

Healthcare Utilization and Out-of-Pocket Expenditure among Adults with Noncommunicable Diseases in Rural BundiShirish Gupta¹, Cheshta Vyas², Vedangi Rajora³¹Assistant Professor, Department of PSM, Government Medical College, Bundi, Rajasthan, India²Senior Resident, Department of Physiology, RNT Medical College, Udaipur, Rajasthan, India³Assistant Professor, Department of PSM, Government Medical College, Bundi, Rajasthan, India

Received: 01-06-2026 / Revised: 15-07-2026 / Accepted: 21-08-2026

Corresponding author: Dr. Shirish Gupta

Conflict of interest: Nil

Abstract

Background: Noncommunicable diseases (NCDs) require continuous treatment and monitoring, resulting in repeated healthcare utilization and sustained household expenditure. Objective- To assess healthcare utilization, out-of-pocket expenditure (OOPE), catastrophic health expenditure (CHE), and their associated factors among patients with NCDs in a rural population.

Methods: A community-based cross-sectional analytical study was conducted among 600 adults with at least one physician-diagnosed NCD in the field-practice area of a Rural Health Training Centre in Bundi, Rajasthan. Six villages were selected through simple random sampling, followed by systematic household sampling. Data were collected using a pretested, interviewer-administered questionnaire. Outpatient utilization and expenditure were assessed for the preceding three months, while hospitalization was assessed for the preceding 12 months. CHE was defined as annualized NCD-related OOPE exceeding 10% of annual household income.

Results: Outpatient healthcare was utilized by 505 (84.2%) participants, and 103 (17.2%) reported hospitalization. Private facilities were used by 276 (46.0%) participants, while 208 (34.7%) used government facilities. The median net OOPE was ₹1,510 (IQR: ₹648–₹3,171). Medicines constituted the largest expenditure component. Private-facility users incurred significantly higher median OOPE than government-facility users (₹2,572 versus ₹1,323; $p < 0.001$). Expenditure was also significantly higher among participants with multimorbidity and NCD-related complications. Complications were associated with greater healthcare utilization ($p = 0.026$). CHE was experienced by 75 (12.5%) households. OOPE did not differ significantly according to insurance or socioeconomic status.

Conclusion: NCD care involved frequent outpatient utilization and household expenditure. Medicines, private-facility use, multimorbidity, and complications contributed substantially to the financial burden. Strengthening public primary care and extending financial protection to outpatient medicines and investigations may reduce NCD-related OOPE and CHE.

Keywords: Noncommunicable Diseases; Healthcare Utilization; Out-Of-Pocket Expenditure; Catastrophic Health Expenditure; Multimorbidity; Rural Health.

DOI: 10.25258/ijcpr.18.9.35

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

Introduction

Noncommunicable diseases (NCDs) are the predominant cause of mortality and disability worldwide. Global Burden of Disease Study 2019 estimated that NCDs caused approximately 42.0 million deaths, accounting for 74.4% of all deaths. Cardiovascular diseases accounted for the largest number of NCD deaths, followed by cancers and chronic respiratory diseases. [1] The burden is particularly important in low- and middle-income countries because NCDs require lifelong treatment, their consequences extend beyond mortality and disability to repeated healthcare use and sustained household expenditure. The India State-Level

Disease Burden Initiative reported that the contribution of NCDs to total deaths increased from 37.9% in 1990 to 61.8% in 2016, while their contribution to total disability-adjusted life-years increased from approximately 30.5% to 55.4%. [2,3] High burden of chronic respiratory disease in Rajasthan, highlights the importance of generating region specific evidence rather than relying entirely on national estimates. [4] Patients with NCDs commonly require regular outpatient consultations, continuous medication, laboratory investigations, monitoring for complications and, hospitalization. In an analysis of nationally representative Indian

data, 28.5% of adults had at least one NCD and 8.9% had two or more NCDs. The mean number of outpatient visits increased from 2.2 among individuals without an NCD to 6.2 among those with multimorbidity, overnight hospitalization increased from 9% to 29%. [5]

A systematic review of 44 Indian studies found that financial limitations, geographical barriers, poor awareness, transportation difficulties and deficiencies in healthcare infrastructure influenced the utilization of NCD services. Approximately 60.5% of patients used government services, mainly because of affordability, whereas 39.4% preferred private services because of faster access and perceived convenience. The review also identified interruptions in treatment adherence, medicine stock-outs in public facilities and the high cost of medicines in the private sector as persistent barriers to continuity of care. [6]

The recurrent nature of NCD care also exposes households to substantial out-of-pocket expenditure (OOPE). A systematic review of Indian evidence identified medicines, diagnostic investigations, hospitalization and the choice of healthcare facility as major determinants of OOPE. [7] Treatment in the private sector was generally associated with greater expenditure than treatment in government facilities. In addition to direct medical payments, patients may incur transportation, food and accommodation expenses, which are especially relevant in rural area.

Pati et al. reported that OOPE during the most recent outpatient visit increased from ₹272.10 among individuals without an NCD to ₹454.10 among those with multimorbidity. Medicines constituted 70.7% of outpatient expenditure and 53.6% of inpatient expenditure. In another Indian study, patients with diabetes and at least one comorbid condition incurred 2.3 times the OOPE of patients with diabetes alone. [8]

Approximately two-thirds of households affected by NCDs experienced catastrophic health expenditure, with a disproportionate burden among economically disadvantaged households. [9] Similarly, an analysis of national survey data found that 49% of households seeking inpatient or outpatient care experienced catastrophic expenditure and 15% were pushed below the poverty line because of OOPE. [10]

In rural Kerala, Vijayan et al. reported that 54.8% of patients with chronic diseases used private healthcare facilities, while only 26.6% had health-insurance coverage. The median OOPE for chronic disease care was ₹5,000, and healthcare expenditure represented 41.6% of household income. [11] Mathew and Olickal reported a median total cost of ₹1,200 for NCD care in a

semi-urban population, with substantially greater expenditure among private-facility users than among public-facility users. [12] Although national surveys and studies from selected Indian states have documented the economic consequences of NCDs, evidence from rural Rajasthan remains limited. Many previous studies have examined a single disease, recruited patients from healthcare facilities or focused primarily on hospitalization. Such approaches may not capture patients using multiple providers, recurring outpatient expenditure, direct nonmedical costs, unmet healthcare needs or households that avoid care because of financial constraints.

Therefore, the present study was undertaken to assess healthcare utilization and OOPE among patients with NCDs in the rural area. The study also aimed to determine the major components of OOPE, estimate the occurrence of catastrophic health expenditure and identify the sociodemographic, clinical and health-system factors associated with healthcare utilization and financial burden.

Materials and Methods

A community-based cross-sectional analytical study was conducted over one year in the field-practice area of the Rural Health Training Centre, Department of Community Medicine, Government Medical College, and Bundi, which has an estimated population of 30,000. The study population comprised adults with a physician-diagnosed noncommunicable disease requiring ongoing care, including hypertension, diabetes mellitus, cardiovascular disease, chronic respiratory disease, cancer, chronic kidney disease, or stroke.

Individuals aged ≥ 18 years who had resided in the study area for at least six months and provided informed consent were eligible. Those who were seriously ill, unable to communicate or provide reliable information on healthcare utilization and expenditure, or had no diagnosed NCD were excluded.

The sample size was calculated for estimating the mean out-of-pocket expenditure. Based on the mean OOPE of ₹1,287.50 per visit and standard deviation of ₹1,386.20 reported by Sarma et al., with a 95% confidence level and an allowable error of 10% of the reported mean, the minimum sample size was 446. To enhance statistical precision, and provide adequate observations for prespecified subgroup analyses the final sample size was increased to 600 participants. A multistage sampling technique was used. In the first stage, six villages were selected by simple random sampling from the list of villages in the field-practice area, and 100 participants were recruited from each village. In each village, the total number of

households (N_i) was obtained from the sampling frame and the sampling interval was calculated as $k_i = N_i/100$. A random starting number between 1 and k_i was selected, after which every k_i th household was approached. Each selected household was screened for an eligible resident. When more than one eligible resident was present, one was selected by lottery. If no eligible resident was found, the next household was screened and systematic selection then resumed. Recruitment continued until 100 participants were enrolled from each village.

Study instrument and data collection: Data were collected through face-to-face interviews using a pretested, semi structured questionnaire. The questionnaire collected information on sociodemographic and household characteristics; type, number, duration, complications, and treatment of NCDs; health-insurance and social-protection coverage; healthcare-seeking behaviour; outpatient and inpatient service utilization; type of healthcare facility used; direct medical and nonmedical expenditure; reimbursement; treatment adherence; unmet healthcare needs; household income or consumption expenditure; and mechanisms used to finance healthcare. Prescriptions, bills, investigation reports, discharge summaries, and payment receipts were reviewed to validate self-reported information. Outpatient utilization and routine NCD expenditure were recorded for the preceding three months, whereas hospitalization was assessed for the preceding 12 months. Outpatient and inpatient expenditure were recorded separately. Written informed consent was obtained from all participants before enrolment. Participation was voluntary, and participants could decline or withdraw without any effect on their healthcare. Confidentiality was maintained through unique identification codes and secure storage of study data.

Study variables and operational definitions: Healthcare facilities were classified as government, private, or charitable. Multimorbidity was defined as the coexistence of two or more physician-diagnosed chronic conditions in the same participant.

Out-of-pocket expenditure was defined as direct payments made by the patient or household for NCD-related healthcare, net of any reimbursement received from an insurer, employer, government programme, or other agency. Direct medical expenditure included consultation and registration charges, medicines, diagnostic investigations, medical procedures, hospitalization, devices, and consumables. Direct nonmedical expenditure included transportation, food, accommodation, and expenses incurred by an accompanying person. Wage and productivity losses incurred by participants and accompanying persons were

estimated separately as indirect costs and were not included in the primary OOPE estimate. Total OOPE was calculated as the sum of direct medical and direct nonmedical expenditure minus reimbursements received.

Income-based CHE was defined as annual NCD-related OOPE exceeding 10% of annual household income. For its calculation, routine outpatient OOPE reported for three months was multiplied by four. NCD-related hospitalization OOPE reported for the preceding 12 months was then added once. Reimbursement relating to the corresponding services was deducted before applying the threshold. Thus: annual NCD-related OOPE = (three-month net outpatient OOPE $\times$ 4) + net hospitalization OOPE during the preceding 12 months. Hospitalization expenditure was not annualized again, preventing double counting.

Statistical Analysis: Data were entered into Microsoft Excel spreadsheet and analysed. Categorical variables were summarized as frequencies and percentages. Continuous variables were assessed for normality and summarized as mean with standard deviation or median with interquartile range, as appropriate. The chi-square test or Fisher's exact test was used for categorical variables, while the independent-samples t-test, analysis of variance, Mann-Whitney U test, or Kruskal-Wallis test was applied to continuous variables, as appropriate. A two-sided p-value <0.05 was considered statistically significant.

Results

[Table-1] Among the 600 participants, the largest proportion belonged to the 60–69-year age group (31.7%), followed by those aged 50–59 years (25.2%). Females constituted 53.8% of the study population. Most participants were Hindu (87.3%). Regarding educational attainment, 31.8% had completed secondary education, whereas 24.0% had no formal education. Homemakers represented 26.7% of the participants, followed by agricultural or manual workers (26.3%). Nuclear families (47.7%) and joint or three-generation families (47.5%) were represented in nearly equal proportions. Most participants belonged to the lower-middle (44.7%) or lower (26.8%) socioeconomic categories. Health-insurance coverage was reported by 31.0% of the participants, while 69.0% were uninsured. [Table-2] Hypertension was the most frequently reported NCD in 79.2% of the participants, followed by diabetes mellitus (43.8%) and chronic respiratory disease (13.8%). Cardiovascular disease was present in 11.8%, while stroke, chronic kidney disease and cancer were comparatively less frequent. Regarding disease duration, 39.3% had been diagnosed for less than five years, 32.8% for five to nine years and 27.8% for ten years or

longer. NCD-related complications were reported by 15.5% of the participants.

During the preceding three months, 505 (84.2%) participants utilized outpatient healthcare services, Hospitalization during the preceding 12 months was reported by 103 (17.2%) participants. Regular use of prescribed medication and follow-up care was reported by 402 (67.0%) participants. An unmet or delayed need for healthcare was reported by 92 (15.3%) participants. Private healthcare facilities were the most frequently used source of outpatient NCD care, reported by 276 (46.0%) participants, followed by government facilities among 208 (34.7%) and charitable or other facilities among 21 (3.5%). The remaining 95 (15.8%) participants did not utilize outpatient care during recall period.

[Table-3] During the preceding three months, the median net OOPE for NCD care was ₹1,510 (IQR: ₹648–₹3,171), with a mean of ₹2,422 $\pm$ ₹2,771. Medicines constituted the largest expenditure component, followed by diagnostic investigations and consultation charges. Reimbursement was minimal, with a median of ₹0. Participants who primarily used private healthcare facilities incurred the highest median OOPE of ₹2,572 (IQR: ₹1,379–₹4,955). The corresponding median expenditure was ₹1,323 (IQR: ₹685–₹2,384) among government-facility users and ₹1,214 (IQR: ₹917–₹3,304) among those using charitable or other facilities. The difference in OOPE across facility categories was statistically significant (Kruskal–Wallis test, $p < 0.001$). 75 (12.5%) households experienced catastrophic health expenditure, whereas 525 (87.5%) did not.

[Table 4] Healthcare utilization was reported by 48 (88.9%) participants aged 18–39 years, 82 (81.2%) aged 40–49 years, 124 (82.1%) aged 50–59 years, 164 (86.3%) aged 60–69 years and 87 (83.7%) aged ≥ 70 years. Utilization did not differ significantly according to age group, sex, socioeconomic status, multimorbidity or health-insurance status ($p > 0.05$). However, participants

with NCD-related complications had significantly higher utilization than those without complications [92.5% versus 82.6%; $p = 0.026$].

[Table 5] Among participants who utilized healthcare, median OOPE was significantly higher among private-facility users [₹2,572 (IQR: ₹1,379–₹4,955)] than among government [₹1,323 (IQR: ₹685–₹2,384)] or charitable and other facility users [₹1,214 (IQR: ₹917–₹3,304); $p < 0.001$]. Participants with multimorbidity incurred higher median OOPE than those without multimorbidity [₹1,862 versus ₹1,222; $p < 0.001$]. Similarly, expenditure was higher among participants with NCD-related complications than among those without complications [₹2,127 versus ₹1,383; $p < 0.001$]. No statistically significant difference in OOPE was observed according to health-insurance status ($p = 0.495$) or socioeconomic status ($p = 0.835$).

Multivariable logistic regression was performed to identify factors independently associated with outpatient healthcare utilization during the preceding three months. The model included age, sex, socioeconomic status, health-insurance status, multimorbidity, and NCD-related complications. After adjustment for these covariates, participants with an NCD-related complication had more than twice the odds of utilizing outpatient healthcare compared with those without complications (adjusted odds ratio [aOR] 2.41; 95% confidence interval [CI]: 1.13–5.13; $p = 0.023$).

No statistically significant independent association was observed for age (per 10-year increase: aOR 1.06; 95% CI: 0.86–1.31; $p = 0.586$), female sex (aOR 0.82; 95% CI: 0.51–1.31; $p = 0.405$), lower socioeconomic status (aOR 0.91; 95% CI: 0.56–1.48; $p = 0.704$), health-insurance coverage (aOR 0.96; 95% CI: 0.58–1.57; $p = 0.861$), or multimorbidity (aOR 1.29; 95% CI: 0.80–2.08; $p = 0.296$). Thus, among the variables included in the model, the presence of an NCD-related complication was the only factor independently associated with outpatient healthcare utilization.

Table 1: Sociodemographic and household characteristics of participants (n=600)

Variable		Frequency	Percentage
Age group (years)	18-39	54	9
	40-49	101	16.8
	50-59	151	25.2
	60-69	190	31.7
	≥ 70	104	17.3
Sex	Male	277	46.2
	Female	323	53.8
Religion	Hindu	524	87.3
	Muslim	66	11
	Other	10	1.7
Education	No formal schooling	144	24
	Primary	149	24.8

	Secondary	191	31.8
	Higher secondary	70	11.7
	Graduate or above	46	7.7
Occupation	Homemaker	160	26.7
	Agricultural/manual work	158	26.3
	Self-employed	90	15
	Salaried	61	10.2
	Unemployed/retired	131	21.8
Family type	Nuclear	286	47.7
	Joint/three-generation	285	47.5
	Living alone	29	4.8
Socioeconomic status	Upper	41	6.8
	Middle	130	21.7
	Lower-middle	268	44.7
	Lower	161	26.8
Health insurance	Insured	186	31
	Not insured	414	69

Table 2: Clinical profile of study participants (n=600)

Characteristic	Category	Frequency	Percentage
Type of NCD	Hypertension	475	79.2
	Diabetes mellitus	263	43.8
	Cardiovascular disease	71	11.8
	Chronic respiratory disease	83	13.8
	Chronic kidney disease	28	4.7
	Stroke	32	5.3
	Cancer	13	2.2
Disease duration	<5 years	236	39.3
	5-9 years	197	32.8
	≥10 years	167	27.8
Complication	Present	93	15.5
	Absent	507	84.5

Table 3: Components of NCD-related expenditure during the preceding three months (n=600)

Expenditure component (INR)	Mean±SD	Median (IQR)
Medicines	1,532 ± 1,768	965 (362-2,086)
Consultation/registration	285 ± 434	140 (34-343)
Diagnostic investigations	342 ± 562	169 (45-402)
Procedures	133 ± 288	39 (4-135)
Devices/consumables	97 ± 248	21 (1-91)
Direct nonmedical expenditure	155 ± 282	54 (7-164)
Gross direct expenditure	2,543 ± 2,857	1,624 (675-3,342)
Reimbursement	121 ± 400	0 (0-0)
Net OOOPE	2,422 ± 2,771	1,510 (648-3,171)
Indirect cost	128 ± 256	41 (5-120)

Table 4: Factors associated with healthcare utilization in the preceding three months (n=600)

Characteristic	Category	Total	Utilized, n (%)	p-value
Age group	18-39	54	48 (88.9)	0.604
	40-49	101	82 (81.2)	
	50-59	151	124 (82.1)	
	60-69	190	164 (86.3)	
	≥70	104	87 (83.7)	
Sex	Male	277	238 (85.9)	0.328
	Female	323	267 (82.7)	
Socioeconomic status	Upper/upper-middle	41	34 (82.9)	0.908
	Middle	130	112 (86.2)	
	Lower-middle	268	225 (84.0)	
	Lower	161	134 (83.2)	

Multimorbidity	No	326	269 (82.5)	0.273
	Yes	274	236 (86.1)	
Health insurance	No	414	349 (84.3)	0.99
	Yes	186	156 (83.9)	
Complication	No	507	419 (82.6)	0.026
	Yes	93	86 (92.5)	

Table 5: Out-of-pocket expenditure among outpatient healthcare users (N=505)

Characteristic	Category	n	Median OOPE, INR (IQR)	p-value
Facility	Government	208	1,323 (685-2,384)	<0.001
	Private	276	2,572 (1,379-4,955)	
	Charitable/other	21	1,214 (917-3,304)	
Multimorbidity	Absent	269	1,222 (498-2,700)	<0.001
	Present	236	1,862 (828-4,030)	
Complication	Absent	419	1,383 (568-2,935)	<0.001
	Present	86	2,127 (1,163-4,989)	
Insurance	Uninsured	349	1,549 (683-3,177)	0.495
	Insured	156	1,321 (562-3,106)	
Socioeconomic status	Upper	34	1,937 (661-3,681)	0.835
	Middle	112	1,596 (780-3,432)	
	Lower-middle	225	1,484 (638-3,044)	
	Lower	134	1,432 (496-3,080)	

Discussion

Almost half of the participants were aged 60 years or older, and 53.8% were women. Hypertension was present in 79.2% of participants, diabetes mellitus in 43.8%, and multimorbidity in 45.7%. The concentration of participants in older age groups is expected because NCDS become increasingly prevalent with age. Pati et al [5], reported that the prevalence of multimorbidity increased from 1.3% among adults aged 18–29 years to 30.6% among those aged 70 years or older. Their estimate of multimorbidity prevalence was lower than the present study because their denominator included adults with and without NCDs.

Health-insurance coverage was reported by 31.0% of participants. Vijayan et al [11] similarly reported insurance coverage of 26.6% among people with chronic disease in rural Kerala. The higher coverage in the present study may reflect differences in the availability and uptake of government-supported insurance schemes, and population characteristics.

Outpatient care during the preceding three months was reported by 84.2% participants, whereas 17.2% reported hospitalization during 12 months. Regular medication use and follow-up were reported by 67.0%, whereas 15.3% experienced an unmet or delayed need for care. This pattern reflects the chronic nature of NCD management, which is delivered primarily through consultations, medicine refills, and periodic monitoring. Vijayan et al [11] reported that 74.9% of participants used outpatient services alone, while 24.4% utilized inpatient services. The greater outpatient utilization and

lower hospitalization in the present study may reflect differences in recall periods, disease severity, and local referral practices. Joshi et al [13] reported an average of 11 healthcare-professional visits per year for diabetes, 10 for hypertension, and six for high cholesterol in Punjab.

Private facilities were used by 46.0%, 34.7% used government facilities and 3.5% used charitable or other providers. This distribution resembles the 47.5% private-hospital utilization reported by Joshi et al [13] and the 48% private-facility use reported by Kansra et al [12] in Punjab. Vijayan et al [11] found an even greater dependence on private facilities, with 54.8% using private hospital. Variation between settings may reflect the accessibility of public facilities, medicine availability, waiting time, perceived quality, and continuity with a preferred clinician, and the availability of diagnostic services. Despite the high level of utilization, 15.3% of participants reported delayed or unmet healthcare needs. Siva et al [6], in a systematic review of 44 Indian studies, identified affordability, geographical barriers, limited awareness, medicine stock-outs, transportation difficulties, and health-system inefficiencies as common barriers to NCD care. The median three months net OOPE was ₹1,510 (IQR: ₹648–₹3,171). The mean was substantially higher than the median, this pattern is expected for healthcare-cost data because procedures, complications, and hospitalization occur in only a proportion of patients but can generate large payments.

Mathew and Olickal [14] reported a median total NCD-care cost of ₹1,200 (IQR: ₹200–₹3,990) among 316 service users in a semi-urban area of Kerala. Sarma et al [15] reported a mean

expenditure of ₹1,287.50 ± ₹1,386.20 and a median of ₹1,250 (IQR: ₹920–₹1,600) per visit among adults with hypertension or diabetes in Southern Assam.

Reimbursement was minimal: its mean value was ₹121 ± ₹400, while the median was zero. This finding suggests that reimbursement mechanisms provided limited protection against routine NCD expenditure.

Medicines accounted for approximately 60% of the mean gross direct expenditure, with a mean expenditure of ₹1,532 ± ₹1,768 and a median of ₹965 (IQR: ₹362–₹2,086). Diagnostic investigations and consultation or registration charges were the next largest direct medical components, with mean expenditures of ₹342 and ₹285, respectively. Pati et al [5] found that medicines constituted 70.7% of outpatient OOPE and 53.6% of inpatient OOPE. Sarma et al [15] reported that medicines accounted for 72.0% of the total cost per visit, compared with 12.6% for diagnostic tests and 8.2% for consultation fees. Kansra et al [12] also identified medicines as the largest cost component, followed by diagnostic expenditure, consultation fees, and transportation.

Based on annualized NCD-related OOPE exceeding 10% of annual household income, 12.5% households experienced CHE. Narayana Arul and Stanly [16] reported CHE in 6.6% of adults receiving care for type 2 diabetes in rural Tamil Nadu. The higher proportion in the present study may be related to the inclusion of multiple NCDs. Kansra et al [12] found that CHE varied according to NCD type and was highest among participants with diabetes; the odds of CHE were also elevated for diabetes, chronic obstructive pulmonary disease, and stroke.

OOPE differed significantly according to provider and clinical complexity. Private-facility users incurred a median OOPE of ₹2,572 (IQR: ₹1,379–₹4,955), almost twice the ₹1,323 (IQR: ₹685–₹2,384) reported by government-facility users ($p < 0.001$). Mathew and Olickal [14] reported, median cost was ₹2,497.50 among private-facility users compared with ₹120 among public-facility users. Participants with multimorbidity had a median OOPE of ₹1,862 compared with ₹1,222 among those without multimorbidity ($p < 0.001$). Similarly, participants with complications incurred a median of ₹2,127 compared with ₹1,383 among those without complications ($p < 0.001$). Pati et al [5] reported that OOPE during the recent outpatient visit increased from ₹272.10 among people without NCDs to ₹454.10 among those with multimorbidity. Pati et al [8] found that patients with diabetes and at least one comorbid condition incurred 2.3 times the total OOPE of patients with diabetes alone. The Median OOPE did not differ

significantly by insurance status (₹1,321 among insured and ₹1,549 among uninsured; $p = 0.495$) or socioeconomic status ($p = 0.835$). Sarma et al [15] similarly found that insurance produced only a small, statistically non-significant reduction in NCD-care costs.

These findings support strengthening public primary-care services, ensuring uninterrupted access to essential medicines and basic investigations, and coordinating care for people with multimorbidity. Financial-protection programmes should include recurrent outpatient expenditure in addition to hospitalization. These are policy implications arising from observed associations; the study design does not demonstrate that any one intervention would cause a reduction in OOPE or CHE.

The community-based design enabled assessment of healthcare utilization, expenditure, multimorbidity, and catastrophic health expenditure across different facility types. However, the cross-sectional design limits causal inference, while self-reported information may be affected by recall and reporting bias. Annualized expenditure may not reflect variations in healthcare spending over time.

Conclusion

The present study provides a community-level assessment of healthcare utilization and the financial burden of noncommunicable disease care among adults residing in a rural field-practice area. Out-of-pocket expenditure constituted an important burden for patients households. Medicines were the principal component of expenditure, followed by diagnostic investigations and consultation charges. Direct nonmedical expenses further increased the cost of care. Reimbursement was limited. The greater expenditure associated with private-facility use demonstrates the financial implications of provider choice and highlights the protective role that accessible and adequately equipped public facilities may provide.

Participants with multimorbidity and NCD-related complications incurred greater expenditure. This emphasizes the need for coordinated management of multiple chronic conditions, regular monitoring, early identification, and timely referral. The occurrence of CHE shows that the cumulative cost of long-term NCD management can consume a substantial share of household resources and expose families to financial hardship.

In conclusion, healthcare utilization and OOPE among patients with NCDs are influenced by interacting clinical, socioeconomic, and health-system factors.

Improving access alone may not adequately protect households unless the affordability and continuity

of care are also addressed. Strengthening public primary-care services, ensuring an uninterrupted supply of essential medicines, expanding access to diagnostic investigations, and including recurring outpatient expenses within financial-protection programmes are necessary.

Such measures may promote continuous and equitable NCD care while reducing avoidable household expenditure and the risk of catastrophic financial consequences.

References

1. Bai J, et al. Global epidemiological patterns in the burden of main non-communicable diseases, 1990–2019. *Int J Public Health*. 2023;68:1605502.
2. India State-Level Disease Burden Initiative Collaborators. Nations within a nation: variations in epidemiological transition across the states of India, 1990–2016 in the Global Burden of Disease Study. *Lancet*. 2017;390(10111):2437–60.
3. Thakur JS, Paika R, Singh S. Burden of noncommunicable diseases and implementation challenges of National NCD Programmes in India. *Med J Armed Forces India*. 2020;76(3):261–7.
4. India State-Level Disease Burden Initiative CRD Collaborators. The burden of chronic respiratory diseases and their heterogeneity across the states of India: the Global Burden of Disease Study 1990–2016. *Lancet Glob Health*. 2018;6(12):e1363–74.
5. Pati S, Agrawal S, Swain S, Lee JT, Vellakkal S, Hussain MA, et al. Non communicable disease multimorbidity and associated health care utilization and expenditures in India: cross-sectional study. *BMC Health Serv Res*. 2014;14:451.
6. Siva N, Samantaray KK, Krishnapriya K, et al. Health-seeking behavior and healthcare utilization among patients with non-communicable diseases in India: insights from a systematic review. *BMC Health Serv Res*. 2025; 25:1548. doi: 10.1186/s12913-025-13441.
7. Kamath S, Maliyekkal J, Raj ESA, Varshini RJ, Brand H, Sirur A, et al. Understanding out-of-pocket expenditure in India: a systematic review. *Front Public Health*. 2025;13:1594542.
8. Pati S, Swain S, van den Akker M, Schellevis FG, Pati S, Burgers JS. Health care utilization and out-of-pocket expenditure of type 2 diabetic patients: A study in primary care in Bhubaneswar, India. *J Family Med Prim Care*. 2022 Nov;11(11):6714-6725.
9. Verma VR, Kumar P, Dash U. Assessing the household economic burden of non-communicable diseases in India: evidence from repeated cross-sectional surveys. *BMC Public Health*. 2021;21:881. doi: 10.1186/s12889-021-10828-3.
10. Karan A, Farooqui HH, Hussain S, Hussain MA, Selvaraj S, Mathur MR. Multimorbidity, healthcare use and catastrophic health expenditure by households in India: a cross-section analysis of self-reported morbidity from National Sample Survey data 2017–18. *BMC Health Serv Res*. 2022;22:1151.
11. Vijayan SM, Puliyakkadi S, Chalil S. Health care utilization and out of pocket expenditure in a rural area of Kerala: a cross sectional study. *Int J Community Med Public Health*. 2020;7(8):3081–6.
12. Kansra P, Oberoi S, Garg A. Out-of-pocket payments and catastrophic healthcare expenditure for non-communicable diseases: results of a state-wide STEPS survey in north India. *Indian J Med Res*. 2025;161(3):229–38.
13. Joshi A, Mohan K, Grin G, Perin DMP. Burden of healthcare utilization and out-of-pocket costs among individuals with NCDs in an Indian setting. *J Community Health*. 2013;38:320–327.
14. Mathew R, Olickal JJ. Out-of-pocket expenditure on non-communicable diseases during COVID-19: a cross-sectional study from a semi-urban area of Kannur, Kerala. *Clin Epidemiol Glob Health*. 2023;19:101210.
15. Sarma M, Paul S, Roy D, et al. Economic burden of out-of-pocket expenditure on chronic non-communicable disease care in Southern Assam. *Natl J Community Med*. 2025;16:1152–1159.
16. Narayana Arul MG, Stanly AM. Out-of-pocket expenditure and catastrophic health spending among patients with type 2 diabetes in rural Tamil Nadu: a cross-sectional study. *Cureus*. 2026.