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Dementia among Senior citizens Residing at Mahalaxmi Municipality, Lalitpur

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INTRODUCTION

Background: Dementia is a progressive neurocognitive disorder marked by progressive decline in memory, thinking, behavior, and the ability to carry out daily activities. It is highly prevalent among low and middle income countries like Nepal, multiple factors are associated with prevalence of dementia. Objectives: To identify level of cognitive function and factors associated with dementia. Method: This study employed a descriptive cross-sectional design. A total of 360 participants were selected using a purposive sampling technique. Questionnaire related to Socio-demographic information, Standard valid tool community Screening Instrument of Dementia (CSID). Results: The study among 360 senior citizens of Mahalaxmi municipality ward no. 4 revealed that slightly female were more (51.7%) with the majority belong to age 60-70 years age group and average age of 70.28 years. Clinically majority of (90.0%) had at least one co-morbidity condition, with hypertension (48.6%) and diabetes (24.7%) being the most prevalent. Analysis revealed that dementia increase significantly with increasing age ($p<0.001$), male gender ($p<0.001$) and types family ($p=0.004$), where those who are living in joint families showed higher cognitive decline. similarly sleep duration ($p<0.001$), smoking habit ($p<0.001$) and co-morbidities ($p=0.001$) were significantly associated with dementia. Respondents with poor sleep, chronic disease and smoking habit had lower cognitive score. Conclusion: Dementia is prevalent in community, one of the growing public health concerns of cognitive impairment in elderly population. Age, gender, and smoking habit alcohol taking behavior, sleeping hour all have an impact on the prevalence of cognitive impairment.

KEYWORDS

Community, Community Screening, Instrument of Dementia, Co-morbidity, Dementia, Senior citizens

INTRODUCTION

Ageing is a natural, lifelong, and continuous biological process that begins at conception and ends with death. In Nepal, individuals aged 60 years and above are legally recognized as senior citizens, as defined by the Senior Citizens Act, 2063 (2006), which was enacted to ensure the protection and social security of older adults.[1] Population ageing is a global phenomenon observed across countries, irrespective of their level of socioeconomic development.[2] According to the most recent census, the proportion of older adults in Nepal has increased by 38.2% compared to the 2011 census, indicating a rapid demographic transition.[3] Older adults are disproportionately affected by mental health problems, making this issue a significant public health concern. The Global Burden of Disease Study 2019 reported that mental disorders accounted for approximately 5% of the total global disease burden.[4] Loneliness and social isolation have been identified as major contributors to mental health conditions in later life. It

is estimated that around 14% of individuals aged 70 years and above are living with a mental disorder, and these conditions contribute to 6.8% of the total years lived with disability in this age group.[5] The World Health Organization Dementia Report has highlighted a substantial and accelerating increase in dementia cases worldwide, particularly in low- and middle-income countries. Memory impairment is common in the ageing population, with studies suggesting that nearly half of individuals aged 50 years and older experience some degree of cognitive or memory decline.[6]

METHODOLOGY

A descriptive cross-sectional study was conducted for this research. A purposive sampling technique was applied to recruit participants. Data were collected through face-to-face interviews conducted between 13 February 2025 and 30 March 2025 among senior citizens residing in Mahalaxmi Municipality, Ward No. 4. All participants were assured of anonymity and confidentiality, and no personal identifiers, including names or identification numbers, were included in the questionnaire. Written informed consent was obtained from each respondent prior to data collection. Ethical approval for the study was granted by the Nepal Health Research Council (Reference No. 1424). The research instrument comprised two sections: Part A included socio-demographic characteristics of the respondents, while Part B utilized the Community Screening Instrument for Dementia (CSID), a standardized and validated tool. Data were entered and analyzed using SPSS version 20, employing both descriptive and inferential statistical methods. The sample size was determined using the following formula:

P=Prevalence of mental disorder is taken 37.7 (Khattri JB, et al. 2013).
Q= 1-p
A 95% of confidence interval was considered for the estimation
The allowable margin of error was set at 5%.
n=z2pq/e2
= $(1.96)^2$ x (0.375 x 0.625)/ $(0.05)^2$
= 360

RESULTS

The study among 360 senior citizens of Mahalaxmi municipality found that slightly females constituted 186 (51.7%) of the sample, most participants were aged 60–70 years 208 (57.8%), and the mean age was 70.28 years. Most respondents followed the Hindu religion 166 (46.1%) and belong to the Brahmin/ Chhetri ethnicity 169 (46.9%). A large portion lived in joint families 151(41.9%), and considerable number were illiterate149 (41.4%). More than half were married 208(57.8%) and unemployed 75 (71.9%), while most (73.3%) consumed a mixed diet. Regarding health habit, around a quarter of the respondents slept less than four hours and only a small portion were current smoker 77 (21.4%) where alcohol users 64(17.8%).

Near about half 174 (48.3%) of respondents only receiving fund from local government followed by more than half 186 (51.7%) were not receiving. More than half of fund receiver respondents. More than fifty 51(29.14%) of respondents were buying medicine from that amount. Majority of respondents 291(80.8%) of respondents keep wish to die at home.

Table 1: Community Screening Instrument for Dementia (CSI-D) Level among Respondents

Categories	Score	Frequency	Percent
Probable	0-4	58	16.1%
Possible	5-6	114	31.7%
Normal	7-9	188	52.2%
Mean score age ± SD= 5.96, ±1.27			

Characteristic	Categories	Level of CSID			X2 value	p-value
		Probable (0-4)	Possible (5-6)	Normal (7-9)		
Age range in years	60-70	8 (3.8%)	45 (21.6%)	155 (74.5%)	136.726	<0.001
	71-80	17 (19.5%)	47 (54.0%)	23 (26.4%)		
	81 and above	33 (50.8%)	22(33.8%)	10 (15.4%)		
	Total (%)	58 (16.1%)	114 (31.7%)	188 (52.2%)		
Gender	Male	35 (20.1%)	67 (38.5%)	72(41.4%)	15.907	<0.001
	Female	23 (12.4%)	47 (25.3%)	116 (62.4%)		
	Total (%)	58 (16.1%)	114 (31.7%)	188 (52.2%)		
Ethnicity	Dalit, Madhesi, Janajati	29 (15.2%)	58 (30.4%)	104 (54.5%)	.821	.663
	Bhramin & chhetri	29 (17.2%)	56 (33.1%)	84 (49.7%)		
	Total (%)	58 (16.1%)	114 (31.7%)	188 (52.2%)		
Ethnicity	Illiterate	27 (18.1%)	44 (29.5%)	78 (52.3%)	1.005	.605
	Literate	31 (14.7%)	70 (33.2%)	110 (52.1%)		
	Total (%)	58 (16.1%)	114 (31.7%)	188 (52.2%)		
Marital Status	Married	33 (15.9%)	59 (28.4%)	116(55.8%)	2.90	.234
	Others	25 (16.4%)	55 (36.2%)	72 (47.4%)		
	Total (%)	58 (16.1%)	114 (31.7%)	188 (52.2%)		
Types of Family	Nuclear	7 (7.4%)	31(32.6%)	57 (60.0%)	15.482	.004
	Joint	21(13.9%)	48(31.8%)	82(54.3%)		
	Extended	30 (26.3%)	35(30.7%)	49 (43.0%)		
	Total (%)	58 (16.1%)	114 (31.7%)	188 (52.2%)		

Chi-Square test applied; level of significance set at p<0.005

Table 2. Shows that Chi-square test of independence was used to observe relationship between CSID score level and demographic variables. The results shows a statistically significant association between cognitive status and age (x2=136.726, P<.001) gender (x2=15.907, P<.001), and types of family (x2=15.482, p=.004). older respondents and male were more likely to fall into the probable and possible categories for cognitive impairment. Additionally individuals form from joint families

were more likely to show low cognitive decline as compared to those from nuclear families. No significant association were found for ethnicity (p=.663), education (p=.605) and marital status (p=.234).

Table 3: Association between Level of CSID with Clinical characteristics

Characteristic	Categories	Level of CSID			X2 value	p-value
		Probable (0-4)	Possible (5-6)	Normal (7-9)		
Dietary habit	Vegetarian	22 (22.9%)	32(33.3%)	42 (43.8%)	5.677	.058
	Mixed	36 (13.6%)	82(31.1%)	146 (55.3%)		
	Total (%)	58(16.1%)	114(31.7%)	188 (52.2%)		
Sleeping hour	Less than 4 hours	33(36.3%)	29(31.9%)	29(31.9%)	45.165	.<0.001
	5-6 hours	22(11.6%)	63(33.3%)	104(55.0%)		
	7 hours & more	3(3.8%)	22(27.5%)	55(68.8%)		
	Total (%)	58(16.1%)	114(31.7%)	188(52.2%)		
Smoking habit	Yes	14 (18.2%)	37 (48.1%)	26 (33.8%)	14.940	<0.001
	No	44 (15.5%)	77 (27.2%)	162 (57.2%)		
	Total (%)	58 (16.1%)	114 (31.7%)	188 (52.2%)		
Alcohol Taking Behavior	Yes	7 (10.9%)	17(26.6%)	40(62.5%)	2.037	.361
	No	34(16.0%)	66(31.1%)	112(52.8%)		
	Total (%)	41 (14.9%)	83 (30.1%)	152(55.1%		
Physical co-morbidity	Yes	57(17.6%)	108(33.3%)	159(49.1%)	13.405	.001 (NA)
	No	1(2.8%)	6(16.7%)	29(80.6%)		
	Total (%)	58(16.1%)	114(31.7%)	188(52.2%)		

Chi-Square test applied; level of significance set at p<0.005
Note: (NA)= not applicable because of one cell value less than 5.

Table 3 show that statistically significant association between CSID levels and sleep duration (x2=45.165, p<.001), smoking (x2=22.832, p<.001) and physical co-morbidity (x2=13.405, p<.001). Respondents with shorter sleep duration, smokers and those with physical co-morbidity were more likely to have lower cognitive scores. No significant association were found between CSID levels and dietary habit (p=.058), alcohol consumption history (p=.361) although dietary variable approached significance. There is significant association found between physical co-morbidity and cognitive status (P=.001). Participant without co-morbidity had much better cognitive scores (80.6%) score normal. Those with co-morbidity had much higher rates of impairment. This suggests that physical health is strongly linked to cognitive health in this senior population.

Variables	Categories	Prevalence Dementia		Odds Ratio	95% Confidence Interval		X2	P value
		Present (CSID Probable 0-4, possible 5-6)	Present (CSID Probable 0-4, possible 5-6)		Lower	Upper		
Age	>70	119 (78.3%)	33 (21.7%)	10.546	6.423	17.317	98.160	<0.001
	70 or less	53(25.5%)	155 (74.5%)					
Gender	Male	102(58.6%	72(41.4%)	2.348	1.538	3.584	15.869	<0.001
	Female	70(37.6%)	116(62.4%)					
Education	Illiterate	71(47.7%)	78(52.3%)	.991	.651	1.509	.002	.968
	Literate	101(47.9%)	110 (52.1%)					
Marital status	Married	92 (44.2%)	116 (55.8%)	.714	.469	1.086	2.484	.115
	Others	80(52.6%)	72(47.4%)					
Types of family	Nuclear	38 (40.0%)	57 (60.0%)	.652	.405	1.049	3.129	.077
	Joint & extended	134 (50.6%)	131 (49.4%)					
Ethnicity	Dalit+ Madhesi + Janajati	87 (45.5%)	104(54.5%)	.827	.546	1.252	.809	.368
	Brahmin & Chhetri	85 (50.3%)	84(49.7%)					
Religion	Hindu	85(51.2%)	81(48.8%)	1.291	.852	1.956	1.450	.229
	Others	87(44.8%)	107(55.2%)					

Table 4 shows older adults above 70 years had markedly higher prevalence of dementia (78.3%) as compared to those aged 70 years or below (25.5%). The odds of having dementia among individuals aged above 70 years were approximately 10.5 times higher (OR=10.546, 95% CL:6.423-17.317,p<0.001) than those aged 70 years or below, including a strong and statistically significant association between advancing age and dementia. Similarly, gender showed a significant association with dementia (x2=15.869, p<0.001)

Clinical characteristic	Categories	Prevalence Dementia		Odds Ratio	95% Confidence Interval		X2	P value
		Present CSID Probable 0-4, possible 5-6)	Absent (CSID normal 7-9)		Lower	Upper		
Co-morbidity	Yes	165 (50.9%)	159 (49.1%)	4.299	1.831	10.095	12.870	<0.001
	No	7(19.4%)	29(80.6%)					
Sleeping hour	Less than 6 hour	147 (52.5%)	133(47.5%)	2.432	1.434	4.122	11.261	<0.001
	More than 6 hour	25 (31.2%)	55 (68.8%)					
Alcohol intake	Yes	24(37.5%)	40 (62.5%)	.672	.379	1.192	1.858	.173
	No	100 (47.2%)	112(52.8%)					
Smoking Habit	Yes	51 (66.2%)	26 (33.8%)	3.557	2.052	6.165	21.589	<0.001
	No	75 (35.5%)	136(64.5%)					
Types of diet	Vegetarian	54(56.2%)	42(43.8%)	1.591	.994	2.547	3.766	.052
	Mixed Diet	118(44.7%)	146(55.3%)					

Table 5 shows that out of total 360 respondents, significant association were observed with co-morbidity, sleeping hours and smoking. Participants who had co-morbid conditions such as hypertension, diabetes or other chronic illness) demonstrated a s higher prevalence (50.9%) related to persons without co-morbidities (19.4%). The odds of developing dementia were about 4.3 times higher among those with co-morbidities (OR=4.299, 95% CL: 1.831-10.095, p<0.005), indicating statistically significant relationship .between the presence of co-morbid illness and cognitive impairment.

Similarly participants who slept less than 6 hours per night had substantially higher prevalence of dementia (52.5%) compared to those who slept more than 6 hours (31.2%). Those with shorter sleep duration were about 2.4 times additional to have dementia (OR= 2.432, 95% CL: 1.434-4.122, p=0.001). Sleep deprivation appears to be associated with a higher likelihood of cognitive deterioration. A significant association was also found between smoking habit and dementia (x2=21.589, p<0.001). Prevalence of dementia among smokers was 66.2% compared to 35.5% among non-smokers. The odds of dementia were 3.6 times higher among smokers (OR=3.557, 95% CL: 2.052-6.165) suggesting that smoking contributes significantly to the risk of dementia.

DISCUSSION

The present study identified 58 older adults (16.1%) with suspected probable cognitive impairment or dementia. Higher prevalence was observed among males, individuals over 70 years of age, those living in nuclear families, short sleepers, smokers, and participants with co-morbidities. This rate is higher than the 4% reported in the World Alzheimer Report (2016) using brief screening tools. The 10/66 Group also reported considerable variation in dementia prevalence, ranging from 2.1% to 8.5% among adults aged 60 and above across 21 global regions. 4 Meta-analytic estimates generally ranged from 5%, with the highest rates in Latin America (8.5%) and the lowest in Sub-Saharan Africa (2–4%).7 In comparison, recent studies in Nepal reported higher prevalence: 75% of older adults in residential care homes showed dementia symptoms using the Cognitive Impairment Test (CIT), 8while another study found 53.7% prevalence, particularly among females and older participants. 9A cross-sectional study in the lowland region of Nepal among 115 adults aged 60 and above reported 93% with signs of mild cognitive impairment using the Montreal Cognitive Assessment (MoCA).11 These differences may be attributed to variations in study settings, assessment tools, and biological or environmental factors. The findings underscore that estimates of cognitive impairment and suspected dementia can vary substantially depending on the methods and context, highlighting the importance of careful interpretation when comparing studies across populations.

This study found male gender showed a significant association or high prevalence than female. (OR=2.348, p<0.001). This indicates that older men were more prone to have dementia compared to female counterparts. These findings found contrast with previous studies that have Observed a higher rate of dementia in females.10 The dissimilarity could be attributed to socio-cultural, biological and behavioral factors. In many Nepalese communities, male are often exposed to greater levels of occupational and environmental stress, alcohol consumption and smoking each of which are recognized determinant of cognitive impairment or dementia. Additionally men may be less likely to seek regular health check-up or screening leading to delayed diagnosis and management of comorbid such as hypertension and diabetes. Other earlier studies suggesting higher dementia prevalence among females often related the finding to longer life expectancy among women and postmenopausal hormonal changes, which increase vulnerability to develop cognitive impairment.

Present study found that age >70 years was strongly associated with higher odds of dementia. This finding is in line of earlier studies conducted in different setting. The study observed a steady increase in cognitive impairment and suspected dementia with age, reflecting a clear age effect, consistent with previous research showing that dementia risk grows with age 11.

Present study found that almost equal proportion of respondents 47.9% among illiterate and 47.7% among literate were risk of dementia, suggesting that literatcy status did no show a marked difference in cognitive impairment. This contrast with findings from other studies, where most participant with dementia or cognitive impairment were educated below the intermediate level (83.3%), indicating a possible protective role of higher education,12 this variation may be due to the difference in education quality life style and cognitive engagement of older adults as well as sociocultural factors infulecing metal stiulation in daily life. In consistent was also observed with other study finding was seen in a descriptive cross-sectional study done in an OPD of another tertiary care hospital in Nepal. 13 In this study, literacy status was not significantly associated with dementia, likely due to limited variability in educational levels and the use of a binary literacy classification in a setting with generally low formal education, and this finding should be interpreted within its sociocultural context rather than as a contradiction to evidence showing a protective effect of higher education in other populations.

Present study found that Respondents with shorter sleep duration, smokers and those with physical co-morbidity were more likely to have lower cognitive scores. Common co-morbidity were hypertension (48.6%0, COPD (20.0%), diabetes mellitus (24.0%) and thyroid problem 14.0%). These findings are consistent with the understanding that chronic physical illness contribute to cognitive impairment through vascular, metabolic and metabolic pathways. Similar results were reported in another study, The presence of comorbidities such as cerebrovascular disease, cirrhosis, asthma, and diabetes mellitus was significantly associated with an increased likelihood of dementia, with odds ratios of 3.35 (95% CI: 2.62–4.28), 3.29 (95% CI: 1.29–8.41), 1.56 (95% CI: 1.07–2.27), and 1.24 (95% CI: 1.07–1.44), respectively. Comorbidity may increase risk for dementia because of cumulative burden of systemic disease that affect brain function.14 Additionally another study found that among the participants, 17.8% had hearing loss, 37.9% had hypertension, 24.1% had diabetes, 25.9% reported harmful alcohol use, 55.2% reported harmful nicotine use, and 8% had a history of traumatic brain injury or obesity. Hypertension and diabetes mellitus can cause micro-vascular damage and reduce cerebral perfusion, leading neuronal loss and cognitive decline. Similarly COPD and other chronic respiratory disease may result in long-term hypoxia, which negatively affects brain metabolism. Smoking further exacerbates oxidative stress and vascular injury, accelerating neurogenerative process. These consistent findings among the research study suggest that there is some modifiable lifestyle and physical health related factors play a important role in the growth of dementia. Although co-morbidity was significantly associated with dementia, the wide confidence interval suggests limited precision of the estimate, possibly due to a smaller number of participants with co-morbid conditions. Therefore, this finding should be interpreted with caution.

The present study revealed that 16.1% of senior citizens in Mahalaxmi municipality were suspected of having probable dementia with higher prevalence among male, individuals aged above 70 years, smokers short sleepers and those with physical co-morbidities. The prevalence observed was lower than some national studies but higher than global maters, possibility due to difference in screening tool, study setting an population characteristics. These findings highlighting

the importance of addressing modifiable lifestyle and health related risk factors to prevent or delay onset of dementia among older adults. Regarding tools such as MoCA and CSID are commonly used for cognitive assessment; the CSID has been specifically validated in culturally similar settings and demonstrates acceptable reliability and sensitivity for community-based dementia detection. Differences in tool characteristics, including sensitivity, specificity, and cultural appropriateness, should be considered when interpreting findings and comparing across studies. A shortened version of the Community Screening Instrument for Dementia (CSI-D) retains the strong screening performance of the full assessment and can be effectively used by non-specialists in low-resource settings.

CONCLUSION

Dementia is a prevalent and growing public health concern among the senior citizens. In Nepal, a substantial proportion of older adults are at risk of cognitive impairment, which is influenced by multiple factors. Age, gender, smoking habits, alcohol consumption, and sleep duration were all found to be associated with the prevalence of cognitive impairment in this population.

RECOMMENDATION

Regular community based screening programme should be conducted to identify older adults at risk of dementia. Early detection will enable time diagnosis, appropriate treatment and better management of cognitive decline. Future studies should employ probability-based sampling techniques and larger sample sizes to enhance representativeness and generalizability. Longitudinal study designs are recommended to better examine causal relationships between risk factors and dementia. Further research covering multiple communities and diverse settings is suggested to improve external validity. In addition, community-based screening programs and awareness initiatives focusing on modifiable risk factors may be beneficial for early identification and prevention of dementia among older adults.

LIMITATION

Present study design was cross-sectional, therefore temporal relationship between contributing factors with dementia. Present study conducted at community excludes institutionalized senior citizens, underestimating severe cases. CSID tool is a screening, not diagnostic tool. Probable dementia is not clinically confirmed.

CONFLICT OF INTEREST

None

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