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Regimen-Based Pharmacoeconomic Analysis of Jan Aushadhi Generic Medicines versus NPPA Ceiling Prices and Branded Equivalents across Five Chronic Non-Communicable Diseases in India

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ABSTRACT

Background: Medicines are the second-largest component of current health expenditure in India, accounting for approximately 21% of current health expenditure in 2022–23, while out-of-pocket expenditure still constituted 43.4% of total health expenditure in the same year. This burden falls disproportionately on patients with chronic non-communicable diseases (NCDs) requiring lifelong pharmacotherapy.

Objective: To estimate the annual per-patient medication cost differences between Pradhan Mantri Bhartiya Janaushadhi Pariyojana (PMBJP) generics, National Pharmaceutical Pricing Authority (NPPA) ceiling prices and branded equivalents for index regimens across five chronic NCD categories, and to model potential population-level savings.

Material and methods: This was a cross-sectional pharmacoeconomic analysis of secondary, publicly available data. Index regimens for type 2 diabetes mellitus (T2DM), hypertension (HTN), ischaemic heart disease (IHD), asthma and hypothyroidism were defined with reference to current guidelines (2014–2026); regimen composition and consumption volumes were investigator-defined modelling assumptions. PMBJP prices were extracted by drug code from the PMBI Product Portfolio List; NPPA ceiling prices from the NPPA Updated Price List as on 11 June 2026 [S.O. 1575(E)/1581(E)]; branded maximum retail price (MRP) was the arithmetic mean of two to three leading brands from licensed online retail pharmacies.

Results: Annual PMBJP regimen costs ranged from ₹203 (hypothyroidism) to ₹4,860 (asthma). Savings versus branded MRP were 75.0% (T2DM), 75.1% (HTN), 72.3% (IHD), 63.7% (asthma) and 44.4% (hypothyroidism); savings versus NPPA ceiling prices ranged from 47.5% to 80.9%. Modelled potential savings at 20% uptake totalled ₹24,050 crore per year (₹21,126–₹24,050 crore across inhaler-use scenarios; ₹12,025–₹36,075 crore across 10–30% uptake).

Conclusion: For the index regimens modelled, PMBJP prices were consistently below both branded MRP and NPPA ceiling prices. Population-level figures are modelled potential savings under stated assumptions, not observed or expected real-world savings, and should be interpreted as indicative of the scale of opportunity rather than as forecasts.

Keywords: cost analysis; generic medicines; Jan Aushadhi; non-communicable diseases; PMBJP

INTRODUCTION

Medicines remain one of the largest recurring health costs borne by Indian households. The National Health Accounts (NHA) Estimates for India 2022–23 place total pharmaceutical expenditure at more than ₹1.61 lakh crore — ₹1.35 lakh crore on prescribed medicines and ₹26,670 crore on over-the-counter products — amounting to roughly 21% of current health expenditure and making medicines the second-largest spending head after inpatient hospital care. The same report shows that out-of-pocket expenditure (OOPE), although falling from 64.2% of total health expenditure in 2013–14, still accounted for 43.4% in 2022–23. [1] Out-of-pocket payments of this magnitude are an established route into financial hardship: earlier work using national consumption data estimated that OOP health payments push a substantial share of households below the poverty line each year. [2]

The burden is concentrated among patients with chronic NCDs, which the World Health Organization identifies as the leading cause of mortality in India. [3] The ICMR-INDIAB-17 survey documented diabetes in 11.4% of adults (approximately 101 million) and hypertension in 35.5% (approximately 315 million). [4] For ischaemic heart disease specifically, the India State-Level Disease Burden Initiative estimated 23.8 million prevalent cases (95% uncertainty interval 22.6–25.0 million) in 2016, within a wider cardiovascular disease total of 54.5 million. [5] Asthma affects an estimated 34.3 million people, [6] and community surveys across eight Indian cities found hypothyroidism in about one in ten adults, corresponding to roughly 40–42 million adults nationally. [7] Because these conditions require uninterrupted daily medication, even small per-tablet differences accumulate into materially different annual costs.

The Pradhan Mantri Bhartiya Janaushadhi Pariyojana (PMBJP), implemented by the Pharmaceuticals and Medical Devices Bureau of India (PMBI) under the Department of Pharmaceuticals, supplies generic medicines subject to specified procurement and quality-control requirements through a national network of Jan Aushadhi Kendras (JAKs). Government reporting states that PMBJP medicines are typically priced 50–80% below comparable branded products, that sales of ₹1,470 crore (at MRP) during FY 2023–24 corresponded to an estimated ₹7,350 crore in savings to citizens, and that a target of 25,000 JAKs by March 2027 has been set. [8] Products are procured from WHO-GMP–certified manufacturers and each batch is tested at NABL-accredited laboratories before release. [9]

Published Indian pharmacoeconomic evaluations of PMBJP have largely examined single drugs or single therapeutic categories, and few have used the statutory NPPA ceiling price as a comparator alongside branded MRP. [10–13] The present study was undertaken to compare, at regimen level, the cost of index pharmacotherapy for five high-burden chronic NCDs under three pricing scenarios - PMBJP, NPPA ceiling and branded MRP - using prices drawn directly from official government price registers, and to model the potential magnitude of population-level savings under explicitly stated assumptions.

MATERIALS & METHODS

Study design. This was a cross-sectional pharmacoeconomic (cost-comparison) analysis of secondary, publicly available data, conducted from the patient/payer

perspective over a one-year time horizon. No human participants, biological samples or identifiable records were involved, and institutional ethics approval was therefore not required under the ICMR National Ethical Guidelines for Biomedical and Health Research Involving Human Participants (2017). [14]

Selection of conditions and index regimens. Five chronic NCDs were selected on the basis of high national disease burden, availability of the relevant molecules on the PMBJP formulary, and existence of current clinical practice guidance. For each condition a single index regimen was defined for costing purposes. It should be emphasised that the cited guidelines establish the classes of therapy that are clinically appropriate; the specific molecules, strengths, single-agent-versus-combination composition and annual consumption volumes used here are investigator-defined modelling assumptions adopted to permit a like-for-like price comparison, and should not be read as guideline-recommended prescriptions.

(i) T2DM — Metformin sustained-release 1000 mg once daily (OD) plus Glimepiride 2 mg OD. Metformin and sulfonylureas are both recognised oral options in the RSSDI 2022 recommendations, the RSSDI 2026 guidance for older adults, and the ADA Standards of Care 2026. [15–17] The fixed dual-therapy combination was an investigator-defined index regimen; metformin monotherapy remains first-line for many newly diagnosed patients, and the dual regimen was chosen only to represent a common maintenance scenario.

(ii) HTN — Amlodipine 5 mg OD plus Telmisartan 40 mg OD. A calcium-channel blocker plus angiotensin-receptor blocker combination at these doses corresponds to a step in the India Hypertension Control Initiative drug- and dose-specific standard treatment protocol evaluated by Kaur et al. [18]

(iii) IHD, chronic secondary prevention — Atorvastatin 10 mg OD plus Clopidogrel 75 mg OD. The 2024 ESC guidelines on chronic coronary syndromes support long-term statin and single antiplatelet therapy in this population but do not recommend this particular agent-and-dose pairing; [19] both the choice of clopidogrel over aspirin and the low statin dose are modelling assumptions selected for cost comparability, and they are lower in intensity than the high-intensity statin therapy the guideline advises.

(iv) Asthma — daily low-dose Budesonide 200 µg metered-dose inhaler (MDI) with as-needed Salbutamol 100 µg MDI, corresponding to the GINA Track 2 Step 2 option of daily low-dose inhaled corticosteroid plus an as-needed reliever. [20] GINA does not specify a number of inhalers per year; annual consumption of 24 budesonide and 24 salbutamol inhalers was an investigator-defined assumption, and was varied in sensitivity analysis.

(v) Hypothyroidism — Levothyroxine 50 µg OD. The American Thyroid Association guidelines endorse levothyroxine as the treatment of choice but require weight- and TSH-based individualised dosing; [21] the fixed 50 µg index dose is a modelling assumption, not a recommended standard dose.

Price sources. PMBJP maximum retail prices were extracted by unique product code from the PMBI Product Portfolio List. [22] NPPA ceiling prices were extracted from the NPPA Updated Price List as on 11 June 2026, which reflects ceiling prices notified under S.O. 1575(E) and S.O. 1581(E) dated 25 March 2026 and effective from 1 April 2026 after application of the annual wholesale price index adjustment of 0.64956%. [23] These ceiling prices are the maximum permissible retail prices for scheduled formulations under the Drugs (Prices Control) Order, 2013, in which ceiling prices are derived by market-based pricing — the simple average price of all brands holding at least 1% market share of the relevant formulation, plus a 16% retailer margin. [24] For inhalational products the

NPPA list specifies a ceiling per metered dose; per-inhaler cost was obtained by multiplying by the 200 metered doses stated on the pack. Branded MRP was taken as the arithmetic mean of two to three leading brands of the identical molecule, strength and dosage form, as listed on licensed Indian online retail pharmacy platforms and verified in June-July 2026.

Analysis. Annual per-patient cost was calculated as unit price × 365 for oral drugs and price per inhaler × 24 for inhalational products. Absolute savings were computed as branded minus PMBJP (and NPPA minus PMBJP) and expressed as percentages of the branded or NPPA cost respectively. Affordability was expressed as the number of days of per-capita daily income required to fund one year of therapy, using per-capita net national income at current prices for FY 2024–25 of ₹1,92,774 (new base-year 2022–23 series), equivalent to ₹528 per day. [25] Potential population-level savings were modelled as: prevalence (millions) × 10^6 × uptake fraction × annual per-patient saving versus branded MRP ÷ 10^7. A 20% uptake was used as the base case, with 10% and 30% as deterministic sensitivity bounds, and asthma inhaler consumption was additionally varied between 12, 18 and 24 inhalers per agent per year. All computations were performed in a spreadsheet and independently re-derived from the underlying unit prices.

RESULT

Unit prices

Table 1 shows per-unit prices for the nine study molecules under the three pricing scenarios. PMBJP prices were the lowest for every formulation examined. The widest branded-to-PMBJP ratio was for glimepiride 2 mg (6.9-fold; branded mean ₹3.92 versus PMBJP ₹0.57 per tablet) and the narrowest for levothyroxine 50 µg (1.8-fold). Two observations relating to the statutory ceiling are noteworthy. First, for glimepiride 2 mg the NPPA ceiling (₹5.94 per tablet) was higher than the mean branded MRP (₹3.92 per tablet), so the ceiling was not the binding constraint on retail price for that molecule. Second, for both inhalational products the mean branded MRP exceeded the corresponding NPPA per-inhaler ceiling — salbutamol ₹123.00 versus ₹100.00 and budesonide ₹434.70 versus ₹416.00. These are observations on listed retail prices for specific brands at a single time point and are not, by themselves, a determination of regulatory non-compliance, which would require pack-level verification against the applicable notification.

Table 1. Per-unit prices of study medicines under three pricing scenarios

Drug (strength, formulation)	NCD	PMBJP (₹/unit)	NPPA ceiling (₹/unit)	Branded MRP (₹/unit)	Branded:PMBJP ratio
Metformin HCl SR tablet IP 1000 mg	T2DM	1.36	4.15	3.79	2.8
Glimepiride tablet IP 2 mg	T2DM	0.57	5.94	3.92	6.9
Amlodipine tablet IP 5 mg	HTN	0.57	2.56	1.66	2.9
Telmisartan tablet IP 40 mg	HTN	1.24	6.92	5.59	4.5
Atorvastatin tablet IP 10 mg	IHD	0.91	5.09	3.14	3.5
Clopidogrel tablet IP 75 mg	IHD	1.93	6.82	7.11	3.7
Salbutamol inhalation IP 100 µg (per inhaler, 200 MD)	Asthma	52.50	100.00	123.00	2.3
Budesonide inhalation IP	Asthma	150.00	416.00	434.70	2.9

200 µg (per inhaler, 200 MD)					
Thyroxine sodium tablet IP 50 µg	Hypothyroidism	0.56	1.06	1.00	1.8

MD = metered doses; T2DM = type 2 diabetes mellitus; HTN = hypertension; IHD = ischaemic heart disease. NPPA ceiling prices for inhalational products are notified per metered dose and were multiplied by 200 to obtain per-inhaler values. Branded MRP is the arithmetic mean of two to three leading brands, verified June–July 2026.

Annual per-patient regimen cost

Annual costs and savings for the five index regimens are given in Table 2. The least expensive PMBJP regimen was hypothyroidism at ₹203 per year and the most expensive was asthma at ₹4,860 per year, the latter driven by inhaler device costs. Savings versus branded MRP ranged from 44.4% (hypothyroidism; ₹162 per year) to 75.1% (HTN; ₹1,986 per year), with the largest absolute saving in asthma (₹8,525 per year, 63.7%). Savings versus the NPPA ceiling ranged from 47.5% (hypothyroidism) to 80.9% (T2DM and HTN); the T2DM and HTN figures were driven mainly by wide gaps for glimepiride (₹5.94 versus ₹0.57) and telmisartan (₹6.92 versus ₹1.24) respectively.

Table 2. Annual per-patient medication cost and savings for index regimens

Disease (index regimen)	PMBJP (₹/year)	NPPA (₹/year)	Branded (₹/year)	Saving vs branded (₹/year)	% saving vs branded	Saving vs NPPA (₹/year)	% saving vs NPPA
T2DM (metformin SR 1000 mg + glimepiride 2 mg OD)	704	3,683	2,815	2,110	75.0	2,978	80.9
HTN (amlodipine 5 mg + telmisartan 40 mg OD)	659	3,460	2,646	1,986	75.1	2,801	80.9
IHD, secondary prevention (atorvastatin 10 mg + clopidogrel 75 mg OD)	1,035	4,347	3,743	2,708	72.3	3,312	76.2
Asthma (budesonide 200 µg MDI daily + salbutamol 100 µg MDI as needed)	4,860	12,384	13,385	8,525	63.7	7,524	60.8
Hypothyroidism (levothyroxine 50 µg OD)	203	387	365	162	44.4	184	47.5

OD = once daily; MDI = metered-dose inhaler. Oral drugs costed at 365 units per year; inhalers at 24 units per agent per year. All regimen compositions and consumption volumes are investigator-defined modelling assumptions (see Methods).

Affordability and modelled population-level savings

Affordability ratios and modelled savings are presented in Table 3. Expressed as days of per-capita daily income (₹528), the branded asthma regimen required 25.3 days of income per year compared with 9.2 days under PMBJP. For hypertension, which affects the largest population, the requirement fell from 5.0 days under branded pricing to 1.2 days under PMBJP. Hypothyroidism imposed the smallest burden in every scenario (0.4–0.7 days). At the 20% base-case uptake, modelled potential savings summed to ₹24,050 crore per year across the five conditions, ranging from ₹12,025 crore at 10% uptake to ₹36,075 crore at 30% uptake. Varying asthma inhaler consumption between 12, 18 and 24 inhalers per agent per year changed

the five-condition total at 20% uptake to ₹21,126, ₹22,588 and ₹24,050 crore respectively, indicating that this single assumption accounts for a ₹2,924 crore (12%) spread in the aggregate estimate.

Table 3. Affordability ratios and modelled potential population-level savings

Disease	PMBJP (days)	NPPA (days)	Branded (days)	Prevalence (million)	@10% uptake (₹ crore)	@20% uptake (₹ crore)	@30% uptake (₹ crore)
T2DM	1.3	7.0	5.3	101	2,131	4,263	6,394
HTN	1.2	6.6	5.0	315	6,257	12,515	18,772
IHD	2.0	8.2	7.1	23.8	644	1,289	1,933
Asthma	9.2	23.5	25.3	34.3	2,924	5,848	8,772
Hypothyroidism	0.4	0.7	0.7	42	68	136	204
Total	—	—	—	—	12,025	24,050	36,075

Days = annual regimen cost ÷ ₹528 per day (per-capita net national income at current prices, FY 2024–25: ₹1,92,774 ÷ 365). Prevalence sources: T2DM and hypertension from ICMR-INDIAB-17; ischaemic heart disease (IHD-specific, 2016) from the India State-Level Disease Burden Initiative; asthma from the Global Asthma Report 2022; hypothyroidism from an eight-city Indian survey. Savings are modelled potential values computed against branded MRP under stated uptake assumptions and assume that all prevalent patients would receive the index regimen; they are not observed or projected real-world savings.

DISCUSSION

This regimen-level analysis found that, for the five index regimens modelled, PMBJP prices were lower than both branded MRP and the statutory NPPA ceiling for every molecule examined. Savings versus branded MRP spanned 44.4% to 75.1% and versus the NPPA ceiling 47.5% to 80.9%. Because both comparators are price constructs rather than observed transaction prices, these differences describe the price architecture facing a patient purchasing retail, not realised expenditure.

The comparison against the statutory ceiling merits comment. Under the Drugs (Prices Control) Order, 2013, ceiling prices for scheduled formulations are set by market-based pricing: the simple average of prices of brands with at least 1% market share, plus a 16% retailer margin. [24] Because this construction is anchored to prevailing brand prices at the time of notification and is revised annually only by a wholesale price index factor, a ceiling can sit above the price at which competitive brands are actually selling. That is what was observed here for glimepiride 2 mg, where the notified ceiling (₹5.94) exceeded the mean branded MRP (₹3.92). The converse situation — listed branded MRP above the per-inhaler ceiling — was seen for both inhalational products. Since NPPA notifies inhaler ceilings per metered dose, translating them to a per-pack basis depends on the dose count claimed on the pack; the finding therefore warrants verification against pack-level labelling before any inference about compliance is drawn.

These findings are broadly consistent with the existing Indian literature. Mukherjee reported substantial price differentials between Jan Aushadhi and branded medicines in an early cost analysis of the scheme, without using the NPPA ceiling as a comparator. [10] Anandhasayanam et al. found a mean saving of 64.65% for Jan Aushadhi generics relative to branded formulations across therapeutic categories, [13] a figure that sits within the 44.4–75.1% range obtained here. James et al. reported comparable advantages specifically for inhalational bronchodilators from the scheme, [11] which is congruent with the asthma results in the present analysis. Behera et al. showed that branded price dispersion in India widens with the number of competing brands, [12] which offers a plausible explanation for the heterogeneity in branded-to-PMBJP ratios seen across molecules in Table 1.

The modelled aggregate figure of ₹24,050 crore per year at 20% uptake is best read as

an order-of-magnitude indication of scale rather than a forecast. It is a deterministic calculation that multiplies four uncertain quantities: disease prevalence, the proportion of prevalent patients actually receiving the specific index regimen, PMBJP uptake, and annual consumption. The sensitivity analyses illustrate this dependence directly — varying uptake alone moves the total between ₹12,025 and ₹36,075 crore, and varying asthma inhaler consumption alone moves it by ₹2,924 crore. A particularly strong assumption is that prevalence can stand in for the number of patients on the index regimen. In practice only a fraction of prevalent patients is diagnosed, a smaller fraction is on treatment, and a smaller fraction still are on the exact molecules and doses costed here; the ICMR-INDIAB-17 data themselves show large gaps between prevalence, awareness and treatment. The population figures should accordingly be regarded as an upper-bound modelled potential under the stated assumptions.

Limitations of the Study

Several limitations qualify these findings. First, branded MRPs were retail listings captured at a single point in time and vary by brand, retailer and region; the two-to-three-brand mean is a convenience sample rather than a market-share-weighted average. Second, the analysis covers medicine acquisition cost only and excludes consultations, investigations, devices, spacers, monitoring and all indirect costs, so it is a drug price comparison rather than a cost-of-illness study. Third, index regimens and consumption volumes were investigator-defined and, for IHD in particular, the low-intensity statin and choice of clopidogrel do not represent guideline-preferred therapy; costs would differ materially under alternative regimens. Fourth, per-inhaler NPPA ceilings required conversion from a per-metered-dose basis. Fifth, population savings are deterministic point estimates without probabilistic uncertainty intervals, and prevalence-based denominators overstate the treated population. Sixth, and importantly, therapeutic equivalence between PMBJP generics and branded comparators was not assessed in this study. WHO-GMP certification and NABL batch testing are manufacturing and quality-control assurances; they do not by themselves establish bioequivalence or clinical interchangeability, and cost savings should not be interpreted as evidence of equivalent clinical outcomes. Finally, prices are current only to June–July 2026 and will change with subsequent NPPA revisions and market movement.

CONCLUSION

For five index chronic-NCD regimens priced from official government registers, PMBJP medicines cost substantially less than both branded equivalents (44.4–75.1% lower) and the statutory NPPA ceiling (47.5–80.9% lower), and the differences were consistent across every molecule examined. Modelled population-level savings are large but are contingent on assumptions about prevalence, regimen eligibility, uptake and consumption, and are reported here as potential rather than expected savings. Within these constraints, the findings support wider integration of PMBJP procurement into chronic NCD care pathways, while indicating that price-ceiling regulation alone does not deliver equivalent affordability. Prospective studies linking actual dispensing data to patient-level expenditure, together with bioequivalence evidence for the specific generic products supplied, would be required to convert these modelled differences into demonstrated real-world benefit.

Declaration by Authors

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