HOSPITAL ADMISSIONS AND THE FINANCIAL COST INCURRED BY THE ELDERLY PATIENTS AT A TERTIARY CARE CENTRE IN GOKARNESHWOR MUNICIPALITY, KATHMANDU, NEPAL

Niraj Shrestha,[1] Leepy Paudel,[2] Prakriti Baral[3]

[1]Department of Community Medicine, [2]Department of Neurosurgery, [3]Department of Oncology, Nepal Medical College and Teaching Hospital, Attarkhel, Gokarneshwor-8, Kathmandu, Nepal

ABSTRACT

Population ageing is a global phenomenon and proportion of elderly people is also increasing in Nepal. However, the increased burden of chronic disease as a result of population ageing, along with medical cost incurred during hospital stay is yet to be explored in Nepal. With the aim of studying these, data of 527 patients 70 years of age and above admitted to Nepal Medical College Teaching hospital, the largest tertiary care center in Gokarneshwor Municipality, was collected from November 2021 to November 2022 and analyzed. Seventy-four percent of the patients were of 70-80 years of age and male: female ratio was almost equal to 1:1. The most common cause of admission was respiratory problems. The cost was not more than Nepali rupees 19,200 for 82% of the patients and the duration of stay was less than 6 days for 75% of the patients. No significant association was found between duration of hospital stay and the age group or the gender. Similarly, no significant association was found between the medical cost incurred during hospital stay and the age group. However, association was found between the hospital cost and gender with males more likely to have higher cost.

KEYWORDS

Financial cost, elderly, tertiary care, Gokarneshwor, Nepal

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CORRESPONDING AUTHOR

Dr. Niraj Shrestha
Associate Professor
Department of Community Medicine
Nepal Medical College and Teaching Hospital
Attarkhel, Gokarneshwor – 8, Kathmandu, Nepal
Email: drniraj.shrestha@nmcth.edu
Orcid No: https://orcid.org/0000-0002-2974-9088
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INTRODUCTION

Population ageing is a shift in the distribution of a country's population towards older ages and is usually reflected in an increase in the population's mean and median ages, a decline in the proportion of the population composed of children, and a rise in the proportion of the population composed of elderly. The aging of populations is occurring in all parts of the world driven by a combination of increasing average life expectancy and decreasing birth rates.[1] Globally, the number of people aged 65 years and above was 841 million in 2013 AD and is expected to more than double to more than 2 billion in the year 2050 AD.[2] The national census of Nepal reveals that the population above the age of 60 was 5% in 1951, 5.8% in 1991, 6.5% in 2001 and 8.1% in 2011.[3] Similarly, according to World Atlas Data-Nepal, population aged 65 years and above of Nepal increased from 3.3 % in 1973 to 6.1% in 2022 growing at an average annual rate of 1.2 percent which is more than nation's growth rate. Though more than half of population falls in the 15-59-year category which conforms that Nepal's population is primarily young, it will shift into the category of 60 and above in a few decades.[4] Though increased life expectancy is a sign of progress, increasing age is also an independent risk factor for respiratory disease, cardiovascular disease, diabetes, and many other chronic conditions. These chronic conditions lead to longer use of health services and increased health care costs. Yet, knowledge regarding different aspects of geriatric health in Nepal is limited.[5] Also, the old age allowance provided to elderly people 70 years and above in Nepal, which was NRs 4000 per month in Fiscal year 2021/22, is not sufficient to meet the health-related expense.[6,7] Studies have also shown that medical treatment of elderly was associated with catastrophic health expenditure where the treatment cost exceeds 10% of the annual household expenditure or income.[8] However, another studies have used and shown that the appropriate cut off point for catastrophic health expenditure for the proportion of out-of-pocket health payments to total expenditure was the threshold of 20% of total expenditure.[9,10] The other criteria for catastrophic health expenditure is if a household's financial contributions to the health system exceed 40% of income remaining after basic needs have been met.[11]

As per restructuring of the administrative units in Nepal into Federal Structure in September 2015 it consists of six Metropolitan Cities, 11 Sub-Metropolitan Cities, 276 urban Municipalities and 460 rural Municipality.[12] Gokarneshwor Municipality with the population of 149,366 is one of the 276 urban municipalities. Elderly people 70 years and above constitutes 4.4% of the total population of Nepal and 1.4% of the total population of Gokarneshwor Municipality.[13] The data obtained from Nepal Medical College Teaching Hospital related to elderly hospital admissions and the cost incurred is of importance as it is one of the few tertiary centers and the largest tertiary center in Gokarneshwor Municipality.

As data on medical expenditure for the elderly people is very scarce and considering the fact that the proportion of elderly people is increasing in Nepal, this type of research can add to the information for the local as well as other tiers of government in Nepal which may be used in developing welfare and insurance schemes for its elderly citizens.

METHODS AND MATERIALS

After getting ethical approval from the Research Institutional Review Committee of Nepal Medical College (Ref. No. 038 – 078/079) and the Hospital Management of the teaching hospital, data related to the elderly patient aged 70 years and above admitted to the hospital was collected from November 2021 till November 2022, a one-year period, from the record section of Nepal Medical College Teaching Hospital.

There were 527 elderly patients admitted and discharged during this period. In this hospital based descriptive study, data collected was on the diagnosis of the patient, duration of their stay in the hospital and expenditure for hospital services during the stay. The cost included bed charge, cost of investigations and procedural costs. The cost of medicines during the hospital stay could not be included. If the same patient was admitted more than once in this period, their cost and the duration of stay was added. Patients who were referred to other hospitals or left against medical advice were excluded from this study.

As Nepalese Rupees (NRs.) 48,000 is provided by Nepal's government in a year to the elderly people aged 70 years and above,[7] the number of elderly patients whose hospital cost exceeded 10% (NRs. 4,800) and 20% (NRs. 9,600) of this social benefit was assessed for finding out about catastrophic health expenditures based on the social benefits received from the government. Both of these threshold values have been used in studies related to catastrophic health expenditures.[8,9] Twenty percent and 40% of the government's annual social benefit amount for the elderly citizens were used for the category of the hospital cost incurred.

Data was entered using SPSS 16 and chi square test was applied with level of significance set at 0.05 to see if the age group and gender was associated with the duration of hospital stay and hospital related cost incurred.

RESULTS

As shown in Table 1, majority of the elderly patients admitted were in the age range 70-80 years (74%). The mean age of the subjects was 77.1 with standard deviation of 6.1 years. The number of males and females admitted was almost equal and over two fifths of the patients were of *Brahmin/Chettri* ethnicity (almost 41%) followed by the *Tamangs* (24%).

Table 1: Socio demographic profile of the subjects (N = 527)

	n	%
Age		
70-75	255	48.4
76-80	136	25.8
81-85	77	14.6
86-90	44	8.3
>90	15	2.9
Gender		
Male	265	50.3
Female	262	49.7
Caste/Ethnicity		
Brahmin/Chettri	216	41.0
Tamangs	125	23.7
Newars	68	12.9
Sherpas	43	8.2
Others	75	14.2

As shown in Table 2, most of the admitted cases of the elderly patients was due to respiratory problems (40%). This was followed by cases admitted in the Department of Surgery (13.4%) amongst which most was related to the gall bladder followed by hernia problem. However, cases related to neurosurgery has not been included in this category. Cases related to neurology and those requiring neuro surgical intervention accounted for 12.7% of the total cases.

Around 10% of the cases admitted was for treatment of cancer. Amongst all the cancers more than 50% was that related to gastrointestinal system.

Almost 5% of the admissions was for renal disease, 4.6% for general infections and 2.8% of admissions was for hepatic disease.

Table 2: Cause of admissions of the elderly (N- 527)

	Cause of admission	n	%
i	Respiratory	212	40.2
ii	Surgical admission (n -71)		
	a. Related to the gall bladder	*18*	
	b. Related to hernia	*12*	
	c. Related to prostate	*10*	
	d. Pancreatitis	8	
	e. Related to other urology problems	*6*	
	f. Related to appendix	*5*	
	g. Others	12	
	Total cases in Surgery Department	71	13.5
iii	Neurology and neurosurgical cases	67	12.7
iv	Cancer	55	10.4
v	Renal	26	4.9
vi	Infective	24	4.6
vii	Hepatic	15	2.8
viii	Orthopedic	12	2.3
ix	Cardiology	11	2.1
x	Endocrine	10	1.9
xi	Gynecology	5	1.0
xii	Psychiatric	3	0.6
xiii	Others	6	1.1
xiv	Death	10	1.9

Table 3: Total cost during hospitalization and duration of hospital stay (N = 527)

Total cost in NRs.			
	>4,800	370	70.2%
	>9,600	253	48.0%
i	< = 9,600	274	52.0%
ii	9,601-19,200	158	30.0%
iii	>19,200	95	18.0%
Duration of hospital stay in days			
i	< 6 days	395	75.0%
ii	>= 6 days	132	25.0%

Out of the ten deaths the cause was sepsis for 50%, followed by respiratory tract infections.

As shown in Table 3, when NRs. 4,800, which is 10% of the social benefit amount provided by the government in a year, was used as a cut off point for catastrophic health expenditure, it was faced by 70.2% of the total elderly patients

Table 4: Association between the age group and gender with the duration of hospital stay

	Duration of hospital stay			
	<6 (days)	>=6 (days)	Total	P value
Age in years				
70-75	184	71	255	0.15
>75	211	61	272	
Gender				
Male	195	70	265	
Female	200	62	262	0.47
Total	**395**	**132**	**527**	

with interquartile range of 4 days. The longest duration of stay was 20 days for a psychiatry case.

It can be seen from Table 4 that the duration of hospital stay was not significantly associated with the age group and gender.

From Table 5 it can be seen that total cost for hospital services was significantly associated with the age group with older age group (>75 years) more likely to face higher cost. *However, when linear regression analysis was done between age and the hospital cost incurred, with r value of 0.048 and p value of 0.27 no significant correlation was seen between the age group and the hospital cost.*

Table 5: Association between the age group and the cost incurred in hospital

	Cost incurred in the hospital in Nepali rupees (N -527)			
	<=9,600	>9,600	Total	P value
Age in years				
70-75	148 (28.1%)	107 (20.3%)	255 (48.4%)	
>75	126 (23.9%)	146 (27.7%)	272	0.007
Total	274 (52.0%)	253 (48.0%)	527 (100%)	
cOR (95% CI)		*1.60 (1.14 - 2.26)*		

Table 6: Association between gender and the cost incurred in hospital

	Cost incurred in the hospital in NRs. (n-527)		Total	P value
	< = 9,600	>9,600		
Gender				
Male	125 (23.7%)	140 (26.6%)	265 (50.3%)	0.03
Female	149 (28.3%)	113 (21.4%)	262 (49.7%)	
	274 (52.0%)	253 (48.0%)	527 (100%)	
cOR (95%CI)		1.48(1.05-2.08)		

admitted. However, when the threshold of 20% of the social benefit was used (ie NRs 9600), it was seen that 48% of the total elderly admissions faced catastrophic expenditures. For 18% of the elderly admissions, it was more than NRs. 19,200, this amount being equal to 40% of the money received by the elderly people as social benefit. Thirty percent of the elderly admissions had the hospital cost between NRs 9,601 and NRs 19,200. The median cost of hospital stay was NRs 9240 with interquartile range of NRs. 13,553. The maximum cost was NRs 205,457 for a case of 72-year-old female suffering from Chronic Obstructive Pulmonary Disease with sepsis whose duration of hospital stay was 15 days.

For almost 75% of the admissions, hospital stay was less than 6 days and for another 20.5% of the admissions it was between 6 to 10 days. The median stay duration was 4 days

As shown in Table 6 significant association was seen between gender and cost incurred in hospital with males more likely to face higher health expenditure.

DISCUSSION

The most common cause of admission in this study was respiratory problems which accounted to 40% of the total admissions. This result is similar to the findings of Patan Academy of Health Science (PAHS) where almost 53% of the elderly admissions was due to respiratory problems.[3] Similarly, in a study carried out in 84 elderly patients admitted to the emergency department of a tertiary hospital in Chennai, the most common reason was the shortness of breath which accounted to 32% of the total

admissions.[14] In a study conducted in three hospitals in city of Poland showed that the most frequent reasons for hospital admission of the elderly were cardiovascular diseases (CVD) (54.7%) and respiratory tract diseases (19.9%).[15] Similar to the findings of this study, a study done on surgical outcomes of geriatric population in United States also showed that the common cause of surgical admission was related to gall bladder and hernia.[16]

In this study sepsis was cause for 50% of the deaths followed by respiratory illness. In a study done in PAHS in geriatric patients, respiratory illness was the most common cause of death.[3] A study done in 2415 elderly patients who died in a hospital of Tehran, Iran showed that the most common cause of death was stroke followed by septic shock.[17]

In this one-year study, for 70% of the elderly admissions, the cost exceeded NRs. 4,800 which is 10% of the social benefit provided by the government of Nepal and hence would account to catastrophic health expenditure. An analysis from the data of Nepal Living Standard Survey III involving 5,988 households showed that 11.11% of households had faced catastrophic health expenditure.[18] In a cross-sectional household survey of 606 older adults in 2019 in Shandong province, China the incidence of catastrophic health expenditure was 64 percent.[19] Similarly, from a study carried out in 42,949 households from Longitudinal Aging Study in India (LASI), it was concluded that households with high old-age dependency had a higher probability of incurring catastrophic health expenditure.[20] However all of these studies have used the health expenditure in excess to 40% of income after subsistence needs fulfilled as the criteria for catastrophic household expenditure.[10]

In this study for 95% of the total elderly admissions the duration of hospital stay did not exceed 10 days. In a study involving 523 elderly patients admitted to the clinical and surgical wards of a tertiary hospital in Brazil, 33 (6.3%) remained hospitalized for more than 10 days.[21] Similarly, in a study done on elderly admitted to a teaching hospital in Tehran the mean duration of hospital stay amongst the elderly patients was 7.7 days.[22]

In this study no significant association was found between the gender or older age groups and duration of hospital stay. However, a study done in 150 elderly patients at a tertiary care rural hospital in Karnataka, South India showed that duration of hospitalization was more among females. The same study done in Karnataka also showed that the medical costs was higher in females but this study has shown that it is lower than in the males.[23] A study done in the elderly patients in University Clinical Hospital in Wroclaw, Poland showed that the mean length of hospital stay was significantly higher in the older age groups.[24]

Though significant association was seen between the older age group and higher hospital cost there was no significant correlation. This finding is different from the study done in elderly patients of a hospital in Poland where significant association was found between the hospital cost and older age.[23]

The cost of health care for the elderly is a fundamental aspect that should be taken into account in the health sector. Although policy-makers cannot stop population aging, it is important that they anticipate the health services needs of the elderly and documentation of costs incurred in hospital can add to the knowledge in health planning for the elderly population. Such documentation of costs can also be used to formulate preventive intervention programs for the elderly. Collecting data on out-of-pocket health expenditures in hospital among older people diagnosed with chronic disease is crucial to strengthen the mechanisms for financial protection in such conditions. One of the challenges faced by National Health Insurance Program (NHIP) of Nepal is budgetary where the reimbursement amount has outweighed the collected premium and this can be due to lack of estimation of the hospital costs.[25] Hence government of all three tiers of Nepal should give importance to studies related to medical costs incurred in hospital admissions of elderly patients.

Strength of the study – This study has used a large sample size and included elderly aged 70 years and above admitted to the hospital for one year period. Studies like this on health expenditures during hospital stay is limited in context to Nepal. More studies like these may be of help in developing health insurance schemes.

Limitations of the study: As the data was extracted from the record section, it did not include the expenditures on medications used during the hospital stay. Similarly, as the family income of the elderly patient and the cost of medication at home could not be known, the proportion of annual family income spent on health could not be determined. If the elderly patient went for medical care in another health institution during the study period,

then the cost incurred in this time would be missed. This study has mainly used 20% of the social benefits received by the elderly as cut off point for catastrophic health expenditure where as many of the studies done have used the threshold of 40% of the remaining family income after subsistence has been met.

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