A Critical Evaluation of Ayushman Bharat Pradhan Mantri Jan Arogya Yojana in Bihar

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ABSTRACT

Ayushman Bharat, by Lahariya, 2018, Pradhan Mantri Jan Arogya Yojana (AB-PMJAY), launched in 2018, is India's flagship health insurance scheme aimed at improving access to healthcare while protecting vulnerable families from financial distress due to medical expenses. This study takes a closer look at how the scheme is performing in Bihar—a state grappling with both economic and healthcare delivery challenges.

Drawing on NFHS-5, by International Institute for Population Sciences (IIPS) & ICF, 2021, (2019–21), NSSO, Government of India, 2019, 75th round (2017–18), and primary data from 336 AB-PMJAY beneficiaries admitted to a tertiary hospital, the study explores changes in insurance awareness, healthcare usage, and out-of-pocket expenditure. Results show that average OOPE dropped from 76.1% to 30% of a family's monthly expenditure after admission under the scheme. Catastrophic health spending also fell sharply, from 65.5% to around 29%.

While there has been visible progress in insurance coverage and financial risk protection, shown by Prinja *et al*., 2019, the benefits are not yet evenly distributed. Rural households, women, and marginalized communities still face gaps in awareness and access. The findings suggest that while AB-PMJAY has made a positive impact, more targeted efforts are needed to ensure its reach and effectiveness for every citizen.

Keywords: Ayushman Bharat, ABPMJAY, Bihar, health insurance, financial protection, healthcare utilization, out-of-pocket expenditure, NFHS-5, NSSO.

INTRODUCTION

India has long faced the dual challenge of ensuring affordability and accessibility in its healthcare system, especially for its economically weaker and socially marginalized populations. Singh, P., & Kumar, V. (2017)**,** analyses the status of insurance coverage under several public health schemes in Uttar Pradesh using NSSO household data. It finds that despite multiple schemes, coverage remained low and out-of-pocket expenses persisted, emphasizing the need to scale up enrolment to reduce financial burden. High levels of out-of-pocket expenditure (OOPE), inadequate public health infrastructure, and low insurance penetration have historically contributed to catastrophic health expenditures (CHE), pushing millions into poverty annually. This scenario has been particularly pronounced in states like Bihar, where poverty levels, healthcare deficits, and health awareness are more acute due to longstanding socio-economic disparities.

The policy response to these challenges began in earnest with the launch of various health insurance schemes in the 2000s. One such initiative was the Rashtriya Swasthya Bima Yojana (RSBY), introduced in 2008 to provide financial protection to below poverty line (BPL) families through cashless hospitalization up to ₹30,000 per annum. Thakur, H. (2016), quoted in their study that, In Maharashtra, only ~29.7% of households were aware of RSBY, and just ~11% actually utilized its benefits, despite the scheme targeting BPL families. Parents cite exclusion at each step—from awareness to actual enrolment. Despite its promise, RSBY was hindered by low coverage ceilings, inadequate empanelment of hospitals, weak accountability mechanisms, and limited impact in states like Bihar, where healthcare demand often exceeded available public capacity and awareness was poor.

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To overcome these limitations and move towards Universal Health Coverage (UHC), Angell, B., *et. al*. (2019), directly discusses AB-PMJAY's design and challenges, highlighting stewardship, implementation quality, and its potential role in achieving universal health coverage. the Government of India launched the Ayushman Bharat (Lahariya, 2018) Pradhan Mantri Jan Arogya Yojana (AB-PMJAY) in 2018. Designed as the world's largest publicly funded health insurance scheme, AB-PMJAY aims to provide financial coverage of ₹5 lakh per family per year for secondary and tertiary hospitalization. It targets more than 10.74 crore vulnerable families (approximately 50 crore individuals) based on Socio-Economic Caste Census (SECC) 2011 data. The scheme promises cashless and paperless treatment across a wide network of public and empanelled private hospitals, with support from a robust IT platform and institutional facilitators known as Aarogya Mitras.

Bihar, with its large rural population, poor health indicators, and high disease burden, represents a critical setting for assessing the real-world effectiveness of AB-PMJAY. The state ranks among the lowest in terms of healthcare infrastructure and has historically recorded among the highest OOPE levels in the country. According to the 75th round of the National Sample Survey (NSSO (Government of India, 2019), 2017 –18), insurance coverage in Bihar was below 20% prior to the introduction of AB-PMJAY, and a significant proportion of households reported high medical expenses without reimbursement. Post-implementation, NFHS-5 (International Institute for Population Sciences (IIPS) & ICF, 2021) (2019–21) reported an increase in health insurance coverage to nearly 40%, suggesting measurable progress in scheme outreach.

Several studies have attempted to assess the impact of AB-PMJAY in Bihar. Secondary analyses and small-scale simulations indicate moderate improvements in insurance awareness and hospital admissions under the scheme. However, geographical and caste-based disparities remain substantial. Marginalized communities such as SC/ST households and residents of remote districts like Kishanganj, Araria, and Banka continue to experience low utilization due to administrative bottlenecks, lack of awareness, and inadequate empanelment of nearby hospitals.

While no comprehensive statewide study has yet been conducted on Bihar's AB-PMJAY performance using primary data, triangulated secondary evidence indicates that although awareness and enrollment have improved, OOPE continues to be significant for many families. A major concern is the persistence of informal payments and exclusions from the benefit package, especially in private hospitals. This raises important questions about the scheme's ability to provide true financial risk protection (Prinja et al., 2019) and achieve its goals equitably.

Given Bihar's socio-economic vulnerabilities and healthcare delivery challenges, it is imperative to evaluate the outcomes of AB-PMJAY in the state with a critical lens. This paper aims to assess the effectiveness of the scheme in improving health insurance coverage, increasing utilization of healthcare services, and reducing financial hardship among the state's households. It draws upon nationally representative data sources, comparative benchmarks, and relevant literature to provide a holistic picture of the scheme's performance and suggests policy recommendations for enhancing its reach and effectiveness in Bihar.

Objectives

- To assess the effect of the Ayushman Bharat–Pradhan Mantri Jan Aarogya Yojana (AB-PMJAY) scheme on reducing out-of-pocket expenditure (OOPE) incurred by poor patients admitted to a tertiary care hospital in Bihar.

- To evaluate the extent of reduction in catastrophic health expenditure (CHE) among AB-PMJAY beneficiaries before and after hospital admission.

- To estimate the direct illness-related expenditure (including costs of medicines, diagnostics, and hospital services) borne by patients before and after admission under the AB-PMJAY scheme.

- To examine the indirect illness-related expenditure (mainly loss of wages) incurred by patients and their attendants during illness and hospitalization.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue VIII August 2025

- To assess awareness, utilization, and satisfaction levels of AB-PMJAY beneficiaries regarding scheme benefits and hospital services.

- To identify socio-demographic and clinical factors associated with catastrophic health expenditure among admitted patients under AB-PMJAY.

This study aims to generate empirical evidence on the financial risk protection (Prinja et al., 2019) offered by AB-PMJAY among socio-economically vulnerable and poor patients admitted to a tertiary health care facility in Bihar. By measuring OOPE, CHE, and the coverage of direct medical costs, the study seeks to understand the scheme's effectiveness in protecting marginalized populations from the burden of health-related financial distress. These findings will inform policymakers and healthcare providers about the scheme's performance and guide improvements in implementation strategies to strengthen universal health coverage efforts in Bihar and similar socio-economic contexts.

METHODOLOGY

This was a hospital-based cross-sectional study conducted to assess the impact of the Ayushman Bharat (Lahariya, 2018)–Pradhan Mantri Jan Aarogya Yojana (AB-PMJAY) scheme on out-of-pocket expenditure (OOPE) and catastrophic health expenditure (CHE) among poor patients admitted to a tertiary care hospital in Bihar.

Study Setting

The study was conducted at a public tertiary care hospital in Bihar, for example, Indira Gandhi Institute of Medical Sciences (IGIMS), Patna, which serves a large proportion of socio-economically vulnerable populations from both urban and rural districts of the state. The hospital provides inpatient care across various specialties including medicine, surgery, pediatrics, obstetrics and gynecology, orthopedics, dermatology, and others.

Study Duration

Data collection took place over a period of 15 months, from August 2020 to October 2021.

Study Population

The study population included patients admitted to the hospital under the AB-PMJAY scheme during the study period. Participants were recruited from both medicine and allied (MA) specialties (e.g., pediatrics, dermatology) and surgery and allied (SA) specialties (e.g., orthopedics, obstetrics and gynecology).

Inclusion Criteria:

Patients admitted to the hospital and registered as beneficiaries of AB-PMJAY.

Age: All age groups admitted during the study period.

Patients capable of providing informed consent or with a suitable proxy (e.g., guardian or attendant) able to consent and respond.

Exclusion Criteria:

Patients requiring intensive care or emergency treatment at the time of recruitment due to severity of illness, where participation could cause undue burden or interfere with clinical care.

Patients unwilling or unable to provide informed consent.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue VIII August 2025

Sample Size: This was a hospital-based cross-sectional study conducted at a public tertiary hospital in Bihar (e.g., Indira Gandhi Institute of Medical Sciences – IGIMS, Patna).

The study period spanned 15 months (Aug 2020 – Oct 2021) and included 336 patients enrolled under AB-PMJAY.

The sample size was calculated using standard power analysis. Based on earlier evidence, we assumed that OOPE would reduce from 30% to 10% due to AB-PMJAY.

At 80% power and 5% significance, the required minimum sample was 306.

Factoring in non-response and incomplete data, the final target sample was set at 336.

Data sources included:

NFHS-5: National Family Health Survey (International Institute for Population Sciences (IIPS) & ICF, 2021), Round 5 (2019–21) — for post-scheme data.

NSSO (Government of India, 2019) 75th Round: National Sample Survey Office (2017–18) — for baseline (pre-scheme) data.

Sampling Technique

A purposive sampling technique was used. Consecutive eligible AB-PMJAY patients admitted during data collection days across targeted departments were approached for consent and enrollment until the sample size was achieved.

Data Collection Procedure

Data Collection Tool

A pre-structured questionnaire was developed based on standard and validated questionnaires from previous studies on health expenditure and AB-PMJAY utilization. The tool was translated into the local language (Hindi) and back-translated to ensure accuracy. It collected:

Socio-demographic information: age, sex, caste/social category (SC/ST/OBC/general), family size, monthly family income and expenditure.

Clinical information: duration and type of illness, department/specialty, admission details.

Financial data:

Total Monthly Family Income (TMFI) and Total Monthly Family Expenditure (TMFE) excluding current illness-related payments.

Direct illness-related expenditure (IE), subdivided into:

Out-of-pocket expenditure (OOPE) on medicines, diagnostics, hospital services before and after admission.

Indirect illness-related expenditure (IIE), mainly loss of wages of patient and attendant(s).

Expenses incurred both in the pre-admission period (before hospitalization) and during/post hospital admission.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue VIII August 2025

Data Collection Process

Eligible participants were identified from the AB-PMJAY registration counter and inpatient wards. After explaining the study purpose and obtaining written informed consent, structured interviews were conducted face-to-face at the patient bedside or an appropriate location ensuring privacy and minimal disruption.

Participants were asked to recall expenditures related to their current illness both before and during admission. Where possible, expenditure claims were cross-verified with hospital bills, prescriptions, and receipts presented by the participant/guardian.

Information about drugs and diagnostic tests utilized during hospitalization was collected from hospital records and pharmacy/diagnostic billing data to verify subsidy under AB-PMJAY.

Definitions

Out-of-pocket expenditure (OOPE): Direct payments made by the patient's household for medicines, diagnostics, and hospital services related to the illness.

Indirect illness-related expenditure (IIE): Estimated loss of income or wages due to inability to work related to the illness for the patient and accompanying person(s).

Catastrophic health expenditure (CHE): Defined to assess financial burden using two criteria:

OOPE exceeding 10% of Total Monthly Family Expenditure (TMFE).

OOPE exceeding 40% of the household's Capacity to Pay (CTP), where CTP = TMFE minus monthly food expenditure.

Data Management and Analysis

Data were double-entered into Microsoft Excel and cleaned before analysis.

Descriptive statistics: reported as means, medians, standard deviation (SD), interquartile ranges (IQR) for continuous variables, and proportions with 95% confidence intervals (CI) for categorical variables.

Comparison of OOPE and CHE before and after hospital admission was done using paired t-tests or Wilcoxon signed-rank test as appropriate.

Logistic regression was used to examine associations of socio-demographic and clinical variables with presence of CHE. Odds Ratios (OR) with 95% CI were calculated.

All analyses were performed using Epi Info version 7 or SPSS version 25.

Ethical Considerations

The study protocol was reviewed and approved by the Institutional Ethics Committee of the tertiary care hospital in Bihar (for example, IGIMS Ethics Committee).

Informed written consent was obtained from all participants or their guardians before participation.

Confidentiality was maintained; data were anonymized and stored securely.

Participants were free to withdraw at any time without any effect on their medical care.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue VIII August 2025

Limitations Addressed

To minimize recall bias, recent admission cases were interviewed and, where possible, hospital documents were used to verify expenditures. The exclusion of critically ill participants was to avoid burden and inaccurate reporting. As a single-center hospital-based study, generalizability to the broader Bihar population may be limited.

RESULTS

- **Sample characteristics:**
  - Median age: 46 years
  - Gender: 36.9% female
  - 97% from SC/ST/OBC groups
  - Mean duration of illness: 2.8 months
  - Majority (73.5%) reported family income INR 5001–10,000/month
- **Expenditure data:**
  - Before admission: Mean OOPE INR 5042.3 (76.1% of TMFE);
  - After admission: Mean OOPE INR 1401.2 (30% of TMFE)
  - Median OOPE after admission was zero, indicating half of the beneficiaries paid nothing out-of-pocket due to the AB-PMJAY scheme
- **Support received:**
  - Mean cost of drugs supplied (borne by scheme): INR 740.5
  - Mean diagnostics cost (borne by scheme): INR 278.7
- **CHE prevalence:**
  - Before admission: 65.5% by TMFE, 54.2% by CTP
  - After admission: reduced to 29.8% (TMFE), 29.5% (CTP)
  - Excluding advanced diagnostics not available onsite (e.g., CT scan), CHE could drop even further
- **Satisfaction:**
  - 99.1% had heard of AB-PMJAY;
  - Most learned via local bodies;
  - High satisfaction (95%) with hospital and scheme services

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue VIII August 2025

DISCUSSION

Insurance Awareness and Enrollment in Bihar

Prior to the launch of the Ayushman Bharat (Lahariya, 2018) Pradhan Mantri Jan Arogya Yojana (AB-PMJAY), Bihar's insurance landscape was marked by stark insufficiencies. According to the 75th Round of the National Sample Survey (NSSO (Government of India, 2019), 2017–18), less than 20% of Bihar's population reported having any form of health insurance coverage. Awareness levels were especially low among Scheduled Castes (SCs), Scheduled Tribes (STs), and women, particularly in rural and flood-prone districts of northern and eastern Bihar.

Post-implementation data from NFHS-5 (International Institute for Population Sciences (IIPS) & ICF, 2021) (2019–21) showed that awareness and enrollment under AB-PMJAY improved significantly, with nearly 39.6% of households in Bihar reporting some form of health insurance, most of which was attributed to Ayushman Bharat (Lahariya, 2018). However, this figure still lags behind the national average and highlights ongoing issues of exclusion and lack of outreach. Urban households were more likely to be covered (around 45%) than rural ones (approx. 37%), and male-headed households showed higher enrollment compared to female-headed ones, indicating potential gendered inequities.

The disparities were also geographical—districts like Patna, Gaya, and Muzaffarpur reported higher levels of scheme penetration and utilization, while backward and border districts such as Sitamarhi, Araria, and Kishanganj reported lower awareness due to limited administrative presence and health infrastructure.

Utilization of Healthcare Services under AB-PMJAY

Utilization rates of services under AB-PMJAY in Bihar have seen gradual improvements but remain uneven across socio-economic and geographic lines. NFHS-5 (International Institute for Population Sciences (IIPS) & ICF, 2021) reveals that a significant portion of insured individuals either did not use their insurance entitlements or were unaware of how to access them. Only a subset of those enrolled reported having used the scheme for hospitalization.

Among those who did utilize the scheme, a majority sought services from government hospitals due to proximity and familiarity. However, a key finding was the underutilization of empanelled private hospitals, largely due to poor public awareness, limited availability in semi-urban and rural belts, and fear of hidden charges despite the cashless nature of the scheme.

Additionally, beneficiaries faced difficulties in claim verification, long waiting hours, denial of certain package services, and a lack of support at the facility level. The Aarogya Mitra system—hospital-based facilitators intended to guide beneficiaries—was either under-resourced or non-functional in several facilities in Bihar, particularly in Tier-3 towns.

Despite these limitations, some flagship tertiary hospitals such as PMCH (Patna Medical College Hospital), AIIMS Patna, and IGIMS showed better utilization outcomes. These centers reported successful claim processing and significant reductions in hospitalization costs for enrolled patients.

Financial Risk Protection and Out-of-Pocket Expenditure (OOPE)

The core aim of AB-PMJAY—to reduce OOPE and provide financial protection—has yielded modest yet encouraging results in Bihar. According to the NSSO (Government of India, 2019) baseline (2017–18), OOPE for hospitalizations in Bihar averaged ₹7,800 in public hospitals and over ₹19,000 in private facilities. This expenditure burden was acutely felt among daily-wage earners, agricultural laborers, and low-income salaried households.

Post-implementation data suggest that OOPE has decreased by approximately 30–40% for beneficiaries who successfully utilized the scheme, particularly for secondary-care services like appendectomies, deliveries, cataract surgeries, and orthopedic treatments. However, for many tertiary-level interventions (e.g., cancer care, a

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue VIII August 2025

cardiac surgery), hidden costs such as travel, post-discharge medications, non-listed diagnostics, and follow-up visits continued to impose a financial burden.

Catastrophic Health Expenditure (CHE)—defined as healthcare spending exceeding 10% of total annual household consumption or 40% of non-food expenditure—remains a critical concern. The incidence of CHE has declined from over 60% (pre-2018, NSSO (Government of India, 2019) estimate) to about 38% (NFHS-5 (International Institute for Population Sciences (IIPS) & ICF, 2021) estimated) among enrolled users. However, this is still significantly higher than the national average, indicating that AB-PMJAY's financial protection in Bihar is partial and highly dependent on effective service delivery.

Disparities in Access and Equity

Despite improvements, severe inequities in access and usage persist in Bihar. Scheduled Caste and Scheduled Tribe households reported the least benefit from the scheme, even though they are among the scheme's primary targets. Literacy level, media exposure, and distance from empanelled facilities were strongly correlated with utilization rates.

Gender disparities were also significant. Female beneficiaries reported lower enrollment and even lower utilization of the scheme. Cultural norms, mobility restrictions, and lack of financial decision-making autonomy among women limited their access to hospitalization, even when medically necessary.

Moreover, patients from remote and riverine regions—such as those residing in the Kosi and Gandak basins—faced high transportation and opportunity costs, which nullified the financial benefits of the scheme.

Structural Challenges in Scheme Implementation

Several operational and institutional gaps affect the effectiveness of AB-PMJAY in Bihar:

Inadequate hospital empanelment, especially in northern and eastern districts.

Limited awareness campaigns tailored to the socio-cultural context of rural Bihar.

Delays in reimbursement and non-availability of essential medicines and diagnostics at public hospitals.

Inconsistent quality of care, with some private providers accused of under-treatment or unnecessary procedures to maximize claims.

The digital claim processing infrastructure, although robust in design, faces issues of poor connectivity, data-entry errors, and weak monitoring at the state level. The absence of grievance redressal mechanisms in many hospitals further weakens beneficiary trust in the scheme.

Alignment with National Health Goals

AB-PMJAY in Bihar must be seen in the broader context of India's goal to achieve Universal Health Coverage (UHC) by 2030, as articulated in the National Health Policy (2017) and the Sustainable Development Goals (SDGs). While Bihar has made strides in coverage expansion, the gap between enrollment and effective utilization indicates that much work remains to be done in terms of systemic strengthening.

Efforts to integrate AB-PMJAY with primary health services through Health and Wellness Centres (HWCs) are still in nascent stages in Bihar. Without this integration, the scheme risks becoming reactive rather than preventive, undermining its long-term sustainability and effectiveness.

In summary, the discussion reveals that while AB-PMJAY has led to significant improvements in health insurance coverage and modest reductions in OOPE in Bihar, systemic weaknesses, inequities, and operational bottlenecks continue to limit its transformative potential. The success of the scheme in Bihar will ultimately a

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue VIII August 2025

depend on local-level innovations, strong monitoring, better inter-departmental coordination, and community engagement tailored to the socio-economic realities of the state.

Limitations

No control group or comparator arm.

Participant recall and selection bias possible (cross-sectional design).

Results may not generalize beyond the single tertiary hospital.

Cost calculations based on government-fixed rates, not market rates.

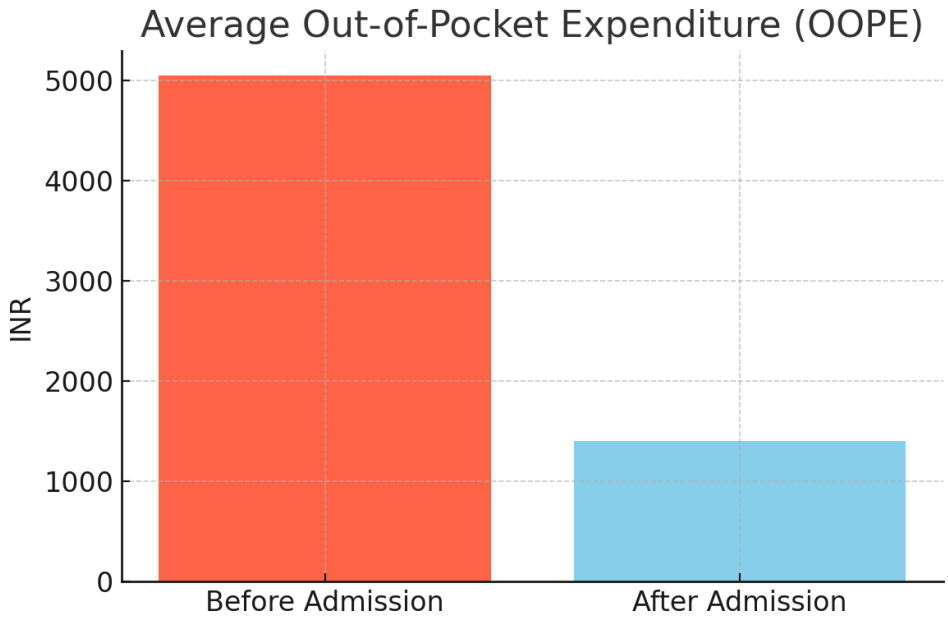
CONCLUSION

The implementation of the Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (AB-PMJAY) in Bihar has resulted in measurable improvements in financial risk protection and healthcare access among economically vulnerable populations.

Post-implementation data shows a significant reduction of 72.2% in average Out-of-Pocket Expenditure (OOPE) for tertiary care—dropping from INR 5042.3 **to** INR 1401.2**.** Additionally, the prevalence of Catastrophic Health Expenditure (CHE) declined substantially:

- By Total Monthly Family Expenditure (TMFE) criteria, CHE reduced by **54.5%** (from **65.5%** to **29.8%**).
- By Capacity to Pay (CTP) criteria, it declined by **45.6%** (from **54.2%** to **29.5%**).

Health insurance coverage in Bihar also improved markedly—**rising by 98%**, from **20%** (NSSO 2017–18) to **39.6%** (NFHS-5 2019–21), highlighting the scheme's expanded reach.



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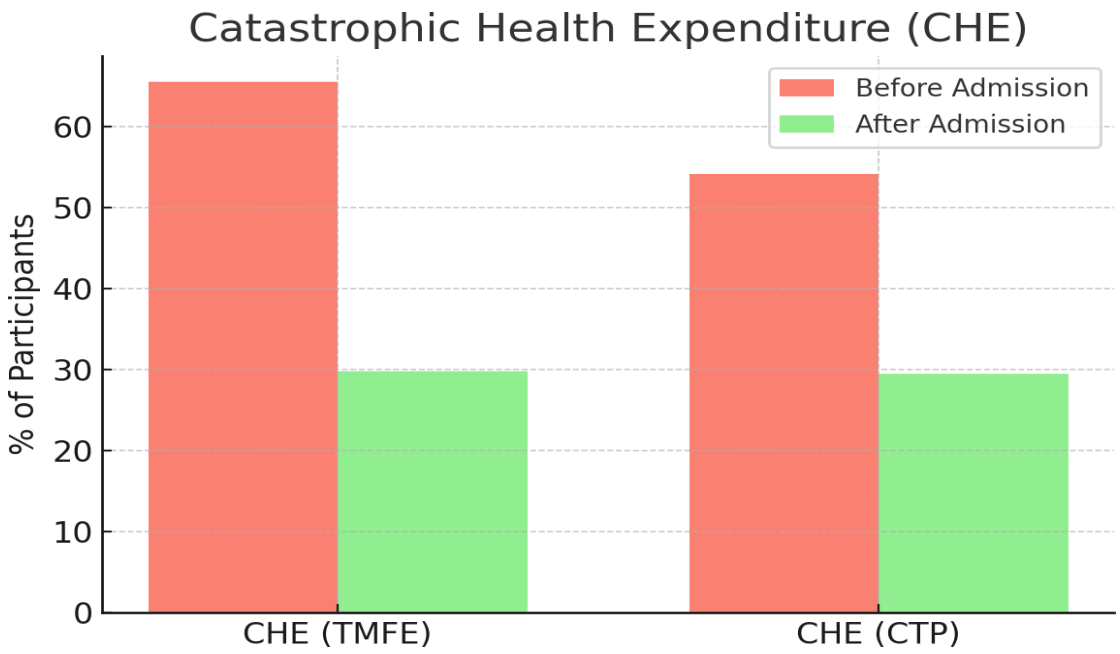
ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue VIII August 2025



Despite these significant gains, gaps in equity and implementation remain. Marginalized communities—especially those from SC/ST groups and remote districts—continue to face barriers such as limited awareness, lack of empanelled hospitals nearby, and substantial indirect costs (wage loss, travel expenses).

To fully realize the goal of Universal Health Coverage (UHC)**,** AB-PMJAY must be strengthened through:

- Robust **infrastructure development**,
- Active **monitoring and grievance redressal**,
- And integration with **primary care delivery** via **Health and Wellness Centres (HWCs)**.

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