

Financial Protection under Public Health Insurance among Socially and Economically Backward Workers: A Comparative Study of Cherthala and Ambalapuzha Taluks in Kerala

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Abstract

Publicly financed health insurance schemes are integral to Universal Health Coverage in India, but their ability to offer financial protection to socially and economically disadvantaged workers has been debated. Over the last two decades, universal public health insurance has been gaining acceptance in low- and middle-income countries, but few studies have examined the impact of public health insurance on out-of-pocket (OOP) expenditure in an Indian context using a between and within compare design context setting: Cherthala and Ambalapuzha taluks in Alappuzha district, Kerala. Using mixed methods approach, this study investigates the protective effect of public health insurance on inpatient OOP expenditure among the most marginalized workers. Based on primary data on insured patients in government taluk hospitals, government medical colleges and large private hospitals, the study explores the incidence of hospitalization, choice of provider and the extent and determinants of inpatient OOP expenditure. Methods — A fully quantitative analysis integrates descriptive statistics with multivariate regression to measure the relationship between insurance status, the type of hospital (private vs. The results show that although public health insurance increases access to inpatient care for workers from socially and economically disadvantaged groups, it still offers only limited financial protection. Patients with insurance still bear high levels of OOP costs, especially for private hospitals, medicines, diagnostics and for longer stay relating to chronic illness. There is significant taluk-level variation in the comparative results which are attributable to the type, spread of health infrastructure, availability of public sector services and dependence of private sector providers. Even with a relatively better public health system in Kerala, people with insurance cover are not protected from financial vulnerability, especially informal and marginalized workers. It highlights the inadequacies of hospital-centric insurance models in environments with fragmented health systems and poverty. To convert insurance coverage into effective financial protection for vulnerable populations, it is critical to re-enforce public provisioning, broaden the benefit packages beyond inpatient care, and regulate private sector costs.

Keywords: public health insurance, financial protection, out-of-pocket expenditure, unorganized workers, health equity, Kerala.

1. Introduction

Achieving Universal Health Coverage (UHC) has emerged as a central objective of health system reform globally, with financial risk protection constituting one of its core dimensions (World Health Organization [WHO], 2010, 2015). Financial protection seeks to ensure that access to needed health services does not expose individuals or households to catastrophic health expenditure or impoverishment. In low- and middle-income countries such as India, this objective remains particularly challenging due to the dominance of out-of-pocket (OOP) payments as a mode of health financing, especially among socially and economically backward populations engaged in informal and unorganised labour (Selvaraj & Karan, 2012; Wagstaff et al., 2016).

India's health system is characterised by a high reliance on OOP expenditure, which accounts for more than half of total health spending, with inpatient care contributing a substantial share of household financial burden (Government of India, 2019; National Sample Survey Office [NSSO], 2015). In response, the state has increasingly relied on publicly financed health insurance schemes—most notably Rashtriya Swasthya Bima Yojana (RSBY) and its successor Ayushman Bharat—Pradhan Mantri Jan Arogya Yojana (PMJAY)—to extend financial protection to poor and vulnerable households (Karan et al., 2014; Prinja et al., 2019). These schemes primarily focus on covering inpatient hospitalisation costs, with the expectation that insurance coverage would reduce OOP expenditure and improve equity in healthcare access.

However, empirical evidence from national and sub-national studies presents a mixed picture regarding the effectiveness of public health insurance in reducing OOP expenditure. While several studies report increased hospital utilisation among insured populations, the impact on financial protection has been modest or uneven, particularly for the poor (Berman et al., 2010; Selvaraj & Karan, 2012; Sriram & Khan, 2020). In many cases, insured households continue to incur significant OOP payments for medicines, diagnostics, informal payments, and services obtained from private providers, thereby limiting the protective role of insurance (Mohanty et al., 2016; Prinja et al., 2019). These gaps are especially pronounced among socially and economically backward workers, whose livelihoods are marked by income insecurity, limited social protection, and heightened vulnerability to health shocks (Joe et al., 2018).

Kerala occupies a distinctive position within India's health landscape, owing to its relatively strong public healthcare infrastructure, favourable health indicators, and long-standing emphasis on public provisioning (Karan et al., 2014; Adithyan, 2024). Recent reforms under the Aardram Mission have further strengthened primary healthcare services and sought to rebuild public trust in government facilities. Yet, Kerala also exhibits high levels of healthcare utilisation and persistent dependence on private hospitals, particularly for inpatient care, which contributes to rising OOP expenditure despite widespread insurance coverage (Mohanty & Ram, 2018; Adithyan, 2024). This paradox raises critical questions about the extent to which insurance-led approaches can deliver meaningful financial protection even in relatively advanced health systems.

Within Kerala, coastal districts such as Alappuzha present a compelling context for examining these issues. The district has a high concentration of socially and economically backward workers engaged in fisheries, coir production, casual labour, and other informal occupations, making them particularly susceptible to healthcare-related financial stress. Moreover, variations in health infrastructure and provider mix across taluks create differential conditions under which public health insurance operates. Comparing Cherthala and Ambalapuzha taluks—each characterised by differing degrees of public sector capacity and private hospital presence—offers a unique opportunity to assess how local health system contexts mediate the relationship between insurance coverage and financial protection.

Against this backdrop, the present study examines the effectiveness of public health insurance in reducing inpatient OOP expenditure among socially and economically backward workers through a comparative analysis of Cherthala and Ambalapuzha taluks in Alappuzha district, Kerala. By focusing on hospital type, morbidity profile, and utilisation patterns, the study seeks to contribute to ongoing debates on the limits of insurance-based UHC strategies and the need for context-sensitive health system strengthening to protect vulnerable populations from financial hardship.

2. Review of literature

The discourse on financial protection in healthcare is firmly anchored in the broader framework of Universal Health Coverage (UHC), where reducing out-of-pocket (OOP) expenditure is a key normative and policy objective (World Health Organization [WHO], 2010; Wagstaff et al., 2016). In low- and middle-income countries, the persistence of high OOP payments has been consistently linked to informal employment, income precarity, and the absence of comprehensive social security systems (Berman et al., 2010; Selvaraj & Karan, 2012). India exemplifies this challenge, where socially and economically backward workers—predominantly engaged in unorganised labour—remain disproportionately exposed to health-related financial shocks despite the expansion of public health insurance schemes (Karan et al., 2014; Prinja et al., 2019).

A substantial body of national-level research has examined the performance of publicly financed health insurance programmes such as RSBY and PMJAY. While evidence indicates increased hospitalisation among insured households, the impact on inpatient OOP expenditure remains limited and uneven (Selvaraj & Karan, 2012; Wagstaff et al., 2016; Sriram & Khan, 2020). Studies consistently report that insured households continue to incur expenses on medicines, diagnostics, informal payments, and post-hospitalisation care, revealing structural limitations in insurance design (Mohanty et al., 2016; Joe et al., 2018). These limitations are particularly acute for informal workers, whose livelihoods are marked by irregular earnings, occupational health risks, and weak bargaining power within healthcare markets.

Kerala presents a distinctive yet paradoxical case in the Indian health landscape. Despite its comparatively strong public healthcare system and favourable health indicators, the state continues to experience high levels of OOP expenditure, largely driven by extensive reliance on private healthcare providers (Karan et al., 2014; Mohanty & Ram, 2018; Adithyan, 2024). Recent reforms under the Aardram Mission have strengthened primary healthcare infrastructure and improved public sector utilisation, yet evidence suggests that insurance-linked reforms alone have not translated into robust financial protection, particularly for inpatient care (Adithyan, 2024). This paradox underscores the need to situate insurance outcomes within local labour markets and socio-economic contexts.

Alappuzha district, historically shaped by coir production, fisheries, and other informal occupations, has received sustained scholarly attention for its distinctive labour structure. Studies on the coir industry highlight the concentration of socially backward communities, the feminisation of labour, and persistent employment insecurity exacerbated by technological change and market restructuring (Florence & Padath, 2024a; Pratheesh, 2021; Pratheesh & Nair, 2022a). Modernisation and mechanisation, while improving productivity, have intensified labour displacement and work alienation, deepening economic vulnerability among traditional workers (Pratheesh et al., 2024). These dynamics have direct implications for health security, as employment instability and declining social cohesion reduce households' capacity to absorb health-related expenses.

Research on coastal and fishing communities in Alappuzha further underscores intersecting vulnerabilities linked to caste, gender, and livelihood precarity. Padath (2025a) documents the transformation of women's roles within fishing households amid socio-cultural change, highlighting increased care burdens and exposure to health risks. Such populations often rely on episodic hospital care while lacking sustained access to preventive and outpatient services, rendering insurance coverage for inpatient care alone insufficient. Complementing this, Padath (2025c) conceptualises civic sense as behavioural infrastructure, offering insights into how trust in public institutions—including healthcare systems—shapes utilisation patterns and compliance, particularly among marginalised groups.

Labour-oriented studies in Kerala have long emphasised the role of informal employment in shaping access to welfare and social protection (Isaac & Raghavan, 1990; Nair et al., 1992). The coir industry literature, in particular, reveals how trade union politics, technological change, and state intervention have produced uneven outcomes for workers' welfare (Rammohan, 1999, 2008; Sudarshana, 2020). These structural conditions intersect with health financing arrangements, influencing hospital choice, treatment pathways, and exposure to OOP expenditure. Workers displaced or deskilled by modernisation are more likely to seek private care due to perceived inadequacies in public facilities, thereby incurring higher costs despite insurance enrolment.

At the sub-district level, variations in health infrastructure and provider mix further mediate the relationship between insurance and financial protection. Comparative studies emphasise that taluk-level differences in public hospital capacity, proximity of private hospitals, and local labour composition significantly influence healthcare utilisation and expenditure outcomes (Mohanty et al., 2016; Joe et al., 2018). However, there remains a notable gap in the literature on taluk-level comparative analyses that explicitly integrate labour structure with insurance outcomes—particularly in districts like Alappuzha, where informal work predominates.

In summary, existing literature establishes that public health insurance in India has expanded access to inpatient care but has not adequately addressed the financial vulnerability of socially and economically backward workers. While Kerala's public health achievements moderate some risks, the persistence of OOP expenditure among informal labour households reflects deeper structural issues related to employment precarity, health system fragmentation, and insurance design limitations. This study builds on and extends the literature by offering a taluk-level comparative analysis of Cherthala and Ambalapuzha, explicitly linking public health insurance performance to labour dynamics and socio-economic marginalisation in coastal Kerala.

3. Methodology

This study adopts a cross-sectional, comparative research design to examine the effectiveness of public health insurance in providing financial protection against inpatient out-of-pocket (OOP) expenditure among socially and economically backward workers in Alappuzha district, Kerala. The analysis focuses on two taluks—Cherthala and Ambalapuzha—selected to capture variation in labour composition, public health infrastructure, and the presence of private hospitals. The study population comprises insured individuals from socially and economically backward households, primarily engaged in unorganised occupations such as coir production, fisheries, and casual wage labour, who experienced inpatient hospitalisation during the reference period.

Primary data were collected through a structured survey administered to patients or caregivers at the point of discharge from selected healthcare facilities. The sampling frame included government taluk hospitals, government medical colleges, and major private hospitals operating in the two taluks. A multi-stage sampling approach was employed to ensure

representation across hospital types and taluks. The survey instrument captured information on socio-demographic characteristics, occupational status, insurance coverage, hospitalisation details, provider choice, length of stay, morbidity profile, and itemised inpatient OOP expenditure, including spending on medicines, diagnostics, procedures, and informal payments.

The primary outcome variable was total inpatient OOP expenditure, analysed both as a continuous measure and as a binary indicator of high financial burden based on percentile thresholds. Key explanatory variables included hospital type, taluk of residence, occupational category, insurance scheme coverage, duration of hospitalisation, and nature of illness. Data analysis combined descriptive statistics to assess expenditure patterns with multivariate regression techniques to identify factors associated with higher OOP expenditure while controlling for socio-economic and clinical covariates. All analyses were conducted using standard statistical software, and results are presented with appropriate measures of statistical significance. Ethical principles of informed consent, confidentiality, and voluntary participation were strictly adhered to throughout the study.

4. Results

This section presents comparative evidence on inpatient utilisation patterns and out-of-pocket (OOP) expenditure among insured socially and economically backward workers in Cherthala and Ambalapuzha taluks. Using facility-level primary data, the analysis quantifies the extent of financial protection offered by public health insurance and identifies how provider type, labour profile, and local health system contexts shape residual OOP burden.

4.1 Socio-economic and occupational profile of hospitalized workers

This section examines the socio-economic and occupational composition of insured hospitalised workers in Cherthala and Ambalapuzha taluks to establish the baseline characteristics of the study population and assess the degree of labour precarity represented in inpatient utilisation. The analysis focuses on employment type, sectoral affiliation, social group, and household income to quantify the concentration of hospitalisation among socially and economically backward workers. Table 1 summarises the socio-economic and occupational characteristics of the insured patients hospitalised in the two taluks. Across both taluks, the inpatient population was dominated by unorganised workers, particularly those engaged in coir-related activities, fisheries, and casual wage labour.

Table 1. Socio-economic and occupational profile of insured inpatients (%)

Characteristic	Cherthala (n=180)	Ambalapuzha (n=170)	Total (n=350)
Unorganised workers	82.2	78.8	80.6
Coir sector workers	41.7	18.2	30.3
Fisheries-related workers	14.4	36.5	25.1
Casual wage labour	26.1	24.1	25.1
SC/ST/OBC households	69.4	72.9	71.1
Monthly household income < ₹10,000	63.9	67.6	65.7

The hospitalisation among insured patients is highly concentrated within unorganised sector workers in both taluks, comprising over four-fifths of all inpatient episodes.

Empirically analysing the sectoral distribution, we can see a statistically significant type-level variation along with taluk-level details, where the largest share of occupation in Cherthala corresponds to coir workers, in opposition to the dominating presence of fisheries workers in Ambalapuzha. Such divergence likely reflects local labour economies instead of variances in insurance access or ability to go to the hospital.

Scheduled Castes, Scheduled Tribes and Other Backward Classes constituted about 69 % in Cherthala and 72 % in Ambalapuzha taluks, showing that social group composition is very high among the former and the latter. Additional economic fragility is evident in income distribution, with almost two-thirds of the hospitalised families reporting monthly incomes below ₹10,000. Though occupations differ, the uniformity in the concentration of income across taluks highlights the notion that economic deprivation is a common underlining trait. In short, the table demonstrates that inpatient uptake through public health insurance in Alappuzha is mainly achieved by those in the informal labour markets and the vulnerable groups. These baseline characteristics provide a reference for the empirical examination of the subsequent differences in provider choice and out-of-pocket payment of the insured population.

4.2 Hospital utilization patterns by taluk and provider type

This subsection examines the distribution of inpatient utilisation across public and private healthcare facilities among insured workers in Cherthala and Ambalapuzha taluks. The analysis quantifies how hospital choice varies by taluk despite uniform insurance coverage, with particular attention to the relative use of government taluk hospitals, government medical colleges, and private hospitals.

Table 2. Distribution of hospitalisations by provider type (%)

Hospital Type	Cherthala	Ambalapuzha	Total
Government taluk hospitals	28.9	41.8	35.1
Government medical colleges	16.1	19.4	17.7
Private hospitals	55.0	38.8	47.2

The data show a clear taluk-level difference in provider utilisation. In Cherthala, private hospitals accounted for more than half of all inpatient admissions (55.0%), exceeding the combined share of government taluk hospitals and medical colleges. In contrast, Ambalapuzha exhibited greater reliance on public sector facilities, with government hospitals together accounting for 61.2% of total hospitalisations. Government taluk hospitals were utilised more frequently in Ambalapuzha than in Cherthala, with a difference of nearly 13 percentage points. Utilisation of government medical colleges remained relatively similar across taluks, indicating that referral-level public facilities play a comparable role in both locations. The higher private sector share in Cherthala suggests differential access, availability, or perceived effectiveness of public facilities at the taluk level.

Across the combined sample, private hospitals constituted the single largest provider category, accounting for nearly half of all inpatient episodes among insured workers. This pattern indicates that insurance coverage does not translate into predominant utilisation of public facilities, even among socially and economically backward populations. Overall, the table demonstrates that provider choice among insured workers is shaped by local health system contexts rather than insurance status alone. The observed variation between Cherthala and Ambalapuzha establishes an empirical basis for examining how provider type influences inpatient out-of-pocket expenditure in subsequent analyses.

4.3 Inpatient out-of-pocket expenditure among the insured

This section quantifies the magnitude and distribution of inpatient out-of-pocket (OOP) expenditure incurred by insured workers across Cherthala and Ambalapuzha taluks and examines variation by provider type. The analysis focuses on mean expenditure levels and the composition of OOP spending to assess the extent of residual financial burden among the insured population.

Table 3. Mean inpatient OOP expenditure (₹)

Category	Cherthala (Mean ± SD)	Ambalapuzha (Mean ± SD)
Overall OOP expenditure	14,860 ± 9,420	11,230 ± 7,810
Public hospitals	6,540 ± 4,110	5,120 ± 3,680
Private hospitals	21,480 ± 10,260	18,950 ± 9,740
Medicines & diagnostics	58% of total OOP	61% of total OOP

The results indicate substantial inpatient OOP expenditure among insured workers in both taluks, with higher average expenditure observed in Cherthala. The mean overall OOP expenditure in Cherthala exceeded that of Ambalapuzha by approximately ₹3,600, reflecting differences in provider utilisation and expenditure composition. Across both taluks, inpatient care obtained from private hospitals resulted in markedly higher OOP expenditure compared to public hospitals. The mean OOP cost in private facilities was more than three times that incurred in public hospitals in each taluk. The standard deviations indicate considerable dispersion in expenditure, suggesting heterogeneity in case severity, length of stay, and service utilisation even within the insured population.

Medicines and diagnostic tests constituted the largest component of OOP expenditure, accounting for more than half of total spending in both taluks. This expenditure pattern remained consistent across provider types, indicating limited coverage or effective reimbursement for these cost components under existing insurance arrangements. Overall, the table demonstrates that insurance coverage does not eliminate inpatient OOP expenditure and that the magnitude of residual costs varies systematically by taluk and hospital type. The concentration of higher expenditure in private facilities establishes a quantitative link between provider choice and financial burden, forming the basis for examining determinants of high OOP expenditure in the subsequent subsection.

4.4 Determinants of high inpatient OOP expenditure

Table 4 reports the results of the multivariate logistic regression estimating the association between patient characteristics, provider type, and the likelihood of incurring high inpatient out-of-pocket (OOP) expenditure among insured workers. The dependent variable is defined as inpatient OOP expenditure above the upper quartile of the sample distribution.

Table 4. Determinants of high inpatient OOP expenditure (Logistic Regression)

Variable	Odds Ratio (OR)	95% CI	p-value
Treatment in private hospital	3.12	2.01–4.84	<0.001
Length of stay (>5 days)	1.87	1.22–2.86	0.004
Chronic illness	1.69	1.11–2.56	0.015
Casual/unorganised labour	1.43	1.01–2.04	0.047
Residence in Cherthala taluk	1.38	1.00–1.92	0.049

Regression results show provider type has the most significant association with high inpatient OOP expenditure. After adjusting for confounding variables, high OOP costs were over three times more common among patients treated in private hospitals compared to those treated in public facilities. The impact of hospital stay was also statistically significant: staying longer than five days was associated with a much higher likelihood of higher OOP expenditure. Financial burden was independently related to clinical characteristics. Chronic illness status was also a strong determinant of high OOP expenditure, a measure that could reflect repeated diagnostic testing, extended treatment, or higher intensity care [51]. Occupational status remained a strong determinant, with casual and unorganised workers at the highest risk of experiencing financial hardships over other occupational groups.

After adjustment for patient specifics, taluk of residence remained associated with higher OOP expenditure among insured (in Cherthala, v. Ambalapuzha). This indicates that there may be additional effects of local health system factors on financial outcomes beyond the effects of individual socio-economic or clinical characteristics. Age and gender were not significant predictors in the adjusted model. Overall, these regression estimates suggest that high inpatient OOP among insured workers is driven more by provider choice, length of stay, illness profile, and local health system context than demographics per se.

5. Discussion

Publicly funded medical care can increase access to inpatient care among disadvantaged workers in coastal Kerala, but this study shows that increased access has not yet resulted in complete financial protection. The prevalence of hospitalisation covered by insurance among unorganised workers hailing from poorer and socially disadvantaged households suggests that at least some insurance schemes are reaching appropriate target populations. The sustained presence of significant OOP expenditure for these populations evidence structural constraints in the design and operation of top-down insurance-based protection mechanisms in mixed health systems.

The composition of jobs then matters significantly to both how health care is used and how high the financial risk. In the special case of coir production, fisheries, and casual labours, the unstable income associated with the occupation and the exposure to increased occupational health risks render them more likely to take inpatient care while further limiting their ability to bear residual medical costs. This disproportionate burden of hospitalisation amongst such workers indicates that health shocks are binding in the context of labour precarity, exacerbating economic vulnerability even in the presence of nominal insurance coverage. This pattern is consistent with wider evidence indicating the tenuous integration of informal labour markets to formal social protection systems.

The selection of the provider becomes a salient factor in cost. Although Kerala has comparatively stronger public healthcare infrastructure, this was not reflected in the choice of facility, with large proportions of insured patients continuing to seek care from private hospitals, especially at Cherthala. This dependence not only indicates a perception of the differentials in quality but also local differences in the availability of care and referral pathways. This significant OOP cost differential attributed to private admissions documents the incomplete net regulation of the private sector by public insurance in respect to prices and services, consistent with national-level studies that document comparable disconnects between insurance and expenditure.

Clinical characteristics are additional modifiers of financial outcomes. Prolonged stays in the hospital in addition to chronic ailments considerably raised OOP spending suggesting that even if insurance coverage provides a lump sum benefit, it inaccurately estimates expenses against long term care or labourise medical conditions. High spending on medicines and

diagnostics reflects ongoing coverage gaps in benefits packages and supply-side constraints in public facilities which incentivise insured patients to source inputs from markets.

Local health system contexts mediating insurance effectiveness is shown by taluk-level variation. Higher financial burden in Cherthala, even after adjusting for individual attributes, reveals that spatial inequalities in public provisioning and private sector supremacy create the determinants of insurance outcomes; they create greater electronic, but narrower other, financial accessibility. This supports the conclusion that even if insurance coverage were achieved, the uneven capacity of health systems at sub-district levels cannot be countered.

Overall, these results indicate that although public health insurance has succeeded to some extent in improving hospital access for marginalised workers in Alappuzha, its role in financial risk protection is partial and unequal. Despite insurance coverage, the continuation of OOP expenditure among insured populations indicates a structural misalignment between the design of insurance, labour-market realities, and the functioning of Kerala's mixed health system.

5.1 Policy implications

Public health insurance reforms under PMJAY and Kerala's Aardram Mission need to move beyond a narrow focus on hospitalisation coverage and address the structural sources of residual out-of-pocket expenditure faced by socially and economically backward workers. First, benefit packages under PMJAY should be recalibrated to ensure comprehensive coverage of medicines, diagnostics, and follow-up care during inpatient episodes, as these components account for the largest share of OOP spending even among insured patients. Strengthening price standardisation and timely reimbursement mechanisms—particularly for private hospitals empanelled under PMJAY—is essential to curb cost shifting onto patients and to enforce effective financial protection.

Second, the Aardram Mission's emphasis on revitalising primary and secondary public health facilities should be strategically aligned with insurance implementation. Expanding diagnostic capacity, drug availability, and specialist services at government taluk hospitals in districts such as Alappuzha would reduce dependence on private providers and limit avoidable inpatient admissions. Insurance utilisation pathways should be explicitly linked to strengthened public facilities through referral protocols and gatekeeping mechanisms, ensuring that insured patients are not systematically diverted to higher-cost private care.

Third, insurance design must recognise the specific vulnerabilities of unorganised and informal workers. PMJAY enrolment and service delivery should be accompanied by targeted outreach through labour collectives, coir societies, fisheries cooperatives, and local self-government institutions to improve awareness of entitlements and grievance redressal mechanisms. Simplifying administrative procedures and ensuring cashless treatment in practice—not merely in policy—would reduce indirect financial barriers for workers with unstable incomes.

Finally, district- and taluk-level monitoring of insurance performance should be institutionalised to capture spatial variations in utilisation and financial burden. Integrating PMJAY data systems with Kerala's public health information infrastructure would enable real-time tracking of OOP expenditure patterns and provider behaviour. Such locally grounded governance mechanisms are critical for translating insurance coverage into meaningful financial protection within Kerala's mixed health system, particularly for marginalised labour populations in coastal districts.

6. Conclusion

This study demonstrates that public health insurance has expanded inpatient access among socially and economically backward workers in coastal Kerala, yet its capacity to provide effective financial protection remains limited. Despite insurance coverage, insured households continue to incur substantial out-of-pocket expenditure during hospitalisation, particularly when care is sought from private providers. The persistence of such expenditure indicates that insurance has functioned more as an access-enabling mechanism than as a comprehensive financial risk protection tool.

The findings highlight the central role of provider type and local health system context in shaping financial outcomes. Higher reliance on private hospitals, longer hospital stays, and chronic illness significantly increase financial burden, while taluk-level variation underscores the influence of spatial inequalities in public health infrastructure. These patterns suggest that insurance outcomes are mediated less by individual characteristics and more by structural features of healthcare delivery within Kerala's mixed system.

Importantly, the concentration of hospitalisation among informal and socially disadvantaged workers reveals a convergence of labour precarity and health vulnerability. For these groups, even partial cost exposure during inpatient care can translate into economic distress, reinforcing cycles of insecurity. The study thus challenges assumptions that high insurance coverage alone is sufficient to achieve financial protection in contexts marked by informal labour markets and private sector dominance.

Finally, the evidence underscores the need to reframe public health insurance as one component of a broader health system strategy. Without parallel investments in public provisioning, regulation of private care, and attention to local labour realities, insurance coverage will continue to fall short of delivering equitable financial protection for vulnerable populations.

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References

- Adithyan, G. S. (2024). Kerala's progress towards universal health coverage: The road travelled and beyond. *BMC Public Health*, 24, Article 112.
- Berman, P., Ahuja, R., & Bhandari, L. (2010). The impoverishing effect of healthcare payments in India. *Economic & Political Weekly*, 45(16), 65–71.
- Florence, M. A., & Padath, P. (2024a). Technological modernization and its challenges in coir industry in Alappuzha. *Journal of Social Sciences and Economics*, 3(2), 92–99.
- Government of India (2019). *National health accounts estimates for India*. MoHFW.
- Isaac, T. M., & Raghavan, P. (1990). *A policy framework for the revitalization of the coir industry in Kerala*. CDS.
- Joe, W., Rudra, S., & Subramanian, S. V. (2018). Horizontal inequity in health care utilisation in India. *Health Policy and Planning*, 33(3), 430–440.

- Karan, A., Yip, W., & Mahal, A. (2014). Extending health insurance to the poor in India. *Social Science & Medicine*, 181, 83–92.
- Mohanty, S. K., & Ram, F. (2018). Spatial patterns of poverty and health spending in India. *Population Research and Policy Review*, 37(4), 547–571.
- Mohanty, S. K., Kim, R., Khan, P. K., & Subramanian, S. V. (2016). Geographic variation in catastrophic health spending in India. *Health Policy and Planning*, 33(2), 192–203.
- Nair, K. N., Isaac, T. M., Van, P. A., & Stuijvenberg, J. (1992). *Modernisation and employment: The coir industry in Kerala*. Sage.
- Padath, P. (2025a). Beyond the waves: Ethnic socio-cultural life and transforming women's roles in the Alappuzha sea fishermen community. *Indialogs*, 12(1), 49–73.
- Padath, P. (2025c). Civic sense as behavioral infrastructure. *Koya University Journal of Humanities and Social Sciences*, 8(2), 622–632.
- Pratheesh, P. (2021). Modernization, coir worker and labour alienation. *IARJSET*, 8(9). <https://doi.org/10.17148/iarjset.2021.8905>
- Pratheesh, P., & Nair, N. G. (2022a). Performance of coir industry in Alappuzha and labour displacement. *HuSS International Journal of Research in Humanities and Social Sciences*, 9(2), 65.
- Pratheesh, P., Reema, M., & Florence, M. A. (2024). Addressing unemployment through the coir industry. *Asian Research Journal of Arts & Social Sciences*, 22(9), 107–119.
- Prinja, S., et al. (2019). The cost of universal health care in India. *PLOS Medicine*, 16(7), e1002955.
- Rammohan, K. T. (1999). *Technological change in Kerala industry*. CSSS.
- Rammohan, K. T. (2008). *Coir in India: History of technology*. Springer.
- Selvaraj, S., & Karan, A. K. (2012). Why publicly financed health insurance schemes are ineffective. *Economic & Political Weekly*, 47(11), 60–68.
- Sriram, S., & Khan, M. M. (2020). Effect of health insurance on inpatient OOP costs. *BMC Health Services Research*, 20, 839.
- Sudarshana, B. (2020). Productive forces in the coir industry. In *The political economy of uneven rural development* (pp. 145–186).
- Wagstaff, A., et al. (2016). Progress on catastrophic health spending. *The Lancet Global Health*, 6(2), e169–e179.
- World Health Organization. (2010). *Health systems financing: The path to universal coverage*.
- World Health Organization. (2015). *Tracking universal health coverage*.

