

Cost analyses of hospital admissions among the elderly seeking care at a rural tertiary care hospital, South India

Ruchi R. Tripathi¹, Mahendra M. Reddy², Ananta Bhattacharyya^{2,3}

¹Sri Devaraj Urs Medical College, Sri Devaraj Urs Academy of Higher Education and Research, ²Department of Community Medicine, Sri Devaraj Urs Medical College, Sri Devaraj Urs Academy of Higher Education and Research, ³Media and Communication Centre, Sri Devaraj Urs Academy of Higher Education and Research, Tamaka, Kolar, Karnataka, India

ABSTRACT

Introduction: In a developing country like India, a proportionately higher number of elderly people live in the rural areas and many of them are financially challenged. Hospitalization and consequent cost thereto pose a heavy burden especially for the elderly. **Objective:** Among elderly in-patients at a tertiary care rural hospital to estimate the average number of episodes of hospitalizations, duration of stay in the hospital, and the direct and indirect costs associated with hospitalizations with 1 year as a reference period. **Materials and Methods:** A structured pre-tested questionnaire was used to capture the details regarding hospitalizations and the costs involved and also the hospital records were verified for the current hospital admission to finally arrive at the direct and indirect costs calculations. Quantitative details like age, episodes of hospitalization in the last 1 year, duration of hospitalization, hospitalization costs, etc., were summarized as median (inter-quartile range [IQR]). Costing analyses were noted separately as direct, indirect, and total costs and expressed in Indian National Rupees (INR). **Results:** The total number of episodes of hospitalization among the 150 study participants was 204 with a mean of 1.36 episodes per person in 1-year duration. The average total cost per episode of hospitalization was found to be INR 11,249 while the average total cost per person per day was INR 1,670.30. The median (IQR) direct and indirect costs were INR 6,222 (3,060–12,670) and INR 690 (200–700), respectively. **Conclusion:** Duration, as well as cost of hospitalization, has been found to be more among females in most age groups among elderly in-patients.

Keywords: Geriatric, health economics, insurance

Introduction

Demographic transition characterized by an increase in the elderly population is a global phenomenon. Population aging has multifarious implications on the society viz. economy, job markets, housing, health care, social protection, family structures and intergenerational ties, and so on.^[1] A 2016 survey undertaken

by the Agewell Foundation indicated that 65% of the elderly people reported themselves as either financially dependent or facing a financial crisis. Notably, about 80% of those in financial difficulties had expressed that the same was due to medical costs.^[2]

The cost of health care during old age is high and increases the out-of-pocket expenditure for the patients.^[3,4] This becomes more evident when facilities of private health care are sought for treatment of ailments. It has been experienced that about half of the expenditure on treatment is incurred toward the procurement of medicines.^[5,6] Elderly people from rural areas in the backdrop of rural distress have a restricted paying capability for health care.^[7]

Address for correspondence: Dr. Ananta Bhattacharyya, Department of Community Medicine, 2nd Floor, Administrative Block, Sri Devaraj Urs Medical College (SDUMC), Sri Devaraj Urs Academy of Higher Education and Research (SDUAHER), Tamaka, Kolar - 563 103, Karnataka, India.
E-mail: docanantab2005@gmail.com

Received: 01-03-2021

Revised: 25-03-2021

Accepted: 11-04-2021

Published: 27-08-2021

Access this article online

Quick Response Code:



Website:
www.jfmpc.com

DOI:
10.4103/jfmpc.jfmpc_418_21

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

How to cite this article: Tripathi RR, Reddy MM, Bhattacharyya A. Cost analyses of hospital admissions among the elderly seeking care at a rural tertiary care hospital, South India. J Family Med Prim Care 2021;10:3071-5.

Pradhan Mantri Suraksha Bima Yojana (PMSBY) though provides accidental death and disability cover at a yearly premium of 12 per annum per member; it gets terminated on the attainment of 70 years of age when the need for such an insurance cover becomes much more significant. In a private sector, health insurance is available at a high premium and not a feasible option in a rural area.^[8] The Pradhan Mantri Jan Arogya Yojana (PMJAY), announced in September 2018, provides an insurance cover of Indian National Rupees (INR) 5 lacs per below poverty line (BPL) family. Many states, including Karnataka, have opted to implement the scheme.^[9]

Under such circumstances, and also there being no previous study from rural Karnataka to the best of our knowledge, a need has been felt to assess the cost of in-patient care and other attributes of hospitalization related to the elderly living in a rural area and also to ascertain the contributory role of the health insurance schemes as the same may provide valuable evidence for planning toward improvement of provision of health care to the elderly living in rural settings. This cross-sectional study was undertaken among elderly in-patients at a tertiary care rural hospital to estimate the average number of episodes of hospitalizations, duration of stay in the hospital, and the direct and indirect costs associated with the hospitalizations with 1 year as a reference period.

Materials and Methods

A cross-sectional study was conducted in a tertiary care hospital located in a rural area of Kolar District, South India, affiliated to a medical college. The majority of the study population belonged to the lower socio-economic class and dependent on agriculture for subsistence. All elderly individuals, aged 60 years and above getting admitted to the said hospital during August and September 2019 with consent were included in the study. However, those having dementia or any psychiatric problems with perceptive and cognitive disabilities were excluded.

It was considered that though the cost analysis would involve a large sample size, even a smaller size could provide valuable inputs regarding health policy and planning. Accordingly, a minimum sample size of 128 elderly patient interviews, equal to 15% of the total bed strength of the hospital (850 beds), was considered adequate to draw the required inference from a single tertiary health care center. A list of elderly patients admitted to the hospital was obtained daily from the Medical Record Section of the hospital and three participants were selected using computer-generated random numbers for the interview every day.

A structured pre-tested questionnaire was developed in English, which was translated into Kannada language and back translated into English, for validation to seek self-reported information from the study subjects. The details of the final diagnosis which were considered as the cause of the hospitalization, the cost of hospitalization, duration of stay in the hospital, details of utilization of any insurance benefits were obtained from the Medical Record Section of the hospital.

Interviews of the selected study participants were conducted by administering the questionnaire to them during their stay in the hospital by a single person fluent in local language after obtaining written informed consent. Scrutiny of relevant current hospitalization documents, obtained from the Medical Records Section of the hospital, was done for getting relevant information. For those cases having a history of prior hospitalization, related documents were scrutinized, whenever available. Otherwise, the informant's accounts were relied upon.

Ethical approval was obtained from the Institutional Ethical Committee before the commencement of the study (No. SDUMC/KLR/IEC/23/2019-20). The data gathered from the study subjects have been stored digitally maintaining secrecy and confidentiality.

Data were single entered using EpiData software version 3.1 (EpiData Association, Odense, Denmark) and were analyzed using EpiData Analysis V.2.2.2.178. Quantitative details like age, episodes of hospitalization in the last 1 year, duration of hospitalization, hospitalization costs, etc., were summarized as median (inter-quartile range [IQR]). Qualitative characteristics were reflected as counts (percentage). Costing analyses were noted separately as direct, indirect, and total costs and expressed in INR.

Operational definitions

Elderly or old person

Any person aged 60 years and above irrespective of gender.

Hospitalization

Stay in a hospital for a continuous period of at least 24 hours

Duration of hospitalization

The number of calendar days of hospital stay or part thereof was taken as the duration of hospital stay.

Direct cost of hospitalization

Any expenditure incurred related to a patient during the hospital admission, period of hospitalization, and discharge involving expendable medical store items or drugs, diagnostics, ward, and allied charges, surgical charges, consultancy charges, miscellaneous charges were included in the direct cost.

Indirect cost of hospitalization

Any expenditure incurred related to the loss of wages of the patient or his/her family members, ambulance or other transport charges, expenditure on food and stay, or any other incidental expenditures related to hospitalization of a patient was considered as indirect cost.

Results

Out of a total of 168 hospitalized patients meeting the inclusion and exclusion criteria interviewed, 18 had given incomplete information, and hence, were excluded from the final analysis.

Thus, the data pertaining to the remaining hospitalized patients were analyzed (N = 150) and reported.

Of the 150 study participants, 89 (59.3%) were male and 61 (40.7%) were female with the mean age of males and females being 69 (7.5) years and 66.3 (6.6) years, respectively. The detailed socio-demographic profile has been given in Table 1.

The number of admissions in the Paying General wards were 135 (90%), whereas only 15 (10%) patients opted for the Paying Special wards.

The median duration of hospitalization was different across the age groups. The median duration of hospitalization was higher for females in 60–79 years age groups. In the 80–89 years age group, the median duration of hospitalization was similar in both sexes [Table 2].

A majority of the patients (75.4%) had only one episode of hospitalization. It was also found that as the number of episodes of the hospitalization increased, a progressively lesser number of patients had a history of multiple episodes of hospitalization with the least being four episodes of hospitalization involving 2% of the patients [Table 3]. The total number of episodes of hospitalization contributed by all the participants was 204 yielding an average value of 1.36 episodes of hospitalization per person in the last 1 year with a higher value among the males (1.38) than the females (1.33). The average number of episodes of hospitalization was the highest (1.75) in the senior-most age group (80–89 years).

The median total cost of hospitalization was higher among the females in the 60–69 years as well as 70–79 years age groups. A similar trend was noticed in the direct and indirect costs of hospitalization also in these age groups. However, in the 80–89 years age group, it was a reverse trend where the median total cost of hospitalization was higher among the males than females. While direct costs were higher among the males, there was no significant difference in the indirect costs across the gender in this age group. The average total cost per episode of hospitalization was found to be INR 11,249 while the average total cost per person per day was INR 1,670.30 [see Table 4]. The median (IQR) direct and indirect costs were INR 6,222 (3,060–12,670) and INR 690 (200–700), respectively. The cost of hospitalization was met by paying out of pocket by 114 (76.0%) patients. Among them, 13 (8.67%) had resorted to borrowing of money or selling property. While only 1 person (0.67%) availed of the Employees State Insurance scheme, 35 patients (23.33%) were benefited by the PMJAY scheme.

Discussion

The share and size of the elderly population are ever-increasing with demographic transition in the last few decades and is coupled with epidemiological transition indicating a higher proportion of non-communicable diseases (NCDs) as

Table 1: Socio-demographic profile of the elderly in-patients in a rural tertiary care hospital, South India (n=150)

Socio-demographic variable	Frequency, n (%)
Age in years	
60-69	93 (62.0)
70-79	41 (27.3)
80-89	16 (10.7)
Gender	
Male	89 (59.3)
Female	61 (40.7)
Religion	
Hindu	135 (90.0)
Others	15 (10.0)
Caste	
SC/ST	50 (33.3)
OBC	17 (11.3)
Others	83 (55.4)
Education	
Illiterate	67 (44.7)
Primary schooling	62 (41.3)
More than primary schooling	21 (14.0)
Occupation status	
Employed	55 (36.7)
Unemployed	95 (63.3)
Socio-Economic Class*	
Class V	09 (6.0)
Class IV	21 (14.0)
Class III	54 (36.0)
Class II	58 (38.7)
Class I	08 (5.3)

*Modified BG Prasad Classification (May 2019)

Table 2: Age and sex-wise distribution of median duration of hospitalization of the elderly in-patients in a rural tertiary care hospital, South India (n=150)

Age	Sex	Days of hospitalization, median (inter-quartile range)
60-69 years	Male	7 (3-13)
	Female	9 (6-14)
70-79 years	Male	5 (3-8.5)
	Female	7 (5-13)
80-89 years	Male	7 (2-10)
	Female	7 (5-9)

Table 3: Episodes of hospitalization in the last 1 year of the elderly in-patients in a rural tertiary care hospital, South India (n=150)

Number of episodes of hospitalization*	Frequency	Percentage
1	113	75.4
2	23	15.3
3	11	7.3
4	3	2.0

*Considered as stay in hospital for a continuous period of at least 24 hours

compared to the communicable diseases. Higher disease burden rates at older ages result in greater demand for health

Table 4: Age and sex-wise distribution of median direct and indirect cost of hospitalization of the elderly in-patients in a rural tertiary care hospital, South India (n=150)

Age	Sex	Direct Cost* (in INR)	Indirect Cost* (in INR)	Total Cost* (in INR)
60-69 years	Male	5864 (3005-11835)	600 (200-700)	6094 (3605-12935)
	Female	6971 (3220-13045)	700 (600-1200)	8305 (4020-13550)
70-79 years	Male	4352.5 (2477.5-10037.5)	480 (150-700)	4831 (2740-10187.5)
	Female	6020 (2220-10852)	700 (200-1100)	6720 (2920-10952)
80-89 years	Male	8550 (3195-16420)	600 (100-700)	9150 (3895-17120)
	Female	4795 (3220-8035)	700 (700-700)	5495 (3920-8735)

INR→Indian National Rupees. *All costs expressed in median (inter-quartile range)

care, particularly hospitalization.^[10] It is well-known that elderly hospital admissions tend to incur higher expenditures due to increased length of stay and complicated treatment protocols, and also increased requirement of multimodal investigations.^[11] In this study, we tried to document the cost of hospitalization among the elderly and their related attributes.

Serial cross-sectional nationwide surveys from 1995 to 2014 on hospitalization trends in India have shown that the elderly population had a greater proportion of hospitalizations for NCDs with a higher hospitalization rate among the older males.^[10] Though no comments can be made on the rate of hospitalization based on the current study since the same is based in a health care facility. It also documented a higher number of hospitalizations of the male patients (59.3%). A study conducted in rural Haryana found a marginally higher number of hospitalizations among the female patients (51%) as compared to their male counterparts (49%). However, another study conducted at Pune found more male patients (51.66%) than females (48.33%).^[12] These differences could be incidental or due to different population characteristics. As can be seen in our study, more subjects were in the 60–69-year age group as compared to two successively higher age groups with 10 years of class intervals viz. 70–79 years and 80–89 years. A similar finding regarding age distribution was recorded in a community-based study carried out in Puducherry.^[13] This could be due to the fact that a lesser number of people were alive as the age advanced which is a natural phenomenon.

More female patients were found to be confined to bed (33.8%) as against the male patients (19.1%). This could be due to prolonged nutritional deprivation as well as neglect in gaining timely access to adequate treatment. Almost two-thirds of the admitted patients (74.7%) belonged to socio-economic classes II and III. This probably explains why 90% of the patients were observed to have been admitted in the Private General Wards where the hospital charges are lower as compared to the Special Paying Wards.

The average number of episodes of hospitalization was 1.36 per person with the highest value (1.75) in the senior-most age group (80–89 years). Average numbers of hospitalization among the males were marginally higher (1.38) as compared to the females (1.33).

With an average total cost per episode of hospitalization of INR 11,249.70 and average daily cost per person being INR 1670.30, meeting hospitalization cost by such individuals or households is considered a difficult proposition as the study has found that a majority (63.7%) of such patients (which include unemployed able to work, unemployed unable to work, homemakers and dependents) have no source of income. Accessing any private health insurance scheme is also not a feasible option for them.

Though many studies have shown the beneficial effect of health insurance in reducing the out-of-pocket expenditure (OOPE) and catastrophic health spending, the insurance schemes cover only about 20% of the Indian population. Moreover, not all health insurances cover chronic diseases.^[14] The National Health Policy (NHP) 2017 of the Government of India has spelled out an outlay of 2.5% of the Gross Domestic Product (GDP) for spending on health by the year 2025 to cut down the OOPE and catastrophic health expenditure.^[15] The success of the NHP 2017 will depend upon how well it is eventually implemented. The onus is also on the primary care physicians who must take the responsibility of proper and timely referral which could help in not only decreasing the duration of stay but also unnecessary admissions, and thereby, the OOPE. Moreover, appropriate health educational activities by primary care physicians can prevent or delay various geriatric morbidities.^[16]

This study noticed that 114 (76.0%) met the hospitalization cost through OOPE. Only 49 patients (34.7%) had some form of health insurance cover. Even though, the number of PMJAY beneficiaries is less, it is considered encouraging since PMJAY has been launched only about a year before this study was undertaken. It is a reflection on the fact that benefits have started reaching the target population. It is considered a necessity that this health insurance scheme should gain momentum so that the poor do not fall into the trap of debt or catastrophic health expenditure while meeting hospitalization expenses.

This study has some strengths. It tried to examine the factors related to hospitalization among the elderly, a vulnerable group, and that too, living in rural areas where the paying capacity of the individuals is limited. Second, a trained single person fluent in the local language had administered the questionnaire ensuring uniformity in gathering the required information.

Though this study is the first of its kind conducted in rural Karnataka to the best of our knowledge, the study findings are limited by the fact that it has been carried out in a single tertiary care private hospital which restricts its generalizability. Moreover, the majority of the patients belonged to class II socio-economic status as representation from the lower socio-economic status classes was limited. This study does not reflect what happens when patients are admitted to hospitals where treatment and other services are either free or much higher. This study has captured the history of the previous episodes of hospitalization pertaining to the last 1 year only; a similar history over a longer period could have provided more insight.

Conclusion

The duration, as well as the cost of hospitalization, has been found to be more among females in most age groups among the elderly in-patients. Two-thirds of the patients met their hospitalization expenses from household income or savings and the rest borrowed money or sold properties to raise resources. One-fourth of them had some cover of some health insurance schemes. This makes a strong case for the availability of quality and affordable public health care facilities and creating awareness among the economically backward section about making use of the health insurance available in the public sector.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed. Ethical approval was obtained from the Institutional Ethical Committee before the commencement of the study (No. SDUMC/KLR/IEC/23/2019-20 dated 06-06-2019).

Financial support and sponsorship

This project was supported by Indian Council of Medical Research – Short Term Studentship (ICMR – STS) 2019 program (Reference ID: 2019 – 08038).

Conflicts of interest

There are no conflicts of interest.

References

1. Department of Economic and Social Affairs, Population Division, United Nations. World Population Ageing 2015. United Nations, New York. 2015. p. 164.
2. The Hindu Business Line. 65% elderly in India are financially dependent, says Agewell survey-The Hindu Business Line [Internet]. 2016. Available from: <https://www.thehindubusinessline.com/news/65-elderly-in-india-are-financially-dependent-says-agewell-survey/article9180980.ece>. [Last accessed on 2021 Feb 05].
3. Goldman DP, Zissimopoulos J. High out-of-pocket health care spending by the elderly. *Health Aff (Millwood)* 2003;22:194-202.
4. Mohanty SK, Chauhan RK, Mazumdar S, Srivastava A. Out-of-pocket expenditure on health care among elderly and non-elderly households in India. *Soc Indic Res* 2014;115:1137-57.
5. Lipton HL, Lee PR, Philip R, Freeland MS. *Drugs and the Elderly: Clinical, Social, and Policy Perspectives*. Stanford University Press, California. 1988. p. 262.
6. Sum G, Hone T, Atun R, Millett C, Suhrcke M, Mahal A, *et al.* Multimorbidity and out-of-pocket expenditure on medicines: A systematic review. *BMJ Glob Heal* 2018;3:e000505.
7. Narayan S. *Farm Distress in India - Causes and Possible Remedies*. ISAS Insights: No. 530; Institute of South Asian Studies, Singapore. 2018. p. 4.
8. Kishore J. *National Health Programs of India: National Policies & Legislations Related to Health*. New Delhi: Century Publications; 2019.
9. National Health Authority. About Pradhan Mantri Jan Arogya Yojana (PM-JAY) [Internet]. Available from: <https://www.pmjay.gov.in/about-pmjay>. [Last accessed on 2021 Feb 05].
10. Pandey A, Ploubidis GB, Clarke L, Dandona L. Hospitalisation trends in India from serial cross-sectional nationwide surveys: 1995 to 2014. *BMJ Open* 2017;7:e014188.
11. Pobrotyn P, Susło R, Witczak IT, Rypicz Ł, Drobnik J. An analysis of the costs of treating aged patients in a large clinical hospital in Poland under the pressure of recent demographic trends. *Arch Med Sci* 2020;16:666-71.
12. Raut A, Vohra F, Surve R, Pawar A. A study of prescribing pattern, comorbidities, and cost analysis in elderly hospitalized patients in Pune. *CHRISMED J Heal Res* 2016;3:191-6.
13. Sudarshan BP, Chetan TK. Morbidity pattern among the elderly population in the rural area of Pondicherry: A cross sectional study. *Int J Community Med Public Heal* 2016;3:414-8.
14. Pandey A, Ploubidis GB, Clarke L, Dandona L. Trends in catastrophic health expenditure in India: 1993 to 2014. *Bull World Health Organ* 2018;96:18-28.
15. Ministry of Health and Family Welfare. *National Health Policy 2017*. New Delhi: Government of India; 2017.
16. Fuertes-Guiró F, Viteri Velasco E. The impact of frailty on the economic evaluation of geriatric surgery: Hospital costs and opportunity costs based on meta-analysis. *J Med Econ* 2020;23:819-30.