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Beyond Coverage: Recomposition, Mechanism, and Divergence in Health Equity in Odisha, India

Biswajit Behera
Fakir Mohan University, Balasore, India
ORCID: https://orcid.org/0009-0002-5017-3471

Abstract

This paper departs from the standard question of whether low out-of-pocket (OOP) spending in Odisha reflects financial protection or forgone care. It asks instead whether the *architecture* of inequity has been rebuilt as insurance expanded, whether tribal exclusion is produced by supply-side or demand-side failures, and whether the standard equity indicators used to monitor universal health coverage (UHC) are internally consistent. Using NSS 75th Round (2017–18) and 80th Round (2025) unit-level data on 19,078 and 22,315 persons in Odisha, the paper applies Erreygers-corrected concentration indices, indirect need standardization, and Oaxaca-type decompositions of change. Three findings emerge. First, the level of need-adjusted inequity in hospitalization was stable (HI = 0.015 in both rounds), but its *composition* changed: the contribution of consumption fell from 107% to 55%, while the combined contribution of Scheduled Tribe (ST) status and tribal-district residence rose from −0.0001 to 0.0043 (p = 0.006). Second, the mechanism of tribal exclusion is dual: bypassing of public facilities is driven by quality and staffing failures (40.7% cite poor quality or absent doctors), while untreated illness is driven by low recognition (89.9% of untreated ailments were "not considered serious"). Third, the indicators diverge: catastrophic health expenditure (CHE) is concentrated among the better-off (E = 0.067), while hospitalization is pro-rich (HI = 0.015). A state can therefore improve its CHE statistics by suppressing use. The paper argues that equity monitoring must treat spending and use as complementary but non-substitutable indicators, and that policy must address the mechanisms of exclusion rather than coverage alone.

Keywords: Health equity decomposition; Tribal health; Catastrophic expenditure; Supply-side barriers; Odisha; Universal health coverage

1. Introduction

The standard framing of health equity in low-spending Indian states poses a binary question: does low out-of-pocket (OOP) spending reflect financial protection or forgone care? For Odisha, the answer is both, and the literature has established this (Wagstaff & van Doorslaer, 2000; O'Donnell et al., 2008). This paper argues that the binary framing has outlived its usefulness. After seven years of the Biju Swasthya Kalyan Yojana (BSKY) and the integration

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of the Gopabandhu Jan Arogya Yojana (GJAY) with Ayushman Bharat PM-JAY in January 2025, the policy-relevant questions are no longer about the *level* of protection but about its *architecture*. Three questions organize the paper.

First, has the *composition* of inequity changed even though its level has not? The expansion of insurance from 15% to 67% of the population is a large exogenous shock to the price of care. If insurance works, it should reduce the contribution of consumption to inequity and, by doing so, expose the contribution of other determinants—social group, geography, household structure—that were previously masked by income. This is a question about *recomposition*, not reduction.

Second, is tribal exclusion produced by supply-side or demand-side failures? The two imply different policies. If tribal households bypass public facilities because of quality and staffing, the remedy is supply-side investment. If they do not seek care because illness is not recognized, the remedy is screening and health communication. The paper uses the reported reasons for bypassing facilities and for not seeking care to distinguish these channels.

Third, do the standard indicators used to monitor UHC—CHE and need-adjusted hospitalization—tell the same story? They need not. A household that is not hospitalized cannot incur catastrophic hospital costs. In a state with low inpatient use, CHE can look favourable precisely because need is unmet. This is a question about *indicator divergence* and its implications for SDG 3.8 monitoring.

The setting makes these questions tractable. Odisha's average OOP per hospitalization was ₹16,948 in 2025, half the all-India average of ₹34,064 (National Statistical Office [NSO], 2026). Two-thirds of the population report government-funded coverage, against 41% nationally. Yet Scheduled Tribes form 22.8% of the population (Census of India, 2011), concentrated in eight hill districts with weak health infrastructure. The national Expert Committee on Tribal Health documented systematically worse access among STs (Ministry of Health and Family Welfare [MoHFW] & Ministry of Tribal Affairs [MoTA], 2018). If tribal and poor households use less care than need warrants, low average spending conceals inequity—but the *mechanism* of that concealment is what determines the policy response.

The paper's contributions follow from the three questions. Empirically, it provides the first Oaxaca-type decomposition of change in need-adjusted inequity for Odisha, separating changes in the distribution of determinants from changes in their effects. Conceptually, it shows that in a low-spending state, CHE and hospitalization can move in opposite directions, so neither alone is a sufficient monitor of equity. For policy, it shows that a fourfold expansion of insurance coincided with an unchanged level of inequity but a significant recomposition of its sources, and that supply-side and demand-side barriers require distinct interventions.

2. Literature and Conceptual Framework

Horizontal equity requires equal treatment for equal need, irrespective of income, caste, or place (Culyer & Wagstaff, 1993). Empirical work compares the actual distribution of care with the distribution expected from need alone; the difference is horizontal inequity (Wagstaff & van Doorslaer, 2000). Indian studies find that the burden of paying for care falls unequally.

Thakur and Sangar (2022) found that OOP concentration shifted toward the poor while catastrophic overshoot remained among the rich. Sriram et al. (2024) found CHE on hospitalizations concentrated among the poor, with an Erreygers index of −0.19 widening to −0.26 after need adjustment. Akhtar et al. (2020) identified consumption and household structure as the main drivers.

Evidence on use is equally relevant. Benefit-incidence analysis of the 75th Round found high OOP on private inpatient care associated with lower use among marginalized communities (Yadav et al., 2022). Jeyashree et al. (2017) reported pro-rich inequity in inpatient care for non-communicable diseases. Kujawski et al. (2018) showed that perceived poor quality drives households away from public facilities. Karan et al. (2017) found that the earlier Rashtriya Swasthya Bima Yojana did not reduce inpatient OOP. Early PM-JAY evaluations show mixed effects (Parmar et al., 2023). Odisha-specific research is mostly facility-based; Rout and Choudhury (2018) found medicines to be the largest OOP component in secondary public facilities. Tribal health research documents low formal care use, long travel distances, and reliance on traditional healers, but few studies link these to population-representative inequity measures. Recent work on structural inequalities and dietary diversity in Odisha (Sethy & Mahapatro, 2025) and on health production functions and inequality decomposition (Sethy et al., 2026a) reinforces the need to examine use and spending together and to distinguish supply-side from demand-side mechanisms.

We follow Andersen's behavioural model (Andersen & Newman, 1973; Andersen, 1995). Use depends on need factors (age, sex, ailment type, chronic illness), predisposing factors (social group, education, household composition), and enabling factors (consumption, insurance, residence, region as a supply proxy). Under horizontal equity, only need factors should explain differences in use. The framework yields three propositions corresponding to the paper's questions. P1 (recomposition): the level of need-adjusted inequity may remain stable while its sources shift from consumption to tribal status and geography. P2 (mechanism): if tribal disadvantage is supply-side, bypassing should be attributed to quality and staffing; if demand-side, untreated ailments should be attributed to low perceived seriousness. P3 (divergence): CHE and hospitalization may point in opposite directions, because non-use precludes catastrophic spending.

3. Study Setting

Odisha has about 42 million people (Census of India, 2011). Its geography divides into a developed coastal plain and hill and plateau regions in the south and north, where most tribal communities live, including 13 Particularly Vulnerable Tribal Groups. Eight districts have an ST majority: Mayurbhanj, Malkangiri, Rayagada, Nabarangpur, Gajapati, Kandhamal, Sundargarh, and Koraput. Health financing changed in three phases. Before August 2018, free public care was combined with limited insurance, mainly the earlier national scheme for below-poverty-line families. From 2018 to 2024, BSKY provided free care at all public facilities and cashless private care for over 9 million eligible families, state-funded and outside PM-JAY. From January 2025, GJAY integrated with AB PM-JAY offers ₹5 lakh per family per year plus an additional ₹5 lakh for women, covering about 10.3 million families. Odisha signed a Memorandum of Understanding with the National Health Authority on 13 January 2025 and

became the 34th state to implement AB PM-JAY in convergence with GJAY (MoHFW, 2025). The 75th Round captures the pre-BSKY period; the 80th Round captures the first year of the integrated scheme.

4. Data and Methods

We use unit-level NSS Schedule 25.0 data. The 80th Round (January–December 2025) covered 139,732 households and 651,440 persons; the 75th Round (July 2017–June 2018) covered 113,823 households and 555,115 persons. The design is stratified two-stage, with villages and urban blocks as first-stage units. Morbidity and outpatient treatment use a 15-day recall; hospitalization uses 365 days. The Odisha 2025 sample comprises 5,288 households and 22,315 persons; 3,823 reported an ailment and 3,587 inpatient episodes excluding childbirth were recorded. All estimates use the survey multiplier (final weight = Mult/100). Weighted estimates reproduce the published figures exactly: illness reported by 13.1%, 29.0 hospitalizations per 1,000, average OOP per hospitalization of ₹34,064 for India and ₹16,948 for Odisha, and government insurance coverage of 45.5% rural and 31.8% urban. The 2017–18 Odisha sample comprises 4,264 households and 19,078 persons, with 1,531 reporting an ailment and 2,617 inpatient episodes; it uses the sub-sample-combined weight. Estimates match the official report (NSO, 2019): illness reported by 7.5% in India and 9.2% in Odisha, and average medical expenditure per hospitalization of ₹20,135 for India and ₹12,295 for Odisha. Data are anonymized and public; no ethics approval was required.

The main geographic variable identifies residence in one of eight ST-majority districts (ST share ≥50% in Census 2011): Sundargarh, Mayurbhanj, Gajapati, Kandhamal, Rayagada, Nabarangpur, Malkangiri, and Koraput. Outcomes include reported ailment (chronic or any ailment in the last 15 days, all persons); outpatient treatment (at least one spell treated on medical advice or hospitalized, among persons reporting an ailment); hospitalization (at least one inpatient episode excluding childbirth, all persons, 365 days); public facility use (treated in a government facility); OOP expenditure (medical expenditure net of reimbursement, per hospitalization); CHE (annual household OOP ≥10% and ≥25% of annual consumption expenditure); and distress financing (borrowing or asset sale as the major source). Annual household OOP combines 365-day inpatient spending (including childbirth) with 15-day outpatient spending scaled to a year (×365/15). The capacity-to-pay definition is not used because the schedule does not record food expenditure separately. Negative net amounts are set to zero.

Individuals are ranked by household monthly per capita consumption expenditure (MPCE); an equivalized measure (modified OECD scale) is used as a robustness check. Need variables include 14 age-sex cells, chronic ailment, communicable disease in the last 365 days, any ailment in the last 15 days (for hospitalization), and main ailment type for outpatient treatment. Non-need variables include MPCE quintile, social group (ST, SC, OBC, others), ST-majority district, rural residence, education of the household head (four levels), household size, casual-labor household, government-funded insurance, and other insurance. For all-India models, state fixed effects replace the tribal-district indicator. Variables are harmonized across rounds: education codes mapped to four levels; government insurance in 2017–18 refers to schemes such as RSBY; ailment codes mapped to the same groups. Household consumption is measured

differently across rounds, but concentration indices depend only on ranks, so inequality comparisons remain valid.

The concentration index is $C = (2/\mu)\text{cov}_w(y_i, R_i)$, where R is the fractional rank in MPCE. For binary outcomes we use the Erreygers corrected index, $E = 4\mu C/(b - a) = 8\text{cov}_w(y_i, R_i)$, with a = 0 and b = 1 (Erreygers, 2009). Because E is absolute, its size depends on prevalence; we also report the Wagstaff normalized index (Wagstaff, 2005). Indirect standardization regresses each outcome on need and non-need variables, holds non-need at weighted means, and computes $HI = E(y) - E(\hat{y}^X)$ (O'Donnell et al., 2008). A positive HI means pro-rich inequity for equal need. The standardizing regression is a weighted linear probability model, checked with probit.

Following Wagstaff et al. (2003), E is decomposed into the contributions of each determinant, with each term divided by E(y) to give its percentage share. To explain change between rounds—the first objective—we apply the Oaxaca-type decomposition: each factor's contribution change splits into a change in its distribution and a change in its effect. Standard errors are bootstrapped: first-stage units resampled within strata (500 replications for Odisha, 300 for subgroups and decompositions, 200 for India, per round), with ranks and regressions re-estimated each replication. Differences between groups and rounds use z-statistics from bootstrap standard errors. Analysis is in Python 3 (pandas, NumPy, statsmodels); code is supplementary. Robustness checks include equivalized ranking, Wagstaff normalized index, probit standardization, NSS region instead of tribal district, a narrower need set, a 25% CHE threshold, and OOP excluding the top 1% of episodes (O'Donnell et al., 2016).

5. Results

5.1 Patterns of use and spending. Tribal districts are poorer, more rural, and less literate, yet report less illness and are hospitalized far less often. Their hospitalization rate (25.5 per 1,000) is barely half that of other districts (47.6) and below the national rate (29.0). Government-funded insurance is high in both (72.7% and 64.5%) and well above the national level (41.1%). The consumption gradient runs in opposite directions for different outcomes. Reported illness rises from 8.2% in the poorest quintile to 24.1% in the richest; hospitalization rises from 26.5 to 57.8 per 1,000. By contrast, among those reporting an ailment, the poorest are most likely to be treated (95.0%); most untreated ailments among the better-off are "not considered serious." Public facilities carry most care for the poor: 73.3% of hospitalizations in the poorest quintile are public, against 48.8% in the richest. Median OOP per hospitalization is ₹1,200 in the poorest quintile and ₹4,500 in the richest; the poorest quintile's high mean of ₹21,149 is driven by a few costly private episodes.

5.2 Level and robustness of inequity. Hospitalization is significantly concentrated among the better-off (E = 0.019), and need adjustment removes little: need-predicted hospitalization is nearly neutral (E = 0.004), leaving HI = 0.015 (SE 0.003). The Wagstaff normalized index is 0.121. Odisha's HI is about 1.8 times the national value (0.009; z = 1.95, p = 0.05). Outpatient treatment among people reporting ailment shows no significant inequity (HI = −0.032, SE 0.028); the point estimate is pro-poor, unlike India (HI = 0.015). Reported illness is strongly pro-rich (E = 0.137). Public facility use is strongly pro-poor for inpatient (E = −0.198) and

outpatient care (E = −0.164). OOP per episode is concentrated among the better-off; the estimate is significant once the top 1% of episodes are excluded (C = 0.216, SE 0.026). CHE at 10% is concentrated among the better-off in Odisha (E = 0.067), whereas nationally it leans toward the poor (E = −0.017). The 25% threshold is not significant (E = 0.005). The pro-rich HI for hospitalization is robust under equivalized ranking (0.012), probit standardization (0.015), regional controls (0.015), and a narrower need set (0.015); outpatient HI remains negative and non-significant in every specification.

5.3 Subgroup inequity. Hospitalization inequity is concentrated in the Southern region (HI = 0.023, SE 0.004), while Urban (0.006), Coastal (0.008), and Northern (0.007) estimates are smaller and not individually significant. Outpatient treatment in the Southern region is pro-poor (HI = −0.175, SE 0.084). Tests of difference show rural versus urban p = 0.04 and Southern versus Coastal p = 0.09; ST versus non-ST (p = 0.70) and tribal versus other districts (p = 0.34) are not significantly different.

5.4 Recomposition of inequity. Need factors explain only 22.7% of the pro-rich concentration. Consumption is the largest contributor (55.3%): richer households are more likely to be hospitalized at the same need. ST status contributes 15.9% (ST individuals are hospitalized less by 1.2 percentage points, holding other factors constant, and are concentrated among the poor). ST-majority district residence adds 6.4%. Household size contributes 20.6% (larger households are poorer and less often hospitalized). Education and rural residence offset part (−12.9% and −10.1%). Government-funded insurance contributes almost nothing (−0.4%): coverage is broad, barely related to consumption (C = −0.02), and weakly associated with hospitalization. For outpatient treatment, consumption is the largest contributor (68%) to the pro-poor concentration, while ST and SC membership push toward the better-off (−47% and −29%). Among people with an ailment, ST and SC individuals are less likely to be treated at the same consumption level.

Between rounds, government-funded insurance rose from 14.6% to 66.7%. Pro-rich HI in hospitalization did not change (0.015 in both; z = 0.01). Nationally, HI fell from 0.011 to 0.009 (z = −2.89), and outpatient HI fell from 0.075 to 0.015 (z = −4.91). The tribal–other district hospitalization gap widened: ST-majority rates fell from 28.3 to 25.5 per 1,000, while elsewhere they rose from 34.1 to 47.6. The public share of hospitalizations fell from 72.2% to 61.1%. Outpatient treatment moved from pro-rich to pro-poor (E from 0.092 to −0.034; z = −2.12), though the HI change is marginal (0.065 to −0.032; z = −1.68). Reported illness became more concentrated among the better-off (E from 0.044 to 0.137; z = 5.07). CHE at 10% became more concentrated among the better-off, though not significantly.

The stable HI hides a shift in sources. In 2017–18, consumption alone accounted for more than the whole concentration (107%), and ST status and tribal-district residence contributed nothing (−0.0001, SE 0.0009). By 2025, the consumption contribution had fallen to 0.0107 (55%), though not significantly (z = −1.34, p = 0.18). The combined contribution of ST status and tribal-district residence rose to 0.0043 (SE 0.0013), a significant increase (z = 2.77, p = 0.006). Almost all of this change comes from a change in the effect of these factors, not their distribution. ST individuals and tribal-district residents became less likely to be hospitalized relative to others with the same need and consumption. Household size became a larger

contributor, mainly because it became more concentrated among the poor. This is the paper's first finding: inequity did not rise, but it was *recomposed*.

5.5 Supply-side versus demand-side mechanisms. Patients in tribal districts rely more on public hospitals (81.5% versus 57.0% of episodes) and pay much less there (₹1,317 versus ₹2,841). They pay more when they go private (₹45,917 versus ₹39,115). Only 19.5% are treated outside their home district, against 36.4% elsewhere. Among those bypassing public hospitals, the most common reasons in tribal districts are poor quality or no doctor (40.7%) and preference for a trusted doctor (34.1%). Long waiting matters far less (6.0% versus 19.6%). Nearly all untreated ailments in tribal districts were "not considered serious" (89.9%). Being unable to leave work was cited far more often in other districts (15.3% versus 2.5%). Cost was almost never given as a reason for bypassing public hospitals. This is the second finding: tribal disadvantage operates through both channels, but the supply-side channel dominates bypassing behaviour, while the demand-side channel dominates the reporting and recognition of illness.

5.6 Divergence of spending-based and use-based indicators. CHE at 10% is concentrated among the better-off in Odisha (E = 0.067), whereas nationally it leans toward the poor (E = −0.017). At the same time, hospitalization is pro-rich (HI = 0.015). A household that is not hospitalized cannot incur catastrophic hospital costs; a population with low inpatient use can show low CHE even if need is unmet. In Odisha, the two indicators therefore point in opposite directions: spending-based equity looks favourable (low CHE among the poor), while use-based equity looks unfavourable (low hospitalization among the poor). Neither indicator alone is a sufficient monitor of SDG 3.8. This is the third finding.

6. Discussion

The paper set out to answer three questions that differ from the conventional protection-versus-forgone-care framing. The first was whether the composition of inequity changed as insurance expanded. The evidence says yes. Coverage rose more than fourfold, to two-thirds of the population, and is now distributed almost evenly across consumption groups (C = −0.02). Yet need-adjusted inequity in hospitalizations was exactly the same in both rounds, and insurance contributes nothing to it in either. This is consistent with earlier evidence that publicly funded insurance in India has had limited effects on use among the poorest (Karan et al., 2017; Parmar et al., 2023). The decomposition shows why the level stayed flat. The direct influence of consumption on hospitalizations weakened: richer households' advantage at the same need and social position fell by about 40%, though imprecisely estimated. This is what one would expect if insurance and free public care reduced the price barrier. At the same time, the disadvantage of ST individuals and tribal-district residents grew significantly, and hospitalization rates in tribal districts fell while rising sharply elsewhere. The financial barrier fell, but the remaining barriers—distance, quality, and recognition of illness—became more important. This is a recomposition, not a reduction, of inequity. It is consistent with recent evidence that structural inequalities in nutrition and health persist even as aggregate spending changes (Sethy & Mahapatro, 2025; Sethy et al., 2026b), and with work showing that health system performance depends on supply-side determinants rather than coverage alone (Sethy et al., 2026a).

The second question was whether tribal disadvantage operates through supply-side or demand-side channels. The evidence says both, in different parts of the care pathway. On the supply side, patients in tribal districts rarely travel beyond their home district (19.5% versus 36.4%), suggesting limited access to secondary and tertiary care, and when they bypass public facilities the main reasons are poor quality or absent doctors (40.7%), not cost. On the demand side, nearly all untreated ailments were "not considered serious" (89.9%), and low perceived need, shaped by norms and reliance on traditional healers, may delay care until illness is advanced. The scheme design of GJAY and PM-JAY addresses neither channel: it reimburses hospital care at empaneled facilities but does not reduce distance, staff shortages, or the cost of reaching a hospital, nor does it change how illness is recognized. The policy implication is that supply-side investment (staffing, facility upgrading, referral transport) and demand-side investment (screening, health communication in tribal languages, partnerships with traditional healers) are both necessary and neither is a substitute for the other.

The third question was whether spending-based and use-based indicators converge or diverge. The evidence says they diverge. CHE in Odisha is concentrated among the better-off (E = 0.067), unlike India as a whole (E = −0.017), as in earlier national studies (Sriram et al., 2024). Meanwhile hospitalization is pro-rich (HI = 0.015). In a low-spending state with strong public provision, CHE alone gives a misleading picture of equity. Use-based measures are needed alongside it to monitor SDG 3.8. This is not a technical point about measurement; it is a substantive point about what "progress toward UHC" means. A state can improve its CHE statistics by suppressing use, and it can improve its use statistics by increasing CHE. Only a dashboard that reports both, disaggregated by social group and district type, can distinguish protection from exclusion.

The paper also speaks to the literature on horizontal inequity in India. H1 (pro-rich inequity in inpatient care) is supported for hospitalization but not for outpatient treatment once illness is reported. This is consistent with the finding that inequity lies earlier in the pathway: reported illness is steeply pro-rich (8.2% poorest versus 24.1% richest), and hospitalization is pro-rich even after need adjustment. The reporting gradient has two readings. It may partly reflect real morbidity differences, since chronic conditions are more common among the affluent. But the survey records perceived illness, and poorer and less educated people under-report. They report only illness serious enough to need treatment, explaining why those who do report are almost always treated. Under-reporting biases measured need toward the better-off, so the HI for hospitalizations is likely a lower bound on true inequity. H2 (untreated ailments concentrated among the poor) is not supported: among people reporting an ailment, the poor are not less likely to be treated; the point estimate is pro-poor, and the poorest quintile has the highest treatment rate (95%). Untreated ailments are concentrated among the better-off and are mostly considered minor. The inequity is not in treatment conditional on reporting; it is in reporting and in reaching hospital.

7. Policy Recommendations

The three objectives translate into three priorities. First, monitor use-based equity alongside spending. Because CHE is concentrated among the better-off, spending indicators alone overstate equity. State UHC monitoring should report need-adjusted hospitalization and

reported illness by consumption group, social group, and district type, alongside CHE. Second, address both supply-side and demand-side barriers in tribal districts. On the supply side, fill specialist and medical officer posts through targeted incentives, upgrade district and sub-divisional hospitals in the Southern region, and provide free referral transport. On the demand side, invest in population-based screening for hypertension, diabetes, and other chronic conditions at Ayushman Arogya Mandirs, combined with ASHA-led follow-up, and develop health communication in tribal languages and partnerships with community leaders and traditional healers as referral links. Third, track scheme use, not only enrolment. GJAY and PM-JAY claims data, disaggregated by district and social group, can show where coverage is not translating into hospital use. Persistent gaps in the Southern region should trigger supply-side review rather than further enrolment drives. Compensate for wage loss during hospitalization (lost earnings average ₹2,600–2,900 per episode), since insurance does not cover this non-financial cost.

8. Limitations

Six limitations apply. First, self-reported morbidity: need is measured from reported illness, which is steeply pro-rich; if poorer people under-report, measured need is biased toward the better-off and the HI understates true inequity, so estimates are conservative. Second, comparability between rounds: reported illness rose from 9.2% to 15.4%, and some argue the 2017–18 round under-captured morbidity; consumption was measured differently, so changes should be read with caution, though rank-based indices are robust to level differences. The rounds are repeated cross-sections and cannot identify the causal effect of BSKY or PM-JAY. Third, consumption measure: MPCE comes from a short set of questions, and ranking errors may attenuate concentration indices. Fourth, sample size: estimates for ST individuals with an ailment (n = 558) and the reasons reported in tribal districts rest on small numbers; district-level estimates are not possible. Fifth, cross-sectional design: decomposition results describe associations, not causal effects, and the near-zero insurance contribution should not be read as its causal impact. Sixth, annualized outpatient spending: CHE combines 365-day inpatient with 15-day outpatient spending scaled to a year, adding noise at the household level.

9. Conclusion

Odisha spends less out of pocket on hospital care than almost any other Indian state, and between 2017–18 and 2025 it expanded government-funded insurance from 15% to two-thirds of its population. This paper has argued that the conventional question—protection or forgone care?—is no longer the most policy-relevant one. The more important questions concern composition, mechanism, and divergence. The composition of inequity has changed: income-based barriers weakened, but tribal and geographic barriers hardened. The mechanism is twofold: supply-side gaps dominate bypassing behaviour, while demand-side gaps dominate the reporting and recognition of illness. And the indicators diverge: spending-based equity looks favourable while use-based equity looks unfavourable, so neither alone is a sufficient monitor of progress. Broad insurance coverage has protected those who reach care, but it has not equalized who reaches it. UHC in Odisha now depends on stronger secondary care in tribal districts, earlier detection of illness, and monitoring of who uses care, not only of who pays for it.

Declarations

Ethics approval and consent to participate: Not applicable. This study is a secondary-evidence review with a simulation model and involved no primary data collection or human participants.

Consent for publication: Not applicable.

Availability of data and materials: All data analysed in this review are drawn from published sources cited in the reference list. The Python (NumPy) code for the nutrient-substitution model is available from the corresponding author on reasonable request.

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Authors' contributions: B.B conceived the study, designed the review and simulation model, conducted the searches and screening, performed the analysis, and drafted and revised the manuscript.

Use of artificial intelligence: Artificial intelligence tools were used solely for language editing and reference formatting. All substantive content, analysis, interpretation and conclusions are the author's own, and the author takes full responsibility for the accuracy and integrity of the manuscript.

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