International Journal of Community Medicine and Public Health
Archana C et al. Int J Community Med Public Health. 2026 May;13(5):2290-2296
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: https://dx.doi.org/10.18203/2394-6040.ijcmph20261411

Original Research Article

Out of pocket expenditure on hypertension and diabetes mellitus among people residing in the rural field practice area of a medical college: a community based cross-sectional study

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Received: 20 January 2026
Accepted: 07 April 2026

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ABSTRACT

Background: Out-of-pocket expenditure (OOPE) on health care especially with non-communicable diseases forces households into poverty. The study was conducted with the aim of understanding the out-of-pocket health expenditure and their coping mechanisms in patients suffering from hypertension and diabetes mellitus in the rural field practice area.
Methods: A community-based cross-sectional study was conducted among 230 study participants suffering from hypertension or diabetes mellitus or both in the rural field practice area of Andhra Medical College, Visakhapatnam.
Results: The total mean OOPE among hypertensives was ₹ 501.69, among diabetics it was ₹ 1522.27, and among both hypertensives and diabetics, it was ₹1352.93. Age<50 years, being literate, belonging to upper-middle and lower-middle socioeconomic status, being married, suffering from diabetes mellitus and receiving treatment from a private hospital were associated with the presence of OOPE.
Conclusions: The current study highlights the rising economic burden of hypertension and diabetes mellitus. There is a significant impact of OOPE on household finances. Many households resort to coping mechanisms such as family members providing the money, borrowing money, selling assets or spending from savings or pension.

Keywords: Diabetes, Hypertension, Out-of-pocket expenditure

INTRODUCTION

Out-of-pocket expenditures (OOPE) on healthcare are payments made by the individual at the point of receiving healthcare services or goods.[1] It reflects the burden of health expenses that households bear. According to the National Health Accounts 2023 report, the OOPE as a percentage of total health expenditure was 47.1% in India.[2] This high OOPE has been found to push many households into poverty, with individuals having to make difficult trade-offs between healthcare and basic necessities such as food, shelter, and education.[3] The OOPE is both in the form of direct costs, such as travel, medication and investigations, as well as indirect costs such as food, or loss of wages. India is experiencing a fast demographic and epidemiological transition. There has been a transition from communicable to non-communicable diseases in the present times.

Non-communicable diseases (NCDs) have slowly become a major cause of both morbidity and mortality. They account for 41 million deaths each year, equivalent to 74% of all deaths globally. The major ones are cardiovascular diseases, hypertension, cancers, chronic respiratory diseases, and diabetes. These five groups of diseases account for 80% of premature deaths globally.[4] The increasing prevalence of NCDs, medical advancements, changing demography, income, management of health care, and absence of health insurance are all leading to high medical spending.[5]

Hypertension and diabetes mellitus are two common coexisting non-communicable diseases requiring long-term treatment and care.[6-8] They will affect the patient's compliance with treatment and can lead to the development of complications if the expenses are not met, ultimately leading to a vicious cycle of financial catastrophe. The individuals and their families' financial situation may be negatively impacted if the appropriate initiatives are not undertaken to address the issue of the economic impact of these conditions. OOPE is a burden to all households as it is incurred during a health event when the household is already in distress. The impact of OOPE is much higher when the household income is low or the OOPE incurred is huge, especially in events of inpatient care or critical illnesses.

Target 3.8 of the Sustainable Development Goals is intended to "Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all".[9] High out-of-pocket expenditure on health in India may limit the achievement of universal health coverage by 2030. In the absence of universal health coverage, health spending is largely met by the households themselves. There is a shortage of literature on health spending pertaining to hypertension and diabetes mellitus within the local context. The present study thus aims to understand the health expenditure among people with hypertension and diabetes.

METHODS

A community-based cross-sectional study was conducted in Simhachalam, the rural field practice area of the Department of Community Medicine, Andhra Medical College, Visakhapatnam, among people suffering from diabetes mellitus and or hypertension. The study was conducted for a period of 2 years from August 2022- July 2024. According to a previous study by Mehta et al, the mean OOPE for the visit was Rs 370.54±237.[10] By using the formula n=4 (SD)2/l2 and a non-response rate of 10%. The sample size derived was 228, which has been rounded off to 230. People suffering from hypertension and or diabetes mellitus for more than 1 year were included in the study.

A pretested semi-structured questionnaire was used to fill in the details about their sociodemographic data, disease condition and the OOPE incurred. Before the study was formally conducted, a pilot study was done to determine the reliability and consistency of the questionnaire and necessary modifications were made. A simple random selection process was employed to identify four of the ten wards within the field practice area. House-to-house visits were done in these four locations with the help of ASHA workers to identify potential participants who met the inclusion criteria until the desired sample size was achieved. After obtaining informed consent, a pre-tested, semi-structured questionnaire was administered to each participant within the comfort of their own home in their local language. The expenditure involved in the care of the disease conditions was obtained retrospectively, and to avoid recall bias, participants were given sufficient time to respond. The expenditure details collected from the participants were cross-checked with proxy sources like bills, lab reports, medical records, prescriptions and medicine blister packs available at the time of the visit. Following the data collection phase, the data was entered into a Microsoft Excel spreadsheet. Subsequently, the data was analyzed using a statistical package for social sciences (SPSS version 25). Categorical data were expressed in frequencies and percentages. To estimate the OOPE on health incurred by the study participants mean OOPE was calculated. Due to the skewed distribution of the variables, median values and interquartile range were also reported. To identify the factors associated with the presence of OOPE, chi-square test, Fisher's exact and logistic regression analysis were done. A probability value (p-value) of <0.05 was considered statistically significant.

RESULTS

Of 230 study participants, 141 (61.3%) were women and 89 (38.7%) were men. The mean age of the study participants was 56.40±10.413 years.

Table 1: Sociodemographic characteristics of the study participants.

Variables	Frequency	Percentage
Education		
Illiterate	101	43.9
Primary and middle school	54	23.4
High school	47	20.4
Intermediate	11	4.8
Graduate	17	7.4
Occupation		
Unemployed	133	57.8
Unskilled	36	15.7
Semi-skilled	31	13.5
Skilled	9	3.9
Clerk, shop-owner	16	7
Semi-profession and Profession	5	0.9
Type of family		
Nuclear	102	44.3
Three-generation	99	43
Joint Family	15	6.6
Living alone	14	6.1
Socioeconomic status		
Upper-middle	6	2.6
Lower-middle	60	26.1
Upper-lower	118	51.3
Lower	46	20

Among the study participants, 101(43.9%) were illiterates. A majority (57.8%) were unemployed, and 51.3% belonged to the upper-middle class. The mean income of the study participants was Rs 20208.70±10686 per month.

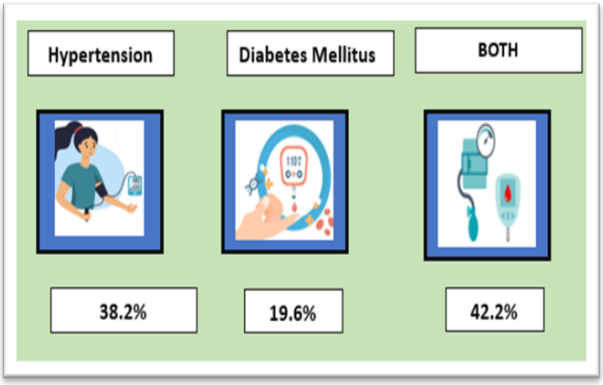

Figure 1: Disease distribution among the study participants.

Among the study participants, 38.2% (88) had hypertension, 19.6% (45) had diabetes mellitus, and 42.2% (97) had both hypertension and diabetes mellitus. Complications were reported by 18.7% (43) of the study participants. The most frequent complications were related to the eyes (such as cataracts and reduced vision), followed by stroke, Urinary Tract Infections, neurological problems, chronic renal disease, heart attack and other conditions (dental and skin-related). Of the study participants with hypertension, 59.1% were being treated at a government facility. Majority of patients with diabetes mellitus (68.9%) and those with both hypertension and diabetes mellitus (54.6%) opted to receive treatment at private facilities.

Out of pocket expenditure

Out of the 230 study participants, 170 (74%) stated that they had OOPE. The highest mean OOPE was Rs 177.97 for consultation among the hypertensives, and the highest mean OOPE was Rs 671.77 and Rs 685.46 for medicines, among the diabetics and those with both hypertension and diabetes mellitus, respectively. The total median OOPE among hypertensives, diabetics and those with both hypertension and diabetes mellitus were Rs. 477 (IQR-100-784), Rs 1522 (IQR- 740-2056.7) and Rs. 1398 (IQR-163-1930), respectively.

Table 2: Mean OOPE across the study participants.

Variable	Hypertension (n=59)	Diabetes mellitus (n=40)	HTN+DM (n=71)
Direct costs			
Cost for travelling	Rs. 49.66	Rs. 71.75	Rs. 66.05
Cost for consultation	Rs. 177.97	Rs. 285	Rs. 246.47
Cost for laboratory investigations	Rs. 127.12	Rs. 445	Rs. 340.14
Cost for medication	Rs. 124.07	Rs. 671.77	Rs. 685.46
Indirect costs			
Loss of wages	Rs. 22.88	Rs. 48.75	Rs. 14.78
Total	Rs. 501.69	Rs. 1522.27	Rs. 1352.93

Table 3: Determinants of OOPE for outpatient visits among study participants.

Variable	OOPE present N (%)	OOPE absent N (%)	Chi-square	P value
Age (years)				
≤50	61 (85.9)	10 (14.1)	7.67	0.006*
≥51	109 (68.6)	50 (31.4)		
Gender				
Men	68 (76.4)	21 (23.6)	0.467	0.494
Women	102 (72.3)	39 (27.7)		
Education				
Literate	108 (84.4)	21 (15.6)	15.599	0.001*
Illiterate	62 (61.4)	39 (38.6)		
Occupation				
Employed	72 (74.2)	25 (25.8%	0.009	1.000
Unemployed	98 (73.7)	35 (26.3)		
SES				
Upper-middle and lower-middle	55 (83.3)	11 (16.7)	4.260	0.039*
Upper-lower and lower	115 (70.1)	49 (29.9)		
Marital status				
Married	123 (79.4)	32 (20.6)	7.300	0.007*
Widowed	47 (62.7)	28 (37.3)		

Continued.

Variable	OOPE present N (%)	OOPE absent N (%)	Chi-square	P value
Insurance				
Present	158 (73.5)	57 (26.5)	0.308	0.765
Absent	12 (80)	3 (20)		
Disease condition				
Diabetes	40 (88.9)	5 (11.1)	7.413	0.025*
Hypertension	59 (67)	29 (33)		
HTN+DM	71 (73.2)	26 (26.8)		
Place of treatment				
Government	51(46.4)	59 (53.6)	82.9	0.001*
Private	119 (99.2)	1 (0.8)		
Complications				
Present	33 (76.7)	10 (23.3)	0.220	0.704
Absent	137 (73.3)	50 (26.7)		
Duration				
<5 years	90 (69.2)	40 (30.8)	3.628	0.163
5-10 years	51 (78.5)	14 (21.5)		
>11 years	29 (82.9)	6 (17.1)		

*P value <0.05 was considered statistically significant

Table 4: Logistic regression to study the factors associated with the presence of OOPE.

Variable	COR (95% CI)	AOR (95% CI)	P value
Age (years)			
≤50	2.798 (1.325-5.911)	1.679 (0.619-4.552)	0.309
≥51	1		
Education			
Literate	3.235 (1.748-5.987)	0.702 (0.291-1.694)	0.432
Illiterate	1		
SES			
Upper-middle and lower-middle	2.130 (1.028-4.415)	1.726 (0.677-4.4)	0.060
Upper-lower and lower	1		
Marital status			
Married	2.290 (1.246-4.208)	2.331 (0.967-5.621)	0.253
Widowed	1		
Disease condition			
Diabetes	2.930 (1.043-8.227)	2.279 (0.622-8.354)	0.214
Hypertension	0.745 (0.396-1.402)	1.099 (0.476-2.539)	0.825
HTN and DM	1		
Place of treatment			
Private	137.66 (18.5-1020.8)	150.33 (19.41-1164.2)	0.001*
Government	1		

*P value <0.05 was considered statistically significant.

The factors found to be associated with the presence of OOPE were age ≤ 50 years, being literate, being married, belonging to upper-middle and lower-middle SES, having diabetes mellitus and getting treated at private hospitals. (p-value <0.05). When logistic regression was done, only the place of treatment was found to be significantly associated with the presence of OOPE.

Coping mechanisms

The most common coping mechanism adopted by the study participants was money provided by the family members, followed by utilisation of salary, pension, borrowing money, health insurance, savings and selling of assets.

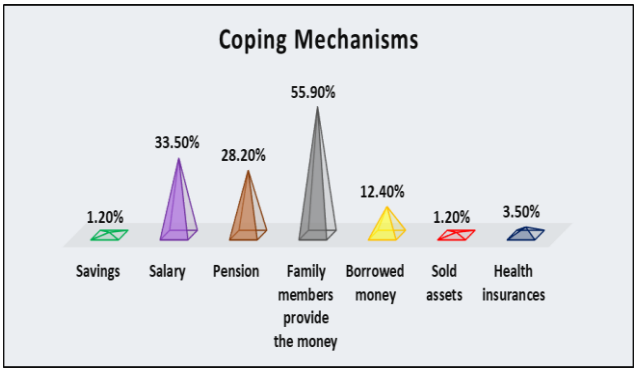

Figure 2: Financial coping mechanisms of the study participants during outpatient visits (n=170) (multiple response answer).

DISCUSSION

OOPE was incurred by 74% of the study participants in our study. Similar findings (72%) were reported in the study done by Fernandes et al.[11] However, studies by Chakraborty et al and Ram et al documented a considerably higher proportion of 90.57% and 100%, respectively.[12,13] This finding may be due to hypertension and diabetes being chronic diseases requiring ongoing and often lifelong treatment and monitoring.

In our study, the mean total OOPE for hypertension was Rs 502.03 per month. Comparatively higher OOPE was reported in studies done by Rakesh et al, Puri et al, Brar et al and Ramanna et al at Rs 667, Rs 1137, Rs 1427 and Rs 1464 respectively.[14-17] A global perspective reveals even greater disparities, with Bedane et al, reporting a mean OOPE of 7194 birr ($127.1) per month.[18] Notably, Joshi et al reported a lower amount of Rs 167.[19] These disparities may be due to differences in the study setting and time periods. Our study found a mean monthly OOPE of Rs 1525.65 for patients with diabetes mellitus. This aligns with the findings of Nanda et al, who reported a similar amount of Rs 1380.2.[20] Comparatively, higher amounts of OOPE were reported in studies done by Ramanna et al and Brar et al (Rs 2077 and Rs 4381 respectively).[16,17] Notably, global studies by Saha et al and Huluka et al reported even higher amounts of Rs 4083.53 and $ 37.4, respectively.[21,22] Conversely, lower amounts of Rs 167, Rs 1172 and Rs 1264 were reported in studies done by Joshi et al, Puri et al and Priyadarshini Swain et alrespectively.[15,19,25]

The mean monthly OOPE for concomitant hypertension and diabetes mellitus in our study was Rs 1385.1. Comparatively, higher amounts of Rs 3932 and Rs 2269 were reported in studies by Brar et al and Kalpana Ramanna et al respectively.[16,17] A lower amount of Rs 370.54 was reported in the study by Mehta et al.[10] An age of less than or equal to 50 years was found to be significantly associated with the presence of OOPE in the current study. This finding contrasts with prior studies done by Ananthesh L et al and Zhai et al which shows that increasing age is associated with higher OOPE.[26,27] Conversely, a study by Chakraborty et al reported an inverse association, where increasing age was associated with lower OOPE.[12] This observation may be because participants aged less than 50 years were more likely to be employed and preferred visiting private hospitals due to their after-work hours operation and reduced waiting time. Conversely, the unemployment status of the elderly could have contributed to their preference for government health facilities, leading to no OOPE. Our study revealed a significant association between literacy and the presence of OOPE. This finding was in agreement with studies by Ananthesh et al, Kansra et al, Huluka et al and Patricia Pushparani showed that higher educational status was associated with higher OOPE.[22,26,29] This finding may be because educated individuals may have higher health literacy. Also, more awareness of educated individuals regarding the disease condition would have led to OOPE.

In our study, participants who belonged to the upper middle and lower middle classes were found to had incurred OOPE. These findings align with previous studies by Brar et al, Alemayehu et al and Pushparani et al.[16,29,30] In contrast, studies done by Ananthesh L et al, Zhai et al and Naren et al reported that patients from lower socioeconomic status had incurred higher OOPE.[26,27,31] Notably, Nanda et al reported that higher socioeconomic status was associated with lower OOPE, whereas Chakraborty et al stated that the poorest had lower OOPE.[12,20] This finding may be because participants belonging to the middle class have higher incomes than the lower classes and have access to a variety of healthcare facilities. Study participants who were married rather than widowed had OOPE in our study. No such association between marital status and OOPE was observed in the study done by Brar et al.[16] The financial burden of healthcare expenditures can be significant for married couples, as they are responsible for covering the medical costs of both themselves and their spouses. A greater number of study participants with diabetes mellitus had OOPE when compared to those having only hypertension and both hypertension and diabetes mellitus. This finding was in agreement with the study done by Brar et al.[16] This finding may be because of the potential requirement for insulin therapy in addition to oral medications. In our study, a higher percentage of OOPE was attributed to medications. This can lead to patients incurring OOPE, particularly if government healthcare facilities experience stock shortages and are unable to dispense medications consistently.

Study participants who chose a private hospital as the place of treatment had OOPE in our study. This finding aligns with previous studies done by Nanda et al, Mathew et al and Chakraborty et al.[12,20,32] This finding may be because government hospitals traditionally operate under a model of subsidized care, offering consultations, diagnostics, and medications at no expense for patients. Conversely, the private healthcare sector often necessitates patient procurement of medications and independent payment for various diagnostic investigations. Despite the cost disparity, participants exhibited a preference for private hospitals, citing reasons such as easier access and perceived increased efficacy of medications provided by private practitioners. Consequently, the financial burden associated with private healthcare significantly exceeds that of the government sector. In our study, it was observed that the participants had employed a range of coping mechanisms to manage healthcare costs. The most common mechanism involved utilizing money provided by family members, followed by reliance on personal income sources like salary or pension. Additionally, they also resorted to borrowing money, leveraging health insurance benefits, using personal savings and selling assets. Similar mechanisms were identified in studies done by

Ipinnimo et al, Patel et al, Rahman et al, Pushparani et al, Nazir et al and Murphy et al.[29,33-37]

Limitations

Although the expenses were cross-validated, these could be subject to recall bias. It cannot account for the non-tangible costs.

CONCLUSION

To conclude, the current study highlights the rising economic burden of hypertension and diabetes mellitus, largely borne by the patients and their families. Additionally, it also highlights the disparities in OOPE based on age, educational status, socioeconomic status, disease conditions and place of treatment. Another significant aspect of our findings is the impact of OOPE on household finances. Many households, resort to coping mechanisms such as family members providing the money, borrowing money, selling assets or spending from savings or pension. These strategies can lead to long-term financial instability and impoverishment, trapping families in a cycle of poverty and poor health. The economic burden of hypertension and diabetes mellitus due to OOPE is a significant public health concern that requires comprehensive and multi-faceted policy responses**.**

Recommendations

Encouraging the use of generic medications is an important strategy, as they are more affordable than brand-name drugs and can significantly reduce patients' out-of-pocket expenses. Additionally, the adoption of telemedicine and digital health tools can provide cost-effective and accessible care for individuals with hypertension and diabetes, minimizing the need for frequent in-person visits. Furthermore, educating patients and promoting the appropriate utilization of health insurance schemes is a crucial step toward reducing out-of-pocket expenditure during inpatient visits.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee Andhra Medical College. (IEC No: 50/IEC AMC/MARCH 2023)

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Cite this article as: Archana C, Avvaru K, Kanta H. Out of pocket expenditure on hypertension and diabetes mellitus among people residing in the rural field practice area of a medical college- a community based cross-sectional study. Int J Community Med Public Health 2026;13:2290-6.