

Original article



Health care utilization and expenditure inequities in India: Benefit incidence analysis

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ABSTRACT

Background: The transition from Millennium Development Goals to Sustainable Development Goals 2030 has yet again emphasized on the unfinished agenda of achieving efficient and equitable health systems and universal health coverage. With trifling public spending on healthcare and insignificant insurance coverage, India has recorded 55 million people descending below the poverty line in one year due to healthcare payments. Not only are these health-related payments impoverishing but also the burden of seeking care is disproportionately skewed towards deprived population groups. Against this backdrop, the present paper examines the inequality in health status, utilization of health care services, and financial risk protection. The study is further complemented by assessing who benefits from public subsidies across different economic quintiles and as per epidemiological transition level (ETL) of states.

Methods: This study used data nationwide National Sample Survey 75th round data. We perform the Benefit Incidence Analysis (BIA) using concentration indices, concentration curve, and poor-rich equity ratio to measure horizontal and vertical inequity and analyze the redistribution dimension to understand which population segment benefits more from public subsidies.

Results: Findings suggest that high out of pocket (OOP) spending on inpatient care, especially in the private sector resulted in lower utilization of health care services especially among marginalized communities. Seeking care for marginalized sub-groups is dilapidating in two major ways-, on one hand, it exhausts all their income/savings for the treatment. On the other, as a result of incapacitation, families lose their daily income. The present analysis finds a higher unmet need for treatment in the poor, and the reasons commonly reported were pertaining to affordability, availability and accessibility. The results also showed that low ETL states faced a higher percentage of catastrophic expenditure vis-à-vis other states, thereby; stressing health system reforms beyond the “one-size-fits-all” strategy.

Conclusions: It is imperative that both Central and State Governments should work together to strengthen the public healthcare system to ensure accessibility and quality of care. Central Government’s Pradhan Mantri Jan Arogya Yojana (PM-JAY) health insurance program is a positive step forward to address the healthcare needs of deprived population subgroups.

1. Introduction

In the health sector, equity in access and utilization has been central to the development agenda; while it is integral to the pursuance of Universal Health Coverage, it is not a natural upshot of it.¹ Health systems often contribute to inequity in the distribution of health benefits

due to demand and supply factors. Health care in India is provided by a vast network of public, private-for-profit, charitable and NGO facilities.² Typically, people who seek treatment in the public healthcare institutions bear, a smaller out-of-pocket (OOP) expenditure for using the facilities against those who rely on the private sector. Consequently, private providers are either not accessible for economically and socially

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disadvantaged groups or the utilization of private medical care results in 'impoverishment' due to enormous healthcare costs.^{3,4} This existence of provider-mix and a fragmented healthcare system creates myriad supply-side factors that often exacerbate inequality.^{2,5} On the demand side, health-seeking behaviour varies immensely across socioeconomic groups. This can be attributed primarily to varying "health ideals" due to differences in level of literacy and health awareness and gets further compounded by geographical and financial constraints in the accessibility of healthcare. Furthermore, there is substantial regional inequality in the economic development and variation in time and the speed of health and demographic transition across states in the country.^{6–8} Since India's demographic and epidemiological transition is characterized by the heterogeneous progress across the region, it is vital to be accounted for while designing healthcare reforms.^{9–12}

Access to quality healthcare facilities is a basic human right that should be cherished irrespective of the ability to pay, social or economic class. However, health systems across the globe are highly inequitable.¹³ Thus, understanding equity and equality dimensions are imperative while analyzing the availability and utilization of care services to all. The terms 'equity' and 'equality' are used interchangeably, but they have different meanings. Equality refers to equal distribution or division of the entity to be distributed (distribuend), while equity means how fair is the distribution of the distribuend.¹⁴ In literature, two critical dimensions cited for examining health inequities include horizontal and vertical inequality. Another measurement of 'redistribution' is added to this two-fold typology, which determines who gets the benefits of subsidy and to what extent. Benefit Incidence Analysis (BIA) is a well-known technique to measure inequality in health status, utilization of health care services, and health care expenditure across different economic classes.^{15–17} Besides, the distribution of health care utilization and health care expenditure, benefit incidence analysis also examines how well the benefits accrue to the poorest populations vis-à-vis rich and which socioeconomic strata bear extreme financial burden of households' expenditure on health. Given the above background, our study examines the magnitude of horizontal inequity in health status and utilization of health care service across economic classes; vertical inequity in financial risk protection to identify the impact of out-of-pocket expenditure on households by economic status; and also examine the public subsidy targeting to know that who gets benefits of public subsidies by economic status giving an indicator of redistribution.

2. Data and methodology

2.1. Data sources, sample size, sampling design and geographical coverage

This study used unit-level data records from the recent nationwide National Sample Survey (NSS) 75th round which was based theme 'Social consumption: Health' conducted during July 2017–June 2018. NSS 75th round data covered a sample of 14258 village/urban blocks (8077 rural villages and 6181 urban blocks), 1,13,823 households (64,552 rural and 49,271 urban) and 5,55,115 individuals (3,25,883 rural and 2,29,232 urban). Detailed information was collected on direct medical and non-medical expenditure for each episode of hospitalization for the last 365 days preceding the survey and a recall period of 15 days for outpatient care. The NSS survey adopted a stratified multi-stage sampling design. In rural areas, sample villages and in the urban areas urban blocks were chosen with Probability Proportional to Size with Replacement (PPSWR) as the first stage. The Sample households were chosen by Systematic Random Sampling without Replacement (SRSWOR) as the second stage. The details of the survey methodology are described in the NSS report.¹³ The survey covered all Indian states and union territories of India.¹⁸

2.2. Study indicators for equity

To understand the magnitude of horizontal and vertical inequity to assess the beneficiaries of public spending, we have used indicators pertaining to health status, utilization of health facilities and impact of Out-of-pocket expenditure on households which has been described in detail in [box 1](#) below.

2.3. Horizontal equity

Horizontal equity principle says that all people with equal health needs should get equal treatment.

2.4. Vertical equity

Vertical equity rule assumes that individuals with unequal health needs should receive appropriately different levels of care.

2.4.1. Health status

To assess the health status of a person, we have used self-reported morbidity. In India and other developing countries, self-reported morbidity is a widely used indicator in extensive national surveys to measure the health status of a population.^{19–22} NSS 75th round collects information on self-morbidity data for each hospitalization episode in the reference period of 365 days and ailment treated as outpatient in 15 days preceding the survey.¹⁸

2.4.2. Unmet need for public health facilities

Unmet need for public health facility was determined as the number of persons who suffered/suffering from any disease and did not access public health facility because of the following reasons: required specific services were not available, or if services were available quality was not satisfactory/doctors not available, quality satisfactory but facility too far, quality satisfactory but involves long waiting, financial constraint and preference for a trusted doctor/hospital and 'other' reasons.¹⁸

2.4.3. Unmet need for treatment seeking

Unmet need for treatment seeking was determined as the number of persons who did not seek treatment at all either from any private or public health facility who suffered from a any disease, due to - no medical facility available in the neighbourhood, facility too expensive, cannot afford to wait long due to domestic/economic engagement or any other reason. However, the present analysis excludes cases where people did not seek care because the ailment was not considered serious enough for treatment.^{18,23}

2.4.4. Out-of-pocket expenditure

Out of pocket considered both direct medical costs (i.e., hospital stay, consultation, treatment medicines and procedures, laboratory and other investigation charges), and direct non-medical costs (i.e., transportation, meals, lodging: for patients and care givers) Our study has considered net out-of-pocket health expenditure; therefore, insurance reimbursements have been subtracted from households' reported health expenditure.^{3,23–25} Like self-reported morbidity, the hospitalization expenditure has been captured for last 365 days and OPD care expenses for 15 days preceding the survey. Since the expenditure for hospitalization and OPD care were collected for different recall periods, we have converted all the expenditures into monthly values used by previous studies.²⁶

2.4.5. Average share of monthly income loss due to treatment care

We have examined the average share of monthly income loss due to morbidity as a percentage of health care expenditure on the total households consumption expenditure.^{27,28,29}

Box 1
Dimensions of equity and indicators used for analysis

| Level of analysis | Dimension of equity | Concept | Indicator used |
|---|---------------------|--|--|
| Health status | Horizontal | Treating equals equally | Self-reported morbidity |
| Utilizations of health care service | Horizontal | Treating equals equally | Hospitalization rate Unmet need for medical consultation for public health facility Unmet need for treatment seeking Average share of annual income loss due to morbidity as a percentage of health care expenditure on the total household's consumption expenditure for hospitalization and outpatient care |
| Impact of Out-of-pocket expenditure on households | Vertical | Treating unequal's unequally | Catastrophic expenditure when average out of pocket expenditure is greater than per capita household consumption expenditure (PHCE) which is new approach of measuring the Catastrophic expenditure Households faced the hardship financing due to OOPE for hospitalization |
| Public subsidy targeting | Redistribution | Who gets benefits of public subsidies? | Hospitalization in public health facilities Hospitalization in free ward in public health facilities Out Patients Department (OPD) consultation in public health facilities |

$$\text{Average share of monthly income loss due to morbidity} = \frac{\text{Monthly Health Care Expenditure on morbidity}}{\text{Households Monthly Consumption Expenditure}} * 100$$

2.4.6. Catastrophic expenditure

In our study, the prevalence of CHE was measured average out of pocket expenditure (OOPE) is greater than per capita household consumption expenditure (PHCE), i.e.,²⁵

$$CHE = 1 \text{ if } OOPE > 10\% HCE_i \text{ and } CHE = 0 \text{ if } OOPE \leq 10\% HCE_i,$$

When out-of-pocket expenditure (OOPE) exceeds the 10% threshold of the household's total consumption expenditure (HCE) considered a catastrophic expenditure.

2.4.7. Hardship financing

As specified in various existing studies, if the household borrows money with interest or sells their property/assets to meet its health care costs, they face 'hardship financing'.^{30,31} Same definition has been employed in the present paper.

2.4.8. Benefit incidence analysis

Benefit Incidence Analysis (BIA) is a standard measure of equity in health financing used to assess who takes how much benefit of the public health system across different economic quintiles. In the present paper, we employ concentration indices and concentration curves for measuring inequity in health status, utilization of health care services, the impact of out-of-pocket expenditure on households and public subsidy across individuals by their economic status and ETL states groups.

2.4.9. ETL states groups

For the present study, the states of India were grouped by their epidemiological transition level (ETL) as in 2016. ETL is defined as the ratio of all-age disability-adjusted life-years (DALYs) due to communicable, maternal, neonatal, and nutritional diseases (CMNNDs) versus those due to non-communicable disease (NCDs) and injuries.^{32,33} DALYs

assess the health loss burden caused by different conditions and consider premature death and disability in one combined measure.³² A smaller ETL ratio denotes advancement in epidemiological transition, i.e. higher burden of NCDs and injuries than CMNNDs. Conversely, a higher ETL ratio denotes higher burden of CMNNDs vis-à-vis NCDs and injuries. The gradient for classification of states into four ETL groups in 2016 was as follows: low ETL (0.56–0.75), lower-middle ETL (0.41–0.55), higher-middle ETL (0.31–0.40), and high ETL (less than 0.31).³² The analysis by ETL classifications will help for policy makers to highlight the health care needs, and which states require immediate attention with regards to addressing the problems of catastrophic spending, unmet care, higher loss of income due to care and OOP spending. 'One-size-fits-all' policy reforms may not adequately solve these burning issues that plagues India's health sector today.

2.5. Statistical analysis

We used descriptive statistics, bivariate tabulations, concentration index, concentration curve, and equity ratio to meet the study's objectives. In the first step of the analysis, the economic status of the household was grouped into 5 quintiles, constructed from the monthly per capita consumption expenditure, which is used as a proxy variable for income status of households by several previous studies.^{24,25,34} Further total expenditure is converted into an adult equivalent household expenditure to account for household composition.^{35–37} It is estimated as:

$$AE = (A + \beta C)$$

where A represents the number of household members aged 18 years and above while C represents those below 18 years, β varies from 0.273 for the members below 1 year to 0.950 for members between 16 and 18

years.³⁷

In the second part of analysis, we carried out the descriptive statistics to know the variation in mean values for all indicators across ETL state groups by expenditure quintiles. Mean out-of-pocket expenditure was estimated for hospitalization and OPD care separately by quintiles. The Chi-square test is used to classify the association between outcome indicators and consumption expenditure quintiles.

In the third step of the analysis, the rich-poor ratio, defined as the richest to the poorest economic quintile ratio, is used to measure the gap in health care benefits across outcome indicators.

In the fourth step, we carried out the Benefit Incidence Analysis for health service utilization. Concentration indices and concentration curves were computed for each indicator to provide a composite measure of inequities. The concentration index estimates the extent of inequality in all the outcome indicators among ETL state groups in India. The concentration index lies in the interval (-1, 1).^{1,23,32,38} If concentration index is 0 there is no inequality in healthcare benefits and positive value indicates that a variable is more concentrated among the richest and vice-versa. Concentration index was calculated as twice the weighted covariance of the health care indicators and household's relative rank in terms of wealth quintile (adult equivalent MPCE with household composition is the rank variable in present study) divided by the mean of households with outcome indicators.

$$C = \frac{2}{\mu} Cov_w(y_i, R_i)$$

Table 1
Profile of respondent who suffered/suffering from any diseases from last 365 days and last 15 days by State and ETL groups, NSS, 2017-18.

| State and ETL groups | Self-reported morbidity OPD last 15 days | | Hospitalization last 365 days | |
|--------------------------------------|--|------------|-------------------------------|------------|
| | n | % | n | % |
| Low ETL state group | | | | |
| Bihar | 2441 | 3.6 | 727 | 2.6 |
| Jharkhand | 1411 | 1.3 | 988 | 2.2 |
| Uttar Pradesh | 6317 | 13.4 | 4403 | 15.7 |
| Rajasthan | 2933 | 5.2 | 1524 | 3.6 |
| Meghalaya | 555 | 0.2 | 25 | 0.0 |
| Assam | 1572 | 0.9 | 416 | 0.8 |
| Chhattisgarh | 1517 | 1.5 | 782 | 1.4 |
| Madhya Pradesh | 2962 | 4.6 | 1355 | 3.1 |
| Odisha | 2594 | 4.1 | 1562 | 4.1 |
| Lower-middle ETL state group | | | | |
| Arunachal Pradesh | 825 | 0.1 | 243 | 0.0 |
| Mizoram | 793 | 0.1 | 224 | 0.0 |
| Nagaland | 634 | 0.1 | 41 | 0.0 |
| Uttarakhand | 780 | 0.4 | 326 | 0.3 |
| Gujrat | 2261 | 3.8 | 1356 | 4.1 |
| Tripura | 1217 | 0.6 | 191 | 0.1 |
| Sikkim | 446 | 0.1 | 149 | 0.0 |
| Manipur | 1306 | 0.2 | 163 | 0.1 |
| Higher-middle ETL state group | | | | |
| Haryana | 1696 | 2.4 | 1057 | 1.7 |
| Delhi | 735 | 1.6 | 312 | 1.1 |
| Andhra Pradesh | 2634 | 5.8 | 3073 | 9.0 |
| Telangana | 1,970 | 2.6 | 866 | 2.2 |
| Jammu and Kashmir | 1754 | 0.8 | 1330 | 0.8 |
| Karnataka | 2644 | 4.9 | 1111 | 2.8 |
| West Bengal | 4582 | 11.4 | 4860 | 14.0 |
| Maharashtra | 5260 | 10.0 | 3992 | 10.4 |
| Union territories other than Delhi | 1240 | 0.3 | 781 | 0.2 |
| High ETL state group | | | | |
| Himachal Pradesh | 1384 | 0.9 | 1014 | 0.8 |
| Punjab | 2042 | 2.4 | 1704 | 3.3 |
| Tamil Nadu | 3961 | 7.0 | 2281 | 4.9 |
| Goa | 266 | 0.2 | 209 | 0.1 |
| Kerala | 3758 | 9.7 | 6067 | 10.5 |
| India | 64,490 | 100 | 43,132 | 100 |

NSS = National Sample Survey; ETL = Epidemiological transition level.
n = Sample is unweighted and % = percentage is weighted.

Where, C represents concentration index, y_i is the binary variable health care indicators occurred in the i th household, μ is the mean of outcome variables, and R_i is the fractional rank of the i th household in the economic status.

3. Results

Table 1 show the profile of respondent who suffered/suffering from any diseases from last 365 days and last 15 days by State and ETL groups, NSS, 2017-18 while Table 2 shows the health status, utilizations of health care service, impact of Out-of-pocket expenditure on households and public subsidy targeting by states of India NSS, 2017-18. Table 3 highlighted the self-reported morbidity, hospitalizations rate, unmet need for public health facility and unmet need for treatment-seeking by expenditure quintiles and ETL state groups in India which are categorized into *Low ETL state groups*, *Lower-middle ETL state groups*, *Higher-middle ETL state groups*, and *High ETL state groups* based on the epidemiological transition level. Nearly 6% population in Low ETL state group and the Lower-middle ETL state-reported morbidity in the last 15 days, whereas the morbidity was 13.0% in *High ETL state groups*. Further, morbidity rates vary across the expenditure quintile and group of states. Self-reported morbidity has a pro-rich distribution in all the state groups understudy with a higher percentage of economically rich suffering from diseases in last 15 days, except *High ETL state groups*, which shows a pro-poor distribution with higher proportion of poorest 20% suffering from diseases in last 15 days. The percentage of hospitalization per episode has a pro-rich distribution in *Low ETL state groups* and *Lower-middle ETL state groups*, whereas in *Higher-middle ETL state groups* and *High ETL state groups*, the findings are contrary. The results show that the unmet need for public health facilities had a pro-rich distribution in all state groups with positive concentration indices. In contrast, the unmet need for treatment-seeking had a pro-poor distribution across all state classifications and national levels.

3.1. Vertical equity in out-of-pocket expenditure for hospitalization in ETL state groups in India

As envisaged, the mean out of pocket expenditure due to hospitalization was higher in the richest quintile compared to the poorest across all the states classification which indicates a progressive pattern. However, upon inspecting the burden of income loss due to OOPe, it is found that poorest were spending more as a proportion of their income than the rich among all the state groups. Overall, *Low ETL state groups* had higher percentage of catastrophic expenditure, while *Lower-middle ETL state groups* faced lower catastrophic expenditure. Catastrophic health expenditure had a pro-poor distribution at national level as well as across state groups with negative concentration index (Table 4).

3.2. Targeting of public subsidy for health care across ETL state groups in India

Table 5 reports the use of public subsidy by patients i.e., hospitalization in public health facilities, availing free ward in public health facilities during hospitalization, and OPD consultation in public healthcare institutions. Hospitalizations in public sector facilities across all the state classifications were higher among the poor compared to the rich. Availing free ward in public health facilities during hospitalization show a significant association with expenditure quintile i.e. availing free ward in public health facilities had a pro-poor distribution in all the state categories as seen by negative concentration indices. OPD consultations in public sector facilities also had a pro-poor distribution in all the group of states with negative concentration indices.

Table 2

Health status, Utilizations of health care service, Impact of Out-of-pocket expenditure on households and public subsidy targeting by sates of India NSS, 2017-18.

| State and ETL groups | Self-reported morbidity | Hospitalization rate per episode | Unmet need for medical consultation (%) | Mean OOPE Hospitalization | Mean OOPE OPD | Hospitalization in public health facilities | Hospitalization in free ward in public health facilities | OPD in public health facilities |
|--------------------------------------|-------------------------|----------------------------------|---|---------------------------|---------------|---|--|---------------------------------|
| Low ETL state group | | | | | | | | |
| Bihar | 2.5 | 1.2 | 10.2 | 1340 | 1711 | 38.6 | 36.0 | 18.5 |
| Jharkhand | 6.7 | 1.4 | 8.9 | 2074 | 1880 | 43.2 | 41.5 | 26.9 |
| Uttar Pradesh | 7.5 | 2.3 | 2.8 | 2609 | 2042 | 27.8 | 25.9 | 14.1 |
| Rajasthan | 4.9 | 2.5 | 2.6 | 1796 | 2054 | 51.2 | 54.3 | 39.8 |
| Meghalaya | 0.4 | 1.7 | 0.0 | 564 | 1688 | 85.5 | 79.1 | 52.7 |
| Assam | 2.5 | 1.0 | 4.6 | 1601 | 1966 | 72.5 | 40.2 | 43.0 |
| Chhattisgarh | 5.0 | 2.0 | 2.7 | 2459 | 930 | 56.0 | 46.9 | 42.1 |
| Madhya Pradesh | 4.0 | 2.1 | 2.4 | 1536 | 2102 | 49.6 | 49.2 | 31.2 |
| Odisha | 9.4 | 3.3 | 3.2 | 1349 | 1228 | 72.9 | 72.2 | 56.8 |
| Lower-middle ETL state group | | | | | | | | |
| Arunachal Pradesh | 2.9 | 3.5 | 6.0 | 624 | 4478 | 93.2 | 73.8 | 90.9 |
| Mizoram | 3.4 | 2.8 | 11.6 | 697 | 1923 | 83.8 | 80.3 | 68.2 |
| Nagaland | 0.8 | 1.4 | 27.4 | 1021 | 2049 | 73.5 | 26.7 | 49.2 |
| Uttarakhand | 3.5 | 1.7 | 2.0 | 1985 | 1478 | 36.2 | 30.6 | 32.9 |
| Gujrat | 7.0 | 2.4 | 1.4 | 1648 | 1205 | 33.5 | 33.5 | 24.7 |
| Tripura | 3.1 | 5.4 | 7.7 | 699 | 4201 | 95.9 | 89.6 | 31.1 |
| Sikkim | 3.4 | 2.8 | 4.9 | 889 | 1560 | 79.9 | 78.9 | 52.0 |
| Manipur | 1.9 | 2.0 | 0.3 | 1802 | 2988 | 80.3 | 64.7 | 82.6 |
| Higher-middle ETL state group | | | | | | | | |
| Haryana | 5.9 | 2.8 | 1.7 | 2042 | 1852 | 31.6 | 28.4 | 19.1 |
| Delhi | 6.0 | 3.2 | 2.1 | 1818 | 1972 | 62.7 | 61.1 | 44.3 |
| Andhra Pradesh | 16.3 | 3.8 | 1.7 | 1790 | 1194 | 28.6 | 31.0 | 21.9 |
| Telangana | 5.7 | 2.3 | 0.8 | 2517 | 1595 | 21.2 | 22.0 | 20.4 |
| Jammu and Kashmir | 7.3 | 2.3 | 0.7 | 1038 | 1070 | 91.8 | 87.9 | 69.3 |
| Karnataka | 4.5 | 2.8 | 2.5 | 1669 | 1580 | 27.2 | 25.4 | 21.8 |
| West Bengal | 14.6 | 4.1 | 4.2 | 1588 | 1434 | 70.2 | 70.0 | 28.7 |
| Maharashtra | 9.1 | 3.1 | 2.1 | 2418 | 1471 | 23.1 | 21.7 | 25.2 |
| Union territories other than Delhi | 6.1 | 2.8 | 0.7 | 2374 | 2386 | 70.3 | 60.6 | 56.6 |
| High ETL state group | | | | | | | | |
| Himachal Pradesh | 10.6 | 4.4 | 2.6 | 1854 | 1948 | 78.5 | 70.5 | 67.7 |
| Punjab | 11.4 | 3.0 | 2.5 | 2919 | 1541 | 30.9 | 20.4 | 14.5 |
| Tamil Nadu | 6.4 | 3.2 | 0.6 | 1788 | 1539 | 50.9 | 51.8 | 54.0 |
| Goa | 6.1 | 4.6 | 0.2 | 1337 | 1175 | 65.7 | 69.3 | 58.9 |
| Kerala | 29.3 | 10.2 | 0.5 | 1845 | 1204 | 39.8 | 36.6 | 47.5 |
| India | 7.9 | 2.8 | 2.6 | 1936 | 1565 | 43.2 | 41.5 | 30.1 |

NSS = National Sample Survey; ETL = Epidemiological transition level. OOPE=Out of pocket expenditure, OPD=Out patients department.

3.3. Out-of-pocket expenditure by health facility across ETL state groups in India

Table 6 examines out-of-pocket payments, catastrophic expenditure, and hardship financing by type of health care provider. Mean out-of-pocket expenditure due to hospitalization was almost six times higher for those seeking treatment in a private healthcare facility vis-à-vis a public healthcare institution across all the state groups. As expected, the average share of monthly income loss due to hospitalization was very high among those seeking care in private hospitals and varies significantly across ETL state groups. The average share of monthly income loss due to OOPE was higher in the Low ETL state group (17.4%) while lower in the Lower-middle ETL state group (9.5%). Almost 12% of hospitalization episodes were financed via borrowing and selling of household assets/selling jewellery. It was nearly two times higher for ailments treated in private hospitals vis-à-vis the public.

Fig. 1 shows the concentration curves for hospitalization rate and utilization of public service for hospitalization in ETL state groups in India while Fig. 2 shows the concentration curves for self-reported ailments in last 15 days and utilization of public service for OPD in ETL state groups in India and Fig. 3 shows the concentration curves for unmet need of public health facility and unmet need for treatment

seeking for OPD care in ETL state groups in India.

4. Discussion

In this study, we have performed Benefit Incidence Analysis using the latest nationally representative survey data (NSSO 75th round) conducted during July 2017–June 2018.¹⁸ This paper examines the inequities in self-reported morbidity, health care service utilization, the impact of out-of-pocket expenditure on households, and use of public subsidy by patients, i.e., hospitalization in public health facilities, availing free ward in public health institutions during hospitalization and OPD consultation in public health facilities. As per our knowledge, very few studies have focused on health care inequality using BIA method in the Indian context. The strength of our study is derived from its use of a countrywide survey followed the standardized study design, covering all the states and union territories of India with a large sample size which offers generalizability to the study results. The inferences are strengthened by using statistical measures like equity ratio, concentration indices, and concentration curve to capture the inequality in health care utilization. Our study indicates several notable findings.

First, self-reported morbidity rate was higher among richer in Low ETL state category, Lower-middle, and Higher-middle ETL state group. In

Table 3

Self-reported morbidity, hospitalizations and unmet need for health-care by income quintile in ETL state groups in India, NSS Social Consumption: Health Survey, 2017-18.

| Characteristics | Low ETL state group | Lower-middle ETL state group | Higher-middle ETL state group | High ETL state group | India |
|--|---------------------|------------------------------|-------------------------------|----------------------|--------------|
| Self-reported morbidity OPD | | | | | |
| Poorest wealth quintile | 2299 (4.8) | 148(4.3) | 1114 (10.2) | 532 (14.0) | 4093 (6.0) |
| Poorer wealth quintile | 2142 (4.9) | 193(3.3) | 1837(9.2) | 906 (13.9) | 5078 (6.5) |
| Middle wealth quintile | 2268 (5.6) | 388(4) | 2925(9.5) | 1570 (13.7) | 7151 (7.6) |
| Richer wealth quintile | 2278 (6.1) | 642(6.3) | 4191(9.4) | 2865 (13.4) | 9976 (8.7) |
| Richest wealth quintile | 2780 (8.0) | 1321(7.6) | 7311 (10.7) | 5401 (12.3) | 16813 (10.2) |
| Total | 11767 (5.6) | 2692(5.9) | 17378 (9.9) | 11274 (13.0) | 43111 (7.9) |
| Equity ratio (Q1: Q5) | 0.60 | 0.57 | 0.95 | 1.14 | 0.59 |
| Concentration index (95% CI) | 0.107 | 0.148 | 0.027 | -0.028 | 0.110 |
| Percentage of Hospitalization per episode | | | | | |
| Poorest wealth quintile | 4984 (1.71) | 657(2.51) | 1822 (3.96) | 627 (7.24) | 8090 (2.27) |
| Poorer wealth quintile | 4146 (1.54) | 914(1.9) | 2607 (3.01) | 1019 (5.14) | 8686 (2.14) |
| Middle wealth quintile | 4293 (1.89) | 1468 (2.37) | 3945 (3.15) | 1609 (5.29) | 11315 (2.62) |
| Richer wealth quintile | 3822 (2.23) | 2038 (2.18) | 5269 (3.05) | 2707 (4.07) | 13836 (2.85) |
| Richest wealth quintile | 4520 (3.09) | 3271 (2.68) | 8726 (3.12) | 5340 (4.49) | 21857 (3.38) |
| Total | 21765 (1.93) | 8348 (2.38) | 22369 (3.17) | 11302 (4.67) | 63784 (2.7) |
| Equity ratio (Q1: Q5) | 0.55 | 0.94 | 1.27 | 1.61 | 0.67 |
| Concentration index (95% CI) | 0.133 | 0.042 | -0.015 | -0.043 | 0.094 |
| Unmet need for medical consultation (OPD)for public health facility (%) | | | | | |
| Poorest wealth quintile | 50.4 | 73.7 | 59.0 | 30.9 | 51.7 |
| Poorer wealth quintile | 59.3 | 33.8 | 56.8 | 44.9 | 56.1 |
| Middle wealth quintile | 65.1 | 49.3 | 64.4 | 47.0 | 61.6 |
| Richer wealth quintile | 66.0 | 56.2 | 63.6 | 47.6 | 59.8 |
| Richest wealth quintile | 66.6 | 77.9 | 75.2 | 62.0 | 70.3 |
| Total | 60.6 | 64.9 | 66.4 | 52.5 | 61.7 |
| Equity ratio (Q1: Q5) | 0.76 | 0.95 | 0.78 | 0.50 | 0.73 |
| Concentration index (95% CI) | 0.051 | 0.099 | 0.054 | 0.087 | 0.055 |
| Unmet need for treatment seeking (%) OPD | | | | | |
| Poorest wealth quintile | 4.5 | 1.5 | 3.0 | 0.7 | 3.7 |
| Poorer wealth quintile | 5.7 | 13.0 | 4.0 | 1.0 | 4.6 |
| Middle wealth quintile | 3.3 | 2.3 | 3.7 | 0.5 | 3.0 |
| Richer wealth quintile | 2.8 | 0.6 | 1.6 | 1.3 | 1.8 |
| Richest wealth quintile | 1.7 | 0.9 | 2.1 | 0.8 | 1.6 |
| Total | 3.8 | 1.8 | 2.6 | 0.9 | 2.6 |
| Equity ratio (Q1: Q5) | 2.61 | 1.76 | 1.41 | 0.90 | 2.35 |
| Concentration index (95% CI) | -0.183 | -0.488 | -0.126 | -0.004 | -0.201 |

Table 4

Vertical equity in out-of-pocket hospitalization expenditures by income quintile in ETL state groups in India, NSS Social Consumption: Health Survey, 2017-18.

| Characteristics | Low ETL state group | Lower-middle ETL state group | Higher-middle ETL state group | High ETL state group | India |
|--|---------------------|------------------------------|-------------------------------|----------------------|-------------|
| Monthly mean out of pocket expenditure due to hospitalization (INR) | | | | | |
| Poorest wealth quintile | 1340 | 885 | 1890 | 1163 | 1472 |
| Poorer wealth quintile | 1711 | 1321 | 1503 | 1335 | 1570 |
| Middle wealth quintile | 1868 | 975 | 1375 | 1598 | 1571 |
| Richer wealth quintile | 1986 | 1210 | 1595 | 1769 | 1713 |
| Richest wealth quintile | 2927 | 1922 | 2600 | 2332 | 2532 |
| Total | 1907 | 1452 | 1885 | 1903 | 1936 |
| Average share of monthly income loss due to hospitalization on Households (%) | | | | | |
| Poorest wealth quintile | 21.3 | 12.7 | 31.6 | 15.3 | 23.2 |
| Poorer wealth quintile | 20.2 | 13.4 | 17.4 | 15.0 | 18.2 |
| Middle wealth quintile | 17.8 | 8.4 | 14.1 | 15.1 | 15.3 |
| Richer wealth quintile | 13.8 | 8.7 | 13.1 | 13.4 | 13.1 |
| Richest wealth quintile | 13.8 | 8.7 | 12.1 | 12.1 | 12.2 |
| Total | 16.5 | 9.0 | 14.0 | 13.0 | 14.2 |
| Equity ratio (Q1: Q5) | 1.5 | 1.5 | 2.6 | 1.3 | 1.9 |
| Percentage of households experiencing the CHE due to hospitalization (PHCE, approach) | | | | | |
| Poorest wealth quintile | 33.4 | 22.8 | 36.1 | 26.7 | 33.4 |
| Poorer wealth quintile | 28.1 | 11.6 | 24.2 | 19.9 | 25.2 |
| Middle wealth quintile | 24.9 | 11.4 | 17.4 | 18.9 | 20.2 |
| Richer wealth quintile | 22.3 | 10.5 | 13.8 | 15.9 | 16.3 |
| Richest wealth quintile | 16.2 | 10.7 | 12.8 | 11.2 | 12.9 |
| Total | 25.7 | 11.4 | 17.5 | 14.9 | 19.6 |
| Equity ratio (Q1: Q5) | 2.1 | 2.1 | 2.8 | 2.4 | 2.6 |
| Concentration index (95% CI) | -0.129 | -0.080 | -0.161 | -0.143 | -0.180 |
| Percentage of households faced the hardship financing due to OOPe for hospitalization | | | | | |
| Poorest wealth quintile | 580 (12.4) | 41(3.6) | 220(12) | 100 (17.5) | 941 (12.6) |
| Poorer wealth quintile | 478 (13.4) | 51(6.5) | 357(13.2) | 150 (15.3) | 1036 (13.3) |
| Middle wealth quintile | 452 (13.9) | 69(4.4) | 516(13.5) | 231 (14.5) | 1268 (13.3) |
| Richer wealth quintile | 412(14) | 77(5.1) | 595(12.6) | 350 (13.7) | 1434 (12.7) |
| Richest wealth quintile | 250(6.2) | 87(3.4) | 653(8.5) | 545 (11.4) | 1535 (8.5) |
| Total | 2172 (12.1) | 325(4.4) | 2341 (11.5) | 1376 (13.3) | 6214 (11.7) |
| Equity ratio (Q1: Q5) | 2.00 | 1.06 | 1.41 | 1.54 | 1.48 |
| Monthly Mean outpatient's care expenditure (INR) ‘ | | | | | |
| Poorest wealth quintile | 1507 | 1218 | 1114 | 743 | 1330 |
| Poorer wealth quintile | 1633 | 927 | 1201 | 1196 | 1405 |
| Middle wealth quintile | 1811 | 981 | 1149 | 1279 | 1414 |
| Richer wealth quintile | 2281 | 1170 | 1490 | 1404 | 1640 |
| Richest wealth quintile | 2375 | 1648 | 1743 | 1507 | 1782 |

(continued on next page)

Table 4 (continued)

| Characteristics | Low ETL state group | Lower-middle ETL state group | Higher-middle ETL state group | High ETL state group | India |
|--|---------------------|------------------------------|-------------------------------|----------------------|--------|
| Total | 1863 | 1357 | 1438 | 1375 | 1564 |
| Average share of monthly income loss due to OPD care on Households (%) | | | | | |
| Poorest wealth quintile | 25.5 | 17.8 | 21.3 | 11.0 | 23.0 |
| Poorer wealth quintile | 19.7 | 8.4 | 15.5 | 12.6 | 16.9 |
| Middle wealth quintile | 17.5 | 8.7 | 12.4 | 12.0 | 14.2 |
| Richer wealth quintile | 18.2 | 8.9 | 12.0 | 11.0 | 13.1 |
| Richest wealth quintile | 12.2 | 7.7 | 8.2 | 7.7 | 8.7 |
| Total | 17.6 | 8.3 | 10.6 | 9.3 | 12.1 |
| Percentage of households experiencing the CHE due to outpatient's care (PHCE, approach) | | | | | |
| Poorest wealth quintile | 37.8 | 28.8 | 26.1 | 20.1 | 33.8 |
| Poorer wealth quintile | 32.5 | 14.0 | 19.1 | 21.1 | 26.1 |
| Middle wealth quintile | 27.2 | 17.2 | 14.3 | 14.4 | 19.7 |
| Richer wealth quintile | 24.8 | 11.6 | 13.9 | 10.4 | 15.8 |
| Richest wealth quintile | 14.9 | 4.0 | 7.6 | 6.6 | 8.4 |
| Total | 28.9 | 9.5 | 13.5 | 10.5 | 18.4 |
| Equity ratio (Q1: Q5) | 2.5 | 7.2 | 3.4 | 3.0 | 4.0 |
| Concentration index (95% CI) | -0.154 | -0.368 | -0.199 | -0.217 | -0.242 |

OOPE = out of pocket expenditure, PHCE=Per capita household's consumption expenditure, CHE = Catastrophic Health expenditure.

contrast, High ETL state classification (CI = -0.028) registered higher morbidity rates among the economically poor in last 15 days. Hospitalization admissions were higher among the richer economic group in Low and Lower-middle ETL state groups while hospitalization rate is estimated to be higher for poor in Higher-middle and High ETL state classification. Findings show that unmet need for treatment seeking was more among poor population at national level as well as for all state categories for different reasons. The results of our study were found to be in consensus with an earlier study in the Indian context which found that the utilization of hospitals were more by richer population in three states, namely Haryana, Punjab and Chandigarh and poor faced higher unmet needs for health care seeking as compared to richer population.³³

Second, besides the health care expenditure being higher among richest economic quintile, the poorest 20% faced a greater burden of income loss due to OOP spending, which indicates that poorest population were spending more as a proportion of their income across all the states groups. Due to higher out of pocket expenditure, households- especially those in poorest two quintiles- are in greater need of financial risk protection. Finding suggests that the Low ETL states have higher CHE, while Lower-middle ETL states have lower CHE. As anticipated, CHE was found to be concentrated among the bottom 20% as exhibited from negative concentration indices for all the state classifications. Higher burden of income loss due to health care utilization, particularly, high cost of hospitalization poses financial barricades for the poor economic groups; the implications of which are often inter-generational.^{39,40}

Third, the hospitalizations in public health facilities were higher among the poor and negative concentration indices exhibit a pro-poor distribution of benefits of public health facilities. As expected, results also confirm that admission in free ward in public health facilities during hospitalization has significant association with economic status, thereby showing that subsidies were used in higher proportion by poor expenditure quintile population across all the state groups as the

Table 5

Targeting of public subsidy for health care in ETL state groups in India, NSS Social Consumption: Health Survey, 2017-18.

| Characteristics | Low ETL state group | Lower-middle ETL state group | Higher-middle ETL state group | High ETL state group | India |
|---|---------------------|------------------------------|-------------------------------|----------------------|--------------|
| Hospitalization in public health facilities | | | | | |
| Poorest wealth quintile | 2798 (53.6) | 541(75) | 955(54.4) | 355 (60.4) | 4649 (55) |
| Poorer wealth quintile | 2047 (46.2) | 706(60.1) | 1378 (50.1) | 548(56) | 4679 (49.4) |
| Middle wealth quintile | 1990 (43.9) | 1085 (61.7) | 1865 (47.1) | 870(54) | 5810 (47.7) |
| Richer wealth quintile | 1599 (38.8) | 1359 (53.7) | 2316 (43.1) | 1360 (47.1) | 6634 (43.6) |
| Richest wealth quintile | 1494 (29.9) | 1609(25) | 2666 (27.3) | 1805 (34.9) | 7574 (30) |
| Total | 9928 (43.5) | 5300 (45.5) | 9180 (41.2) | 4938 (44.6) | 29346 (42.9) |
| Equity ratio (Q1: Q5) | 1.79 | 3.00 | 1.99 | 1.73 | 1.83 |
| Concentration index (95% CI) | -0.104 | -0.209 | -0.133 | -0.110 | -0.117 |
| Hospitalization in free ward in public health facilities | | | | | |
| Poorest wealth quintile | 2594 (50.6) | 477(69.5) | 931(53.6) | 324 (55.9) | 4326 (52.4) |
| Poorer wealth quintile | 1855 (45.3) | 596(53.9) | 1334 (49.5) | 514 (54.1) | 4299 (48.3) |
| Middle wealth quintile | 1785 (41.5) | 938(57.6) | 1810 (46.2) | 825(53) | 5358 (46.1) |
| Richer wealth quintile | 1470 (37.0) | 1174 (51.4) | 2264 (42.8) | 1250 (43.9) | 6158 (42.1) |
| Richest wealth quintile | 1370 (28.8) | 1423 (23.6) | 2526 (26.8) | 1676 (32.3) | 6995 (28.6) |
| Total | 9074 (41.6) | 4608 (42.7) | 8865 (40.6) | 4589 (42) | 27136 (41.3) |
| Equity ratio (Q1: Q5) | 1.76 | 2.94 | 2.00 | 1.73 | 1.83 |
| Concentration index (95% CI) | -0.103 | -0.207 | -0.134 | -0.115 | -0.118 |
| OPD consultation in public health facilities | | | | | |
| Poorest wealth quintile | 710 (33.8) | 82(18.7) | 379(34.4) | 313 (68.2) | 1484 (36.9) |
| Poorer wealth quintile | 575 (25.8) | 112(49.2) | 595(35) | 409 (52.1) | 1691 (33.3) |
| Middle wealth quintile | 559 (24.1) | 166(42.7) | 899(27.1) | 736 (51.4) | 2360 (30.4) |
| Richer wealth quintile | 524 (22.4) | 244(36.8) | 1204 (30.3) | 1270 (49.3) | 3242 (33.8) |
| Richest wealth quintile | 588 (23.5) | 342(15.1) | 1512(18) | 1703 (34.1) | 4145 (23.2) |
| Total | 2956 (26.3) | 946(26.8) | 4589 (26.4) | 4431 (44.5) | 12922 (30.1) |
| Equity ratio (Q1: Q5) | 1.44 | 1.23 | 1.91 | 2.00 | 1.59 |
| Concentration index (95% CI) | -0.069 | -0.217 | -0.128 | -0.113 | -0.084 |

concentration index values were negative. Poor benefited more from public health facilities, probably because they have constrained economic resources to afford care in a private healthcare institution.^{4,23} Furthermore, OPD consultations in public health facilities also had pro-poor distribution across all state categories as well as at all India level.

Fourth, in this study, we found that out of pocket expenditure due to the hospitalization was almost 6 times higher in private health facilities compared with public health institutions for all ETL state classifications. Existing literature shows similar results with mean out of pocket expenditure being 3-5 times higher in private health facilities.^{3,4,24,41} Not only OOP spending but also the average income loss due to hospitalization was higher among those who sought care in a private facility and it varies across ETL state groups. Studies note higher cost of diagnosis, medicine and comfort services for bed and other infrastructure

Table 6
Out-of-pocket expenditure by health facility in ETL state groups in India, NSS Social Consumption: Health Survey, 2017-18.

| Characteristics | Low ETL state group | Lower-middle ETL state group | Higher-middle ETL state group | High ETL state group | India |
|--|---------------------|------------------------------|-------------------------------|----------------------|-------|
| Monthly mean out of pocket expenditure due hospitalization (INR) | | | | | |
| Public health facility | 677 | 404 | 469 | 538 | 553 |
| Private health facility | 3039 | 2450 | 2966 | 3083 | 2988 |
| Total | 2003 | 1520 | 1928 | 1947 | 1936 |
| Average share of monthly income loss due to hospitalization on Households (%) | | | | | |
| Public health facility | 6.8 | 3.2 | 4.2 | 4.2 | 5.0 |
| Private health facility | 23.8 | 13.0 | 19.8 | 19.1 | 20.4 |
| Total | 17.4 | 9.5 | 14.4 | 13.3 | 14.7 |
| Percentage of households experiencing the CHE due to hospitalization (PHCE, approach) | | | | | |
| Public health facility | 6.4 | 2.2 | 2.9 | 2.8 | 4.1 |
| Private health facility | 39.9 | 18.9 | 27.0 | 24.0 | 30.5 |
| Total | 25.7 | 11.4 | 17.5 | 14.9 | 19.6 |
| Percentage of households faced the hardship financing due to hospitalization care expenditure | | | | | |
| Public health facility | 8.9 | 3.1 | 5.2 | 11.4 | 7.7 |
| Private health facility | 15.7 | 6.0 | 16.1 | 15.0 | 15.3 |
| Total | 12.8 | 4.7 | 11.6 | 13.4 | 12.0 |
| Monthly mean out of pocket expenditure due to outpatient's care (INR) | | | | | |
| Public health facility | 1637 | 861 | 806 | 682 | 996 |
| Private health facility | 2326 | 1668 | 1798 | 2048 | 2007 |
| Total | 2145 | 1452 | 1536 | 1440 | 1702 |
| Average share of monthly income loss due to OPD care on Households (%) | | | | | |
| Public health facility | 17.0 | 6.8 | 6.9 | 5.3 | 8.6 |
| Private health facility | 20.5 | 9.0 | 12.3 | 12.6 | 14.3 |
| Total | 19.7 | 8.5 | 11.1 | 9.8 | 12.8 |
| Percentage of households experiencing the CHE due to outpatient's care (PHCE, approach) | | | | | |
| Public health facility | 25.9 | 9.9 | 8.7 | 5.9 | 13.4 |
| Private health facility | 35.5 | 9.7 | 17.0 | 14.4 | 22.7 |
| Total | 33.0 | 9.7 | 14.8 | 10.9 | 20.0 |

OOPE = out of pocket expenditure, PHCE=Per capita household's consumption expenditure, CHE = Catastrophic Health expenditure.

explain higher OOP spending in a private medical institution.^{5,42,43} Analysis also shows that the average share of monthly income loss due to out-of-pocket expenditure was higher in *Low ETL* state group (17.4%) whereas it was lower in *Lower-middle ETL* state group (9.5%).

Fifth, almost 12% patients reported facing financial hardship to seek inpatient care as the ensuing expenditure was financed through borrowing and selling of household assets/jewellery and hardship financing was nearly twice among patients who had taken the treatment in a private hospital. There are very limited studies that talk about hardship financing. A study done by Tahsina, Tet al. (2018) in Vietnam found that households were economically vulnerable post seeking treatment in private health care facilities.⁴⁴ Similarly, a recent study in the Indian context highlighted the burden of inpatient care financing among social and economically deprived classes and found greater reliance of such population sub-groups on hardship financing if the care was sought in a private facility.^{24,45-50} Our study also indicates that a greater proportion of patients who took treatment in a private hospital relied on borrowing/selling assets for meeting inpatient care expenditure while OPD expenses were met largely using income and savings. The present paper also finds that *Low ETL states* faced higher percentage of catastrophic expenditure, whereas, *Lower-middle ETL states* had lower catastrophic expenditure. Poorest economic class registered higher CHE with pro-poor distribution at all India level along with all the state categories. Concentration index values were found to be negative for both hospitalization and outpatient care and the magnitude was further higher if private health facilities were chosen for treatment.

Finally, self-reported morbidity and hospitalization rates had a pro-rich distribution and this indicates that due to high costs the utilization of health care services by poor were relatively low, especially for hospitalization care services. In case of the unmet need for treatment seeking, it shows pro-poor distribution for different reasons and higher treatment cost emerged as one of the most crucial reasons. Despite the higher spending on treatment by rich, the CHE is pro-poor and also poorest quintile faced relatively higher burden of income loss.

5. Limitation of the study

Despite contributing significantly to the existing literature, this study has some limitations. *First*, recall bias is a major limitation for any expenditure data. *Second*, the data does not provide information on the amounts secured via various source of financing, therefore the amount of hardship financing could not be measured. *Third*, our study does not analyze the indirect cost of wage loss of patients and care givers due to non-availability of data. Even with these limitations, our study has been able to yield policy relevant insights on the extent of inequality in health care system.

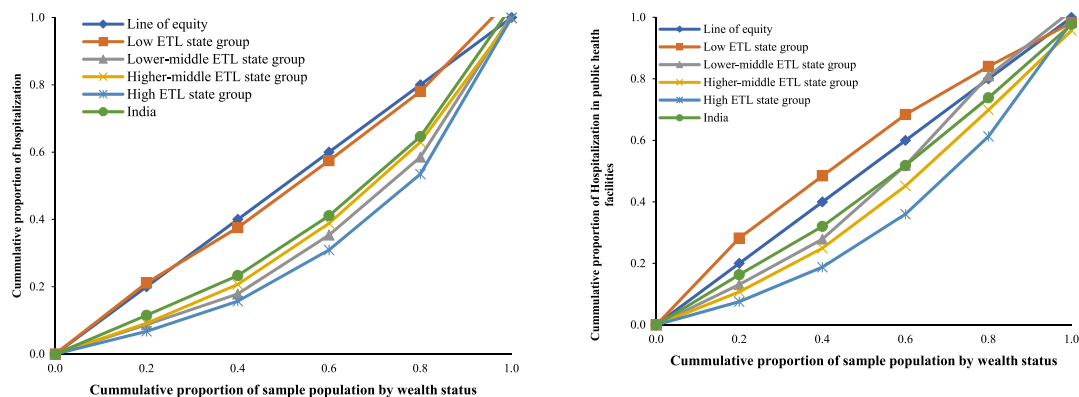


Fig. 1. Concentration curves for hospitalization rate and utilization of public service for hospitalization in ETL state groups in India.

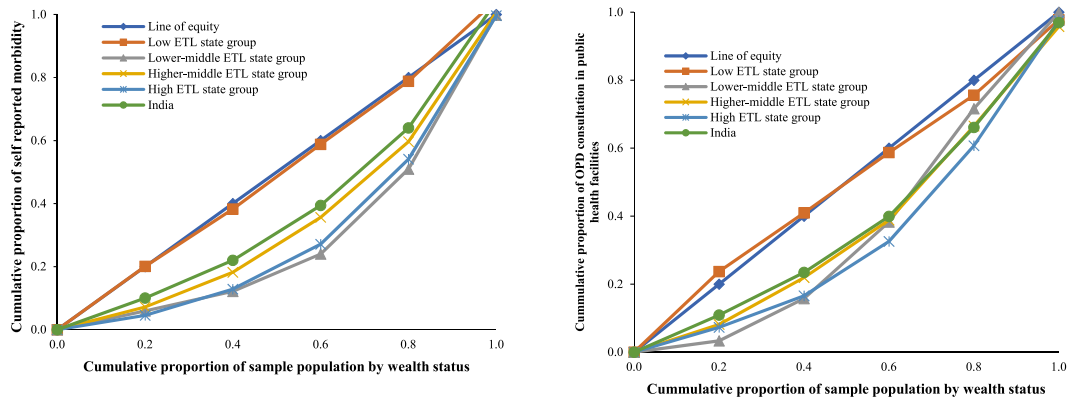


Fig. 2. Concentration curves for self reported ailments in last 15 days and utilization of public service for OPD in ETL state groups in India.

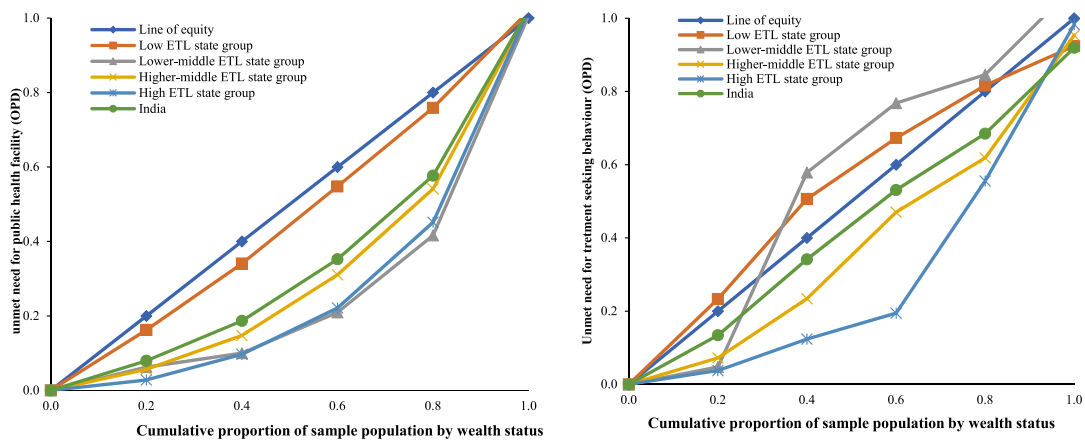


Fig. 3. Concentration curves for unmet need of public health facility and unmet need for treatment seeking for OPD care in ETL state groups in India.

6. Conclusion

The present analysis indicates that the unmet need for seeking care was higher in poor and the possible reasons reported included unavailability of medical facility in the neighbourhood, expensive facility, long waiting times and domestic/economic engagement among others. Also, population in poor economic quintiles spent a higher share of their income on healthcare and experienced crippling catastrophic spending. From policy perspective, it is imperative that public health spending must be effectively allocated to address the health needs of all, especially of poor, as their healthcare needs remain unmet. Also, it is imperative that the healthcare reforms are based on more granular analysis as national averages may keep in veil the local socio-economic and infrastructural ruptures. For instance, the present study shows that morbidity reporting in low ETL states is nearly half of those reported in high ETL states. It is pertinent to understand if these rates vary due to ‘actual’ morbidity rates being lower in the former or are rooted in factors such as socio-economic disparity, lower testing or accessibility of services.

7. Policy implication and further research

Government policies and spending should aim to strengthen the public healthcare system to ensure accessibility, affordability and provision of quality of public health care services. Further research would be needed to identify the unmet needs among different geographical regions and across other population sub-groups. A bigger challenge that needs to be addressed along with provisioning of affordable care is to identify channels of improving utilization of public sector services.

Ethics statement

We have used recent NSS 75th round survey data. The NSS is a countrywide population-based survey organization under the Ministry of Statistics and Programme implementation (MoSPI), Government of India. The NSS obtained the ethical consent from the review committee before survey and during survey a usual consent form filled with signatories by the respondent once he/she have agreed to participate in the study. Since this study used the secondary data which is available in public domain and this dataset does not cover any personal information of participants, so their privacy is protected. Hence, no ethical approval is required separately for this study.

Data availability statement

Our study used the NSS 75th round survey data which is publicly on <http://www.mospi.gov.in/>.

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Declaration of competing interest

None declared from all authors.

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