



The clinic under the neem tree: Ayurveda, public health, and the quiet reordering of India's health ecosystem

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DOI: <https://doi.org/10.66856/ijhssr.2026.12.3.12283>

Abstract

Ayurveda occupies an odd position in Indian public health. It is everywhere in the culture and comparatively thin on the ground in the formal outpatient statistics, which makes it easy to either overstate its reach or dismiss it altogether. This article argues that both readings miss what has actually happened over the last two decades. Drawing on national survey evidence, policy documents, clinical literature, and the growing body of social science work on medical pluralism in South Asia, it traces how Ayurveda moved from a culturally protected but administratively marginal system into a formally resourced arm of the state health apparatus, and asks what that shift has done for the functioning of the health ecosystem as a whole. Three contributions stand out. First, Ayurveda has extended the reach of primary care in places where biomedical staffing has chronically failed, though the mechanism is often about warm bodies and trust rather than about doctrine. Second, it has given the system a vocabulary and a set of practices for chronic, subclinical, and lifestyle-linked complaints, precisely the territory where a curative, episode-based biomedical model performs worst. Third, it has become an economic and regulatory object in its own right, with consequences for medicinal plant supply chains, rural livelihoods, and drug safety governance that are rarely discussed in the same breath as clinical outcomes. Against this, the paper takes seriously three critiques: the persistent thinness of high-quality efficacy evidence for many popular formulations, the risk that Ayurvedic personnel become cheap substitutes rather than genuine colleagues, and the commercial capture of the sector by wellness marketing. The conclusion suggests that the most defensible case for Ayurveda in Indian public health is not that it replaces anything, but that it makes a stretched and unevenly distributed system a little more elastic, and that this elasticity is worth protecting on its own terms rather than by pretending the evidence problem has been solved.

Keywords: Ayurveda, AYUSH, public health, medical pluralism, primary health care, health systems, India, integrative medicine

Introduction

The Problem with Asking Whether Ayurveda "Works"

Walk into a primary health centre in, say, a block headquarters town in Chhattisgarh on a Tuesday morning and you will often find two queues. One is for the medical officer, if the post is filled that month. The other is for the Ayurvedic physician attached to the co-located dispensary, and depending on the district, that queue may be longer, shorter, or made up of people who have already stood in the first one and are now standing in the second. Nobody in either queue is conducting a philosophy of science seminar. They want their knee to stop hurting, their child's cough to settle, their sugar to come down, and they want somebody to look at them for more than ninety seconds. That scene is a decent starting point for this article, because the question usually asked about Ayurveda in public health, does it work, turns out to be the wrong first question. Not because it is unimportant. It matters enormously, and I will spend a fair amount of space on it. But it is the wrong first question because a health system is not only a delivery mechanism for efficacious molecules. It is also a distribution of trust, an allocation of human beings across geography, a set of financing arrangements, a supply chain, and a story people tell themselves about what health is and who gets to define it. Ayurveda touches all of those layers. Judging it only on the first is a bit like judging a railway network purely on the tensile strength of the rails. India's health system is under strain in ways that are by now familiar to anyone who reads the literature. Public spending on health has hovered stubbornly low as a share of GDP for decades, out-of-pocket expenditure remains one of the largest single drivers of

catastrophic household spending, and human resources are distributed with a lopsidedness that no amount of policy language has yet fixed (Balarajan *et al.*, 2011; Patel *et al.*, 2015; Rao *et al.*, 2011) ^[1, 17, 24]. Meanwhile the epidemiological picture has shifted underneath everyone's feet. Cardiovascular disease, diabetes, chronic respiratory illness, and mental health conditions now carry a burden that a system designed around infectious disease control and maternal survival was never structured to absorb. This gap has stepped a formalised AYUSH sector, of which Ayurveda is the largest component by practitioner numbers, institutional weight, and cultural gravity. The Department of Indian Systems of Medicine and Homoeopathy, created in 1995 and renamed AYUSH in 2003, became a full-fledged Ministry in 2014. That upgrade was not merely nominal. It came with budgets, a National AYUSH Mission, a mandate to run a share of the country's primary care infrastructure, and, more recently, a diplomatic apparatus that has taken Ayurveda into World Health Organization classification systems and bilateral agreements. So, the question this article puts is narrower. Given that Ayurveda has been institutionally scaled up over roughly two decades, what has that done to how the Indian health ecosystem functions? Where has it helped? Where has it been oversold? And what would a more honest, less defensive integration actually require?

Scope and Method

This is a review and synthesis, not a primary study. I have drawn on four bodies of material, and it is worth being upfront about the limits of each. The first is national survey

data, principally the National Sample Survey rounds on social consumption of health (71st round, 2014; 75th round, 2017^[15, 33]-18) and the Longitudinal Ageing Study in India. These are the only sources with the sampling power to say anything national about utilisation. They also have a well-known weakness: they capture treatment episodes as classified by respondents in a two-week or twelve-month recall window, which systematically undercounts self-medication, household remedies, and the enormous informal space of grandmother knowledge that shades into Ayurveda without ever being called that (Rudra *et al.*, 2017)^[8]. The second is the clinical and pharmacological literature, which ranges from genuinely rigorous randomised trials to studies whose methodological weaknesses would not survive a first-year epidemiology seminar. I have tried to flag which is which rather than treating the corpus as uniform. The third is policy and administrative material from the Ministry of Ayush, the National Health Policy 2017^[15], and associated programme documents. This material is useful for what was intended and funded. It is much less useful for what actually happens at the facility level, since government reporting on its own schemes is not exactly a neutral instrument. The fourth, and to my mind the most underused by health researchers, is the social science literature on medical pluralism in South Asia: Leslie (1976)^[12] and his intellectual descendants, Langford (2002), Banerjee (2009), Sujatha (2011), Sujatha and Abraham (2012), Bode (2008), Nisula (2006)^[2, 11, 16, 29, 30]. This body of work is very good at explaining why people do what they do, which is exactly the thing that utilisation statistics cannot tell you.

It is tempting to describe Ayurveda as an unbroken tradition stretching back to the Charaka Samhita, and the marketing certainly does. The historical scholarship is more careful. Wujastyk and Smith (2008) and Langford (2002)^[11, 35] both argue that what we now recognise as institutional Ayurveda, with colleges, degrees, standardised curricula, printed pharmacopoeias, and clinics, is substantially a product of the late nineteenth and twentieth centuries, shaped in dialogue with and often in reaction against colonial biomedicine. Hardiman (2009)^[7] traces how indigenous medicine became a nationalist symbol, then a marketable asset, and shows that the two roles have never fully separated. This matters for public health more than it might first appear. If Ayurveda's present form is partly a modern construction, then arguments that appeal to ancient authority to escape contemporary standards of evidence are on shaky ground. But the reverse also holds. Critics who treat institutional Ayurveda as a fossil that failed to modernise are describing something that does not exist. The system has been continuously reinventing itself for a century, and the current push toward clinical trials and standardised manufacturing is a further chapter in that story, not a betrayal of it. Here the numbers are genuinely instructive, and slightly deflating for enthusiasts. Rudra *et al.* (2017), analysing the 71st NSS round, found that about 6.9 percent of outpatient episodes in the preceding fortnight involved AYUSH care, with no dramatic rural-urban gap. Utilisation was concentrated in chronic conditions, skin complaints, and musculoskeletal problems, which fits the intuition that people turn to Ayurveda when biomedicine has offered them a long-term management plan they find unsatisfying. Public facilities mattered more in rural areas, and utilisation was notably higher in Chhattisgarh, Kerala, and West Bengal, three states with quite different reasons for that pattern. The 75th round (2017-18) recorded a figure closer to 4.5 percent, and some commentators read this as evidence

of decline despite a decade of promotion. That reading may be too quick. Survey classification changed between rounds, and a two-week outpatient window is a narrow lens for a system whose characteristic use is intermittent, preventive, and domestic. Later evidence complicates it further: a national survey in 2022^[6]-23 reported that a very large share of respondents, something over half, said they use AYUSH in some form, citing perceived effectiveness, faith, and a belief in fewer side effects as their reasons. Reconciling a 4.5 percent figure with a 53 percent figure is not a matter of one being wrong. They are measuring different things: formal outpatient encounters versus self-reported engagement across a lifetime, including household preparations, over-the-counter products, and yoga. Studies of older adults using the Longitudinal Ageing Study in India find utilisation rising with age, with pain, and with joint disease, which is again consistent with the chronic-complaint pattern. Interestingly, some of this work finds a mild pro-rich gradient in the use of Indian systems of medicine, which cuts against the romantic assumption that Ayurveda is primarily the poor person's fallback. In urban India it often functions as a premium choice. Chopra *et al.* (2013)^[4] ran a randomised, double-blind, controlled equivalence trial comparing standardised Ayurvedic formulations with glucosamine and celecoxib in symptomatic knee osteoarthritis and reported comparable symptomatic benefit with a favourable tolerability profile. Whatever one thinks of the broader field, that is a properly designed study on a condition where conventional options are themselves modest. Work on Prakriti, the Ayurvedic constitutional typology, has attracted attention from genomics researchers. Prasher *et al.* (2008)^[22] reported differences in genome-wide expression and biochemical parameters across extreme constitutional types, and a small field of Ayurgenomics has grown around the finding. Whether this ultimately amounts to a robust stratification tool or a sophisticated correlation hunt remains genuinely open. I would not bet heavily either way at this stage. The COVID-19 period produced a surge of research. AYUSH-64, a polyherbal formulation originally developed for malaria, was repurposed and studied as an adjunct in mild to moderate disease, with reported reductions in time to clinical recovery in add-on designs (Gundeti *et al.*, 2022). Tillu *et al.* (2020)^[6, 31] argued early for a population-level prophylactic framing drawing on Ayurveda and yoga. Kotecha (2021)^[9] documented the Ministry's programme of interventions. The honest assessment is mixed. Some of this work was competent and useful; a good deal of it was underpowered, open-label, and conducted under conditions where standard care itself was shifting weekly. The structural problem, which Patwardhan (2014)^[18] has articulated better than most, is that the randomised controlled trial was designed to test single agents against fixed endpoints, while Ayurvedic therapeutics is individualised, multi-component, and sequenced over time, often bundled with diet and daily regimen. This is not a licence to abandon rigour. It is an argument for methodological pluralism, including pragmatic trials, whole-system research designs, and well-run observational cohorts. The uncomfortable truth is that this argument has been made for twenty years, and the volume of high-quality output has not risen nearly as fast as the volume of the argument.

Priya and Shweta (2010)^[23], in a health systems study across eighteen states, produced what remains one of the most clear-eyed assessments of AYUSH mainstreaming

under the National Rural Health Mission. Their finding was not that co-location failed, but that it succeeded in a much narrower way than intended. AYUSH doctors were frequently absorbed into general clinical duties, prescribing allopathic drugs, running immunisation sessions, filling gaps left by absent medical officers. The system got a warm body at the facility. It did not particularly get Ayurveda. Sujatha (2011) ^[29] pushes the point further, asking what integration is actually supposed to mean, and noting that most policy usage collapses into subordination: the traditional system supplies personnel and legitimacy while biomedicine retains epistemic authority. Lakshmi *et al.* (2015) ^[10], reviewing integration efforts across low- and middle-income countries, find a similar pattern internationally. Against this, Shankar and Patwardhan (2017) ^[27] argue for a more ambitious vision in which AYUSH takes lead responsibility for domains where it plausibly has comparative advantage, particularly prevention, rehabilitation, and chronic disease management, rather than serving as an understudy. Whether the institutional incentives permit that is another matter. Saper *et al.* (2008) ^[26], sampling Ayurvedic products sold online from both US and Indian manufacturers, detected lead, mercury, or arsenic in roughly one in five, with rasa shastra products considerably more likely to contain them. The finding was contested at the time, partly on the grounds that rasa shastra deliberately incorporates processed metals and that classical purification procedures alter toxicity. That defence is not empty, but it also cannot be settled by assertion. Mukherjee *et al.* (2017) and Katoch *et al.* (2017) ^[8, 14] both survey the regulatory landscape for Ayurveda, Siddha, and Unani drugs and reach broadly similar conclusions: the framework exists on paper, enforcement capacity is thin, and pharmacovigilance is the weakest link of all. The World Health Organization has been formally interested in traditional medicine for a long time, and its Traditional Medicine Strategy 2014-2023 set out a framework encouraging member states to regulate, integrate, and generate evidence rather than either ignore or uncritically endorse traditional systems (WHO, 2013). The subsequent global report (WHO, 2019) found that a large majority of member states now have some form of national policy on traditional and complementary medicine, which tells us something about political appetite and rather less about implementation quality. India has been an unusually active player in this space, and its motives are mixed in ways worth acknowledging. There is a genuine public health argument, that traditional medicine can extend coverage in resource-constrained settings, an argument that Payyappallimana (2010) ^[20] makes carefully. There is also a straightforward commercial and diplomatic interest. Ayurveda is a soft power asset and an export category, and the wellness tourism market attached to it is substantial and growing. This dual character produces a recurring analytical difficulty. Documents that appear to be health policy are frequently also industrial policy, and the two objectives do not always point the same way. What is good for the export of premium panchakarma packages is not obviously the same as what is good for a subcentre in Bastar. Scholars reading Indian AYUSH policy would do well to ask, of any given initiative, which of the two it is primarily serving. Quite often the answer is both, unevenly. The gap which is most striking is the clinical literature asks whether a formulation outperforms placebo. The social science literature asks what people do and why. The health systems

literature asks whether a facility functioned. Almost nobody asks the integrating question, which is whether the presence of Ayurveda in the system changes system-level outcomes: catastrophic expenditure, continuity of care, treatment adherence, delay in seeking care for serious conditions. Those are answerable questions. They are just not being asked often enough, and the remainder of this article is in part an argument that they should be.

The Policy Architecture: How Ayurveda Got a Desk in the Building

The post-independence settlement was ambivalent. Committees were appointed, reports were written, and indigenous systems were granted recognition without much money. The Central Council of Indian Medicine, established under a 1970 Act, standardised education and registration, which had the effect of creating a professional class of degree-holding Ayurvedic physicians distinct from hereditary practitioners. That was a consequential move. It gave Ayurveda a workforce the state could count, deploy, and regulate, while pushing folk and household traditions further to the margins. The real inflection came in the 2000s. The National Rural Health Mission, launched in 2005, made mainstreaming of AYUSH an explicit strategy, chiefly through co-location of AYUSH practitioners and dispensaries at primary health centres and community health centres. The National AYUSH Mission followed in 2014^[33], with centrally sponsored funding streams for services, education, quality control of drugs, and medicinal plant cultivation. The National Health Policy 2017^[15] went further rhetorically, endorsing mainstreaming and specifically identifying yoga and AYUSH-based approaches for wellness and for the prevention and management of non-communicable disease. Then came Ayushman Bharat. Of the roughly 150,000 Health and Wellness Centres envisaged, the Ministry of Ayush was allocated approximately 12,500, later rebranded as Ayushman Arogya Mandirs, to be run on AYUSH lines with a physician, multipurpose workers, and ASHA linkages, along with a yoga hall and herbal garden as standard features. Reported footfall at these centres has grown very substantially, from around fifteen million beneficiaries in 2021^[9] to well over a hundred million by 2025 on the Ministry's own accounting, though as with all self-reported programme statistics the figures should be treated as directional rather than precise. Alongside service delivery, three developments deserve mention because they changed the sector's external standing. The Traditional Knowledge Digital Library, built after India spent considerable effort revoking patents on turmeric wound healing and contesting a European patent on a neem-derived fungicide, converted classical textual knowledge into a searchable prior-art database accessible to patent examiners worldwide. Whatever else one thinks about it, it was a genuinely clever piece of institutional design. Second, the inclusion of a traditional medicine module in ICD-11 gave Ayurvedic diagnostic categories a formal berth in global health information systems, which is a precondition for ever generating comparable data. Third, the establishment of the WHO Global Traditional Medicine Centre at Jamnagar in 2022^[6] anchored an international research and standards agenda in Gujarat. Domestically, the regulatory architecture was overhauled when the National Commission for Indian System of Medicine Act, 2020^[31] replaced the Central Council of Indian Medicine, mirroring the reform that produced the National Medical Commission.

The stated aims were quality assurance in education and reduction of corruption in college accreditation. Whether the new body has delivered on either is, at time of writing, still an open question. The infrastructural footprint that all this has produced is not trivial. Public sources put the AYUSH network at roughly 3,800 hospitals, over 37,000 dispensaries, some 8,000 and more dedicated wellness centres, and in the region of 750,000 registered practitioners across systems, with colleges having expanded from a few hundred in 2014 to over eleven hundred. Manufacturing has grown from under three billion dollars in 2014 to figures in the low twenty billions by 2022, with services valued comparably. Growth of that speed always raises a question about quality, and I will return to it.

The Workforce Question: Who Actually Staffs Indian Primary Care

If you want to understand why Ayurveda matters to Indian health systems, look at the human resource arithmetic rather than the pharmacology. India's biomedical workforce is not only insufficient in aggregate, it is spatially maldistributed in a way that has proved almost immune to policy. Doctors cluster in cities and in the southern and western states. Rural postings go unfilled or are filled nominally by physicians who are elsewhere. Rao *et al.* (2011) ^[24] documented this, and little in the intervening years has fundamentally altered it. Compulsory rural service bonds have been introduced, litigated, softened, and circumvented. AYUSH graduates, by contrast, are produced in large numbers, are distributed more evenly, and, crucially, are more willing to work in small towns and rural areas because the alternative labour market for them is thinner. This is an uncomfortable observation to make plainly, since it implies that part of Ayurveda's health systems value derives from the relative weakness of its graduates' outside options. But pretending otherwise would be sentimental. What follows from this is the single most contested policy question in the field: what should these practitioners be permitted to do? The debate is usually framed as the bridge course controversy. Proposals to permit AYUSH graduates, after supplementary training, to prescribe a defined list of allopathic medicines and deliver defined services have been advanced repeatedly. The Indian Medical Association has opposed them with considerable vigour, using the phrase mixopathy and warning of a two-tier system in which the poor get half-trained doctors. In 2020, a notification permitting postgraduate Ayurvedic surgical trainees to perform a specified set of procedures triggered protests and a national strike call. Both sides have a point, which is what makes it intractable. The critics are right that a licence to prescribe pharmaceuticals without full pharmacological training is a genuine patient safety issue, and right too that quietly staffing rural facilities with cheaper personnel lets the state off the hook for fixing biomedical distribution. The proponents are right that in the actual, non-ideal world, an AYUSH graduate at a subcentre is frequently the only clinically trained person available for fifty kilometres, and that this person is already, informally and without training or protection, prescribing antibiotics. Priya and Shweta (2010) ^[23] found exactly this. The question is therefore not whether task-shifting will happen but whether it happens with training, protocols, and accountability, or without. My own reading, offered tentatively, is that the framing of the debate does more damage than either position. Arguing about whether an Ayurvedic physician may prescribe

amoxicillin obscures the more interesting question of what such a practitioner could contribute that a general physician typically does not: sustained counselling on diet and daily routine, longer consultations, management of chronic musculoskeletal pain without escalating to opioids or repeated NSAID courses, and continuity of relationship in a community they will not leave next year.

Where Ayurveda Actually Does Public Health Work?

The first mile- presence, trust, and the reduction of delay: The most underrated contribution is simply presence. A functioning facility that is open, staffed, and culturally legible reduces delay in seeking care. Delay is a killer in ways that rarely make it into outcome tables: the untreated cellulitis that becomes sepsis, the hypertension that goes unmeasured for years, the tuberculosis that is treated as a persistent cough for four months. Where AYUSH facilities function well, they act as a low-threshold entry point. People who would not travel forty kilometres to a district hospital will walk to a local vaidya. If that vaidya can measure blood pressure, check a random blood sugar, recognise danger signs, and refer, the system has gained something real, quite independent of any question about the pharmacology of what was dispensed. This is the logic behind equipping Ayushman Arogya Mandirs with basic diagnostics, and it is sound logic even on a completely sceptical view of Ayurvedic therapeutics. The trust dimension deserves more attention than it gets. Nisula (2006) ^[16], working in Mysore, found that patients moved fluidly between systems without any sense of contradiction, choosing on the basis of the complaint, the practitioner's manner, cost, and prior experience. Sujatha and Abraham (2012) ^[30] make the same point across multiple sites. People are not confused pluralists in need of correction. They are pragmatic ones. A health system that refuses to meet them where they are simply loses them to unqualified private providers, which is what has largely happened in rural north India.

Chronic disease and the long tail: Consider type 2 diabetes. Biomedical management is genuinely effective at the level of glycaemic control, and nothing in Ayurveda substitutes for metformin or insulin. But the actual clinical problem for a fifty-year-old shopkeeper in a district town is not the pharmacology. It is adherence, diet, physical activity, sleep, and the fact that his consultation lasts four minutes and consists of a prescription refill. Ayurveda's framework of ahara and vihara, food and daily conduct, and its long tradition of treating what it calls prameha as a disorder of living rather than an isolated blood value, gives a practitioner both licence and vocabulary to spend an hour on precisely the things that determine outcomes (Sharma & Chandola, 2011) ^[28]. Payyappallimana and Venkatasubramanian (2016) ^[21] develop this argument in relation to food, pointing out that Ayurvedic dietetics offers a locally grounded, culturally intelligible nutrition framework in a country where imported dietary guidance has repeatedly failed to translate. Telling a household in coastal Karnataka to eat a Mediterranean diet is a category error. Telling them, in a vocabulary they already possess, which foods to increase during the monsoon, is not. Similar arguments apply to musculoskeletal complaints, which is the single largest category of Ayurvedic utilisation in the survey data. Chronic low back pain and knee osteoarthritis are conditions where conventional management is often

unsatisfying, where long-term NSAID use carries real gastric and renal costs, and where the Chopra *et al.* (2013)^[4] trial suggests a plausible alternative. Panchakarma-based regimens, physical therapies, and structured oil applications occupy a therapeutic space between doing nothing and joint replacement, and that space is enormous in a country with India's demographics.

Preventive and seasonal public health: There is a strand of Ayurvedic practice that is essentially public health by another name: ritucharya, the seasonal regimen, and the various community-level practices built around it. Kerala's karkidaka chikitsa, the monsoon month of restorative treatment and medicated gruel, is the best-known example. Whatever the specific pharmacological claims, the underlying instruction is to rest, eat lighter, and attend to the body during the season of highest infectious and rheumatic morbidity. That is not bad advice. During dengue outbreaks, the Tamil Nadu government has distributed Nilavembu kudineer, a Siddha decoction, at scale. The evidence for its antiviral effect is contested, and I am not persuaded by the stronger claims. But there is a systems point that survives scepticism: a state health department with a culturally accepted, cheaply produced, mass-distributable intervention has a mechanism for reaching households during an outbreak, and that mechanism carries messaging about fluid intake, fever monitoring, and when to come to hospital. The intervention is partly a delivery vehicle for surveillance and health communication. The COVID-19 period showed both the promise and the pathology of this. On the promising side, the Ministry's advisories on immunity-supportive practices reached households that no biomedical communication strategy was reaching, and the AYUSH-64 work generated at least some usable clinical data (Gundeti *et al.*, 2022; Kotecha, 2021)^[6, 9]. On the pathological side, the same period produced Coronil, a product launched with claims that outstripped its evidence by a considerable margin and that required public correction. The lesson is not that Ayurveda failed. It is that a sector without robust internal quality control will be exploited by its most commercially aggressive members during a crisis, which is equally true of the pharmaceutical industry.

Mental health and the therapeutic ecology: India's treatment gap for common mental disorders is enormous, and the psychiatric workforce is nowhere near sufficient to close it. Yoga and meditative practices under the AYUSH umbrella have a reasonable evidence base as adjuncts for depression and anxiety, and they carry almost none of the stigma that attaches to a psychiatric consultation. A man who will not visit a mental health clinic will attend a yoga session at the local wellness centre. Serious mental illness requires psychiatric care, and there is a real risk of somatising serious conditions into vague constitutional imbalance and delaying treatment. But for the very large population with subclinical distress, sleep disturbance, and stress-linked somatic complaints, a low-stigma, community-based entry point has obvious value, and the formal system has never had one.

Ageing: Ayurveda has an explicit branch, rasayana, concerned with what we would now call healthy ageing and functional maintenance. India's population is ageing rapidly while its geriatric care capacity is close to non-existent outside metropolitan private hospitals. LASI-based studies

find precisely this pattern of older adults turning to AYUSH practitioners for pain and joint disease. Whether the specific rasayana formulations do what is claimed is a fair question. That older Indians are using these services in large numbers, for complaints the formal system handles poorly, is not in dispute.

Maternal and child health: a more cautious ledger: India's gains in maternal and neonatal mortality over the past two decades are among its clearest public health achievements, and they were driven by institutional delivery, skilled birth attendance, referral transport, and cash transfer schemes. Ayurveda did not deliver those gains, and any suggestion that it might substitute for them would be actively harmful. That said, there are adjacent spaces where an AYUSH presence has done useful work. Antenatal counselling on diet, anaemia, and rest is delivered more effectively by someone speaking a familiar idiom than by a poster. Postnatal care in the Indian context has always had a strong domestic and ritual dimension, sutika paricharya in the classical vocabulary, involving rest, specific foods, oil massage, and a period of protected recovery. Much of this is sensible, and where health workers engage with it rather than dismissing it, compliance with the parts that matter clinically tends to improve. Child nutrition is more contested. Ayurvedic paediatric practices around weaning foods and digestive strength have plausible dietary content, and lehana, the traditional practice of giving prepared licks to infants, is culturally deep. But the same cultural depth means that harmful practices travel alongside beneficial ones, including delayed initiation of breastfeeding, prelacteal feeds, and the use of unregulated preparations in infants whose renal and hepatic clearance is immature. The heavy metal concern discussed later is at its sharpest here. The appropriate posture in maternal and child health is engagement without delegation. Use the practitioner's standing in the community and the vocabulary the community trusts, but keep clinical responsibility firmly with the established programme.

The Supply Chain: Plants, Livelihoods, and an Ecological Bill Coming Due

One of the more consequential effects of Ayurveda's expansion has almost nothing to do with clinics. Ayurvedic manufacturing depends on medicinal plants, and demand has grown fast. Ved and Goraya (2008)^[32], in the standard reference on the subject, documented a demand and supply picture in which a majority of raw drug volume was still sourced from the wild rather than from cultivation. That is a sustainability problem with a straightforward logic: rising demand plus wild collection plus weak regulation equals depletion of exactly the species the system depends on. There are two ways to read the expansion. The optimistic reading is that a large domestic industry creates incentives and markets for cultivation, giving smallholders in states like Madhya Pradesh, Uttarakhand, and Rajasthan a viable non-food crop, supported by National Medicinal Plants Board subsidies. Some states now offer substantial subsidies for key medicinal crops explicitly to raise rural incomes. Where this works, it is genuine rural development attached to a health objective, which is a rare and pleasant combination. The pessimistic reading is that industrial-scale demand tends to concentrate on a handful of high-volume species, that wild collection is cheaper than cultivation and will therefore persist, that collectors, often adivasi

households, sit at the weakest point of the value chain and capture very little of the final price, and that adulteration and species substitution flourish when demand outruns supply. All of these are documented concerns rather than speculation. For public health specifically, the adulteration issue is the sharp end. If the botanical identity of a raw drug is uncertain, then no amount of clinical trial evidence about the formulation transfers to the product a patient actually buys. This is a supply chain problem masquerading as an evidence problem, and it will not be fixed by more trials.

Safety, Quality, and the Pharmacovigilance Gap

It is a persistent and dangerous popular belief that because something is herbal it cannot harm you. Ayurvedic classical texts themselves do not say this; they are quite specific about dose, contraindication, and preparation. The belief is a modern marketing artefact. Three risks deserve naming. The first is heavy metal content, particularly in *rasa shastra* preparations that intentionally incorporate processed mercury, lead, or arsenic compounds. Saper *et al.* (2008) [26] found detectable levels in about a fifth of sampled products. Practitioners argue that classical *shodhana* and *marana* procedures transform these into biologically distinct forms, and there is some laboratory work suggesting altered particle characteristics. I do not think this question is settled, and given the stakes for paediatric and pregnancy exposure, the burden of proof should sit heavily on the manufacturer. The second is herb-drug interaction. Patients very frequently take Ayurvedic and allopathic medicines simultaneously and, crucially, do not tell either practitioner about the other. Some interactions are clinically meaningful. A patient on warfarin taking a preparation with antiplatelet activity has a real problem, and neither prescriber knows. The third is regulatory capacity. ASU drugs are regulated under the Drugs and Cosmetics Act with a distinct schedule, and the Pharmacopoeia Commission for Indian Medicine and Homoeopathy sets standards. But drug inspection capacity is limited, licensing sits with state authorities of varying rigour, and the sector has thousands of small manufacturers. A national pharmacovigilance programme for ASU drugs exists, and its reporting volumes remain low relative to the sector's size, which is more likely a reflection of underreporting than of exceptional safety. None of this is an argument against Ayurveda. It is an argument that a system claiming a legitimate place in public health must accept the regulatory burdens that come with the claim. You cannot simultaneously demand parity of status and exemption from parity of scrutiny.

Critiques and Challenges

The evidence problem has not been solved, only reframed: The methodological argument that whole-system, individualised therapeutics fit poorly into conventional trial design is legitimate. It is also, by now, somewhat overused. Twenty years of that argument has produced fewer well-designed pragmatic trials and whole-system studies than one might expect given the sector's budget growth. Meanwhile, a large volume of low-quality output, small samples, no blinding, surrogate endpoints, no registration, continues to appear in journals with limited peer review. The effect is corrosive: it gives sceptics an easy target and it makes it harder for the genuinely good work, of which there is some, to be noticed. If the sector wants to be believed, the quickest route is not better arguments about epistemology. It is a dozen adequately powered,

preregistered, independently conducted pragmatic trials on the conditions where Ayurveda is actually used most.

Substitution rather than complementarity: Priya and Shweta (2010) [23] finding remains the most serious structural critique. If mainstreaming in practice means AYUSH doctors performing biomedical functions at lower cost, then the state has used a cultural resource to paper over a budgetary failure. The patient gets a doctor of sorts; the district gets a filled post on paper; nobody has to confront why the medical officer position has been vacant for six years. That is a bad equilibrium, and it is stable, which is worse.

Commercialisation and the wellness drift: There is a widening gap between Ayurveda as a system of care for sick people and Ayurveda as a consumer wellness category. Bode (2008) [32] traced the pharmaceuticalisation of the industry, and the trend has accelerated since. Detox packages at resorts, immunity boosters, cosmetic products with classical-sounding names: this is a large and profitable market, and it pulls talent, capital, and public attention away from the clinical and public health work. It also, more subtly, shifts the meaning of Ayurveda in the public mind toward something aspirational and elective, which is not obviously good for its standing as serious medicine. The pro-rich gradient in the utilisation data is arguably an early symptom.

The politics problem: It would be evasive not to say this. State promotion of Ayurveda in India is entangled with cultural nationalism, and that entanglement damages the field in both directions. It generates defensive overclaiming from supporters, since criticism gets read as civilisational insult. It also generates reflexive dismissal from critics, who see the political framing and stop reading. Neither reaction is good for patients. Sujatha (2011) [29] is careful about this, and more researchers should be. The intellectual task is to hold the empirical questions separate from the symbolic ones, which is difficult but not impossible.

The equity assumption may be backwards: One claim gets repeated so often that it has stopped being examined: that Ayurveda serves the poor. Sometimes it does, particularly through free public dispensaries in states with dense AYUSH infrastructure. But the survey evidence complicates the picture. Rudra *et al.* (2017) [15] found a mildly pro-rich concentration index for use of Indian systems of medicine in both rural and urban areas, meaning better-off households used them somewhat more, while allopathy showed a flat distribution. Studies among older adults have found associations with higher subjective socioeconomic status. Why might that be? Partly cost. A course of good quality classical medicine, taken over months, is not cheap, and the branded end of the market is expensive by any measure. Partly time. Ayurvedic treatment typically demands dietary discipline, regular routine, and repeat visits, which are luxuries for a daily wage worker. And partly information. Knowing which practitioner is any good, and which product is authentic, is a form of cultural capital unevenly distributed. There are gender and caste dimensions too, less studied than they should be. Women's use of AYUSH services is documented in some settings as higher for reproductive and musculoskeletal complaints, though household decision-making about spending on

women's health remains a constraint that no system solves on its own. And the professionalisation of Ayurveda through degree colleges has, over a century, transferred authority from hereditary and often lower-caste healing lineages to a credentialed class drawn largely from elsewhere. Whatever else that was, it was a redistribution of legitimacy, and its beneficiaries were not the traditional practitioners. None of this means Ayurveda is regressive. It means the equity claim needs evidence rather than assumption, and that free provision through public facilities is doing more of the equity work than the system's cultural accessibility is.

Toward a More Honest Integration

If the diagnosis above is roughly right, what follows is a few propositions that needs to be assessed. Define the domains rather than the hierarchy. Instead of arguing about whether Ayurveda is equal to biomedicine, specify conditions and functions where it takes lead responsibility, and hold it accountable for outcomes there. Chronic musculoskeletal pain, lifestyle counselling in diabetes and hypertension, post-acute rehabilitation, functional complaints of ageing, and adjunctive care in palliative settings would be a defensible starting list. Acute emergencies, infectious disease requiring antimicrobials, obstetric complications, and cancer therapy would not be. Invest in pragmatic trials on the conditions people actually use it for, not on the ones that are easiest to publish. Fund them independently of the Ministry that promotes the sector, because the conflict of interest is obvious and it undermines the results even when the results are sound. Fix the supply chain before scaling further. Botanical authentication, cultivation incentives, and traceability are unglamorous, but without them clinical evidence does not transfer to products. Build referral protocols and make them binding. The greatest harm an Ayurvedic practitioner can do is not usually a dangerous prescription. It is a delayed referral. Clear, trained, audited danger-sign recognition would address most of the safety concern that critics raise, and it is entirely achievable. Take pharmacovigilance seriously, including mandatory reporting and disclosure of concurrent use. A simple question on every intake form, what else are you taking, would catch a good deal. Finally, protect the space for household and folk knowledge, which the professionalisation of Ayurveda has steadily eroded. The most cost-effective health practices in rural India are often domestic ones, and the drive to formalise everything into a licensed clinical encounter risks throwing them away.

Conclusion

The claim that Ayurveda has helped India's health ecosystem function more effectively is true, but not for the reasons usually given. It is not primarily because Ayurvedic formulations have been shown to outperform conventional alternatives, which for most conditions has not been established, though for a few it has. It is because a health system is a social institution before it is a technical one, and Ayurveda has supplied things that Indian public health was badly short of: people willing to work where doctors will not go, a framework for talking about chronic illness and daily life that ordinary Indians already understand, a low-stigma entry point for distress and ageing, and a route by which the state can communicate with households during outbreaks. These are real contributions, and they are systemic rather than pharmacological. Recognising this would be liberating for everyone involved. Advocates

would not have to defend indefensible efficacy claims to justify the sector's existence. Critics could concede the health systems value without endorsing every product on the shelf. What worries me is the direction of travel. The sector is growing much faster than its evidence base, its regulatory capacity, and its raw material supply. Rapid growth without those three catching up produces a predictable outcome: a large, commercially successful, publicly promoted sector whose actual clinical quality is unknown and whose failures, when they come, will be spectacular enough to discredit the genuinely valuable parts. That would be a loss, and not only for Ayurveda. The queue outside the dispensary is not going to disappear because researchers have unresolved questions about mechanism. Those people will keep coming, because the alternative is often nothing at all. The task for public health is not to adjudicate an ancient argument about the nature of medicine. It is to make sure that when they arrive, what they receive is safe, honestly described, competently delivered, and connected to the rest of the system by someone who knows when to pick up the phone.

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