes	No		
Age (years)	60 – 69	77 (40.3%)	114 (59.7%)	191	< 0.001
	70 – 79	76 (64.4%)	42 (35.6%)	118	
	80 and above	44 (72.1%)	17 (27.9%)	61	
Sex	Male	62 (42.5%)	84 (57.5%)	146	0.001
	Female	135 (60.3%)	89 (39.7%)	224	
Education level	Illiterate	145 (62.5%)	87 (37.5%)	232	< 0.001
	Literate	52 (37.7%)	86 (62.3%)	138	
Marital status	Married	117 (47%)	132 (53%)	249	0.001
	Others	80 (66.1%)	41 (33.9%)	121	
Ethnicity	Brahmin/Chhetri	95 (49.2%)	98 (50.8%)	193	0.106
	Others	102 (57.6%)	75 (42.4%)	177	
Occupation	Unemployed	101 (59.1%)	70 (40.9%)	171	0.037
	Others	96 (48.2%)	103 (51.8%)	199	
Monthly income	Up to 50,000	161 (54.8%)	133 (45.2%)	294	0.25
	Above 50,000	36 (47.4%)	40 (52.6%)	76	
Sufficient family income	Sufficient	150 (51.2%)	143 (48.8%)	293	0.123
	Not Sufficient	47 (61%)	30 (39%)	77	
Alcohol consumption	Yes	16 (42.1%)	22 (57.9%)	38	0.146
	No	181 (54.5%)	151 (45.5%)	332	
Smoking	Yes	46 (56.8%)	35 (43.2%)	81	0.46
	No	151 (52.2%)	138 (47.8%)	289	
Living arrangements	Living with spouse	19 (65.5%)	10 (34.5%)	29	0.3
	Family members	170 (51.8%)	158 (48.2%)	328	

	Alone	8 (61.5%)	5 (38.5%)	13	
Currently working	**Yes**	17 (32.1%)	36 (67.9%)	53	0.001
	No	180 (56.8%)	137 (43.2%)	317	
Comorbidity	**Yes**	128 (58.4%)	91 (41.6%)	219	0.016
	No	69 (45.7%)	82 (54.3%)	151	
Social support	**Low/medium social support**	189 (66.1%)	97 (33.9%)	286	<0.001
	High social support	8 (9.5%)	76 (90.5%)	84	
Quality of life (QOL)	**Low QOL(<86)**	134 (80.2%)	33 (19.8%)	167	<0.001
	High QOL(>86)	63 (31%)	140 (69%)	203	
Total		197 (53.2%)	173 (46.8%)	370	

Based on the results of binary logistic regression analysis, those aged 80 years and above were 3.83 times more likely to have depression than those aged 60 to 69 years. Females were 2.05 times more likely to have depression than males. Those with low/medium social support were 18.51 times more likely to have depression, while those with low quality of life had 9.02 times of depression. Those with co-morbidities had a 67% higher chance (Odds Ratio = 1.67) of having depression (Table 3).

Table 3 Binary logistic regression analyses of associated factors with depression among the elderly in Mahalaxmi Municipality, Lalitpur, Nepal, May 2022 (n=370)

Variables		**Unadjusted OR (95% CI)**	***p*-value**
Age	**60-69** [ref]	Reference	
	70-79	2.67 (1.66-4.3)	<0.001
	80 and above	3.83 (2.04-7.19)	<0.001
Sex	**Male** [ref]	Reference	0.001
	Female	2.05 (1.35-3.14)	
Education	**Educated** [ref]	Reference	<0.001
	Uneducated	2.75 (1.78-4.25)	
Marital Status	**Married** [ref]	Reference	0.001

	Others	2.2 (1.4-3.46)	
Currently working	**Yes** [ref]	Reference	0.001
	No	2.78 (1.5-5.16)	
Ethnicity	**Others** [ref]	Reference	0.106
	Brahmin/ Chhetri	1.40 (0.93-2.11)	
Occupation	**Others** [ref]	Reference	0.038
	Unemployed	1.55 (1.03-2.31)	
Sufficiency of family income	**Enough** [ref]	Reference	0.125
	Not enough	1.49 (0.89-2.49)	
Alcohol consumption	**Yes** [ref]	Reference	0.149
	No	1.64 (0.84-3.25)	
Comorbidity	**Absent** [ref]	Reference	0.016
	Present	1.67 (1.1-2.53)	
Social Support	**High** [ref]	Reference	<0.001
	Low/Medium	18.51 (8.58-39.92)	
Quality of life	**High** [ref]	Reference	<0.001
	Low	9.02 (5.56-14.63)	

OR, odd's ratio; 95% CI, 95% confidence interval; [ref], reference group

The variables such as age, sex, education, ethnicity, marital status, occupation, income sufficiency, alcohol consumption, financial dependency, comorbidities, social support, and quality of life were included in multiple logistic regression analyses.

Age, social support, and quality of life were found to be significantly associated with depression after adjustment of the confounding effects of other variables. Those aged 80 years and above were 1.82 times and aged 70 to 79 years were 2.05 times more likely to have depression than those aged 60 to 69 years. Those with low/medium social support (compared to high social support) had a higher chance (OR = 13.87) of having depression, and those with low quality of life (compared to those with high quality of life) were 5.65 times more likely to develop depression (Table 4).

Table 4 Multiple logistic regression analysis of factors associated with depression among the elderly in Mahalaxmi Municipality, Nepal, May 2022 (n=370)

Variables		Adjusted OR (95% CI)	*p-value*
Age	**60-69** [ref]	Reference	
	70-79	2.05 (1.12-3.76)	0.019
	80 and above	1.81 (0.77-4.28)	0.174
Social Support	**High** [ref]	Reference	<0.001
	Low/Medium	13.87 (5.81-33.08)	
Quality of life	**High** [ref]	Reference	<0.001
	Low	5.65 (3.06-10.42)	

OR, odd's ratio; 95% CI, 95% confidence interval; [ref,] reference group

Discussion

With the epidemiological transition along with a lifestyle change, the prevalence of mental health disorders is increasing among the elderly, warranting the need to assess its burden.

Depression was reported to be prevalent in more than half of the respondents in this study, which is similar to other studies conducted in Rupandehi[20] and Kavre[21] in Nepal. The similarity in findings might be due to comparable sociodemographic conditions, and lifestyle of the elderlies in these regions. A lower prevalence of depression was reported by studies from developed countries such as Fuzhou, China[22], and Germany[23]. The lower prevalence of depression among the people in these developed regions could be due to better education, socioeconomic condition, independency and higher quality of life. There have been also reports of a higher prevalence of depression in Kerala, India; which might be explained by a higher proportion of comorbidities among the participants in the study[24] compared to this study.

Depression was reported to be significantly higher in higher age groups in this study, with those aged 70 to 79 years twice likely to develop depression. Similar findings were reported from other studies in Nepal[4], India[24], and Egypt[25]. With increasing age comes the declining health status of the elderly, as well as chances to experience major life stressors like retirement, death of loved ones, etc. which increases their vulnerability to depression[26].

The elderly with low social support were more likely to be depressed than those with high social support. Studies have reported that greater social support and interaction decrease the symptoms of depression[27], which might explain this finding. Similar findings of higher depression among those with low social support have also been reported by studies from India[28] and Ethiopia[25].

This study's results showed that elderly with low quality of life were 5.65 times more likely to have depression than those with high quality of life. This finding corroborated with findings from other studies done in Nepal[10], China[29], and Canada[30]. The status of physical health, psychological well-being, and social health was higher among those with high quality of life, and thus they were less likely to have depression. There was poor control of depressed individuals over the physical, psychological, social, and environmental domains of quality of life[31].

This study provided evidence on depression and its associated factors, based on data collected among 370 elderly people which is representative of the elderly of Mahalaxmi Municipality. The study also used valid, reliable, and standard tools to measure depression, social support, and quality of life. It provides baseline data on depression for the municipality, based on which the effect of policy interventions can be studied.

However, due to the cross-sectional nature of the study, the cause-effect relationship of the factors cannot be established, which needs cautious interpretation. The sample size might not suffice to explain all the associations resulting in a wider confidence interval. The direction of the relationship between depression and quality of life could not be established. Further studies are required to explore the relationship of depression with these factors. Similarly, the burden of depression reported in this study might be slightly lower than the actual burden as we excluded the diagnosed cases of depression and those cognitively impaired.

Conclusion

There was a significant burden of depression among the elderly, affecting more than half of the elderly participants. This finding represents a substantial health problem in Mahalaxmi Municipality, warranting further examination and management of the confirmed cases. Depression was found to be significantly higher among those in older age groups, with low social support and low quality of life. This provided evidence of the need for targeted interventions for elderly people to improve their quality of life and social support among the elderly. Prioritization

of mental health services among the elderly seems to be an extremely important action to be executed. Further studies should be conducted to explore the cause-effect relationship of these associated factors.

Ethical Approval Statement

Ethical approval was obtained from the Ethical Review Committee for Human Research, Faculty of Public Health, Mahidol University (COA-MUPH 2022-003). Ethical approval was also obtained from Nepal Health Research Council, Kathmandu (Ref. No. 3651) to conduct the study.

Author Contributions

GSS designed the study and formulated the research instrument under the supervision of SK, SS, and SJ. GSS conducted the pre-test, reliability test, and data collection under the supervision of SK. GSS carried out the initial statistical analysis of data according to guidance from SS. SK guided GSS on manuscript writing. All authors read and approved the manuscript before submission for publication.

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Conflicts of Interest

There was no conflict of interest.

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