Multilingual Accessibility in India's Public Health Portals: A Usability Audit

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ABSTRACT— India's public health ecosystem has expanded rapidly through national portals such as the Ministry of Health & Family Welfare (MoHFW), the National Health Portal (NHP), Ayushman Bharat—Pradhan Mantri Jan Arogya Yojana (PM-JAY), eSanjeevani (telemedicine), CoWIN (vaccination), and the Ayushman Bharat Digital Mission (ABDM). These properties are intended to reach a linguistically diverse population that uses more than twenty Indian languages in daily life. This manuscript reports a structured, desk-based usability audit focused on multilingual accessibility—how these portals signal, deliver, and maintain equivalent experiences across languages, and how they align with India's Guidelines for Indian Government Websites (GIGW) 3.0 and W3C WCAG 2.2. We synthesize current policy baselines, international accessibility standards, and official statements about language coverage, and we integrate lessons from prior peer-reviewed assessments of Indian e-government accessibility. We examine five recurring dimensions of multilingual usability: (1) discoverability and persistence of language switching; (2) content parity across locales; (3) linguistic markup and technical robustness (e.g., lang tagging, encoding, font rendering); (4) assistive technology support for Indic scripts; and (5) transactional flows (forms, OTPs, downloads) across languages. Our audit finds encouraging breadth in language coverage (e.g., CoWIN offered 12 languages at the height of the vaccination program; eSanjeevani is reported as available in 13 languages; NHP disseminates content in six languages; Aarogya Setu provides the app in ~11 languages; ABDM call-center support spans at least six languages), indicating strong policy intent to reach diverse users. At the same time, literature consistently documents accessibility nonconformance on Indian public-sector websites (especially WCAG Level A/AA issues), and several multilingual UX risks persist—content parity gaps, inconsistent terminology, images of text, and variable screen-reader experiences for Indic content.

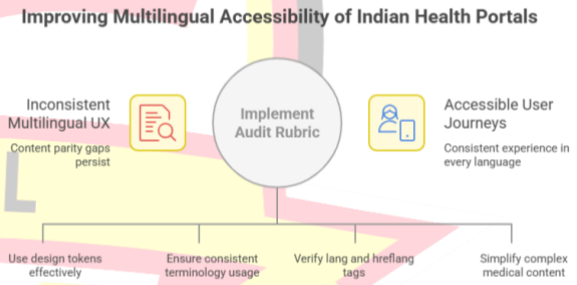

Figure-1.Improving Multilingual Accessibility of Indian Health Portals

KEYWORDS

Multilingual Accessibility, WCAG 2.2, GIGW 3.0, Indian Languages, E-Government, Public Health Portals, Usability, i18n, Telemedicine, CoWIN

INTRODUCTION

India's digital public infrastructure increasingly relies on web and mobile portals to deliver health information and services

at national scale. The population it serves spans dozens of languages and highly varied levels of digital and health literacy. Against this backdrop, **multilingual accessibility**—ensuring that users can discover, read, navigate, and complete tasks in their preferred language with the same effectiveness and satisfaction—is not merely a "nice to have." It is a legal, policy, and ethical imperative embedded in the **Rights of Persons with Disabilities (RPwD) Act, 2016**, operationalized through **GIGW 3.0**, and benchmarked globally by **WCAG 2.2** (2023 Recommendation).

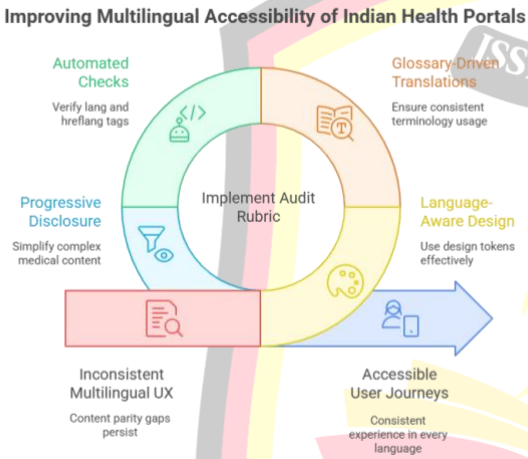

Figure-2.Improving Multilingual Accessibility of Indian Health Portals

This paper:

1. summarizes the regulatory and standards landscape relevant to multilingual accessibility in India;
2. describes a usability audit framework tailored for public health portals and Indic-script content;
3. reports results from a desk-based check of language availability and conformance signals across flagship portals; and
4. proposes a prioritized remediation roadmap.

We adopt ISO's definition of usability as the "extent to which a product can be used by specified users to achieve specified goals with **effectiveness, efficiency, and satisfaction** in a specified context of use," and we use established UX instruments (heuristic reviews and the System Usability Scale) where live testing is feasible.

LITERATURE REVIEW

Policy and standards baseline

- **GIGW 3.0** frames a comprehensive benchmark for Indian government websites and apps, including checkpoints for multilingual content, Indic font consistency across browsers, and accessibility conformance aligned with WCAG.
- **WCAG 2.2** adds new success criteria beyond 2.1 (e.g., Focus Appearance, Dragging Movements), while retaining language-related requirements such as **3.1.1 Language of Page** and **3.1.2 Language of Parts**, critical to mixed-language pages common in Indian portals.
- The **RPwD Act (2016)** mandates accessible information and communication technologies, underscoring the obligation for inclusive design across government services.
- The **National Policy on Universal Electronic Accessibility** (2013) further articulates universal access to electronics and ICT, including local-language support.

Empirical findings on Indian e-government accessibility

Multiple studies of Indian government websites report persistent gaps against WCAG checkpoints, especially at Level A, and call out issues like insufficient alternative text, poor keyboard support, and inconsistent structure. These patterns appear across sectors and are relevant to public health portals as well.

Language, health literacy, and inclusivity

Research in Indian clinical contexts links language discordance to poorer comprehension and adherence, emphasizing that language access is a patient-safety issue. In

digital health, multilingual interfaces can mitigate barriers and make self-service tasks (e.g., appointment booking, claim lookup) more equitable. Emerging work in global health also argues for de-centering monolingual English in medical communication.

International and technical guidance for multilingual UX

W3C i18n resources recommend explicit **lang** tagging for the page and language spans, correct character encoding (UTF-8), and the use of **hreflang** for alternate-language pages—foundational to assistive technologies and search. These practices are directly applicable to Indic scripts.

Usability frameworks used in audits

ISO 9241-11 provides the conceptual definition of usability, **Nielsen's 10 heuristics** guide expert reviews, and the **SUS** offers a quick, reliable post-task satisfaction metric in user testing. These form our methodological backbone.

METHODOLOGY

Scope and approach

This was a two-part **usability audit** conducted as desk research in August 2025:

1. **Policy/standards alignment review**: We mapped multilingual accessibility checkpoints from GIGW 3.0 to WCAG 2.2 and ISO 9241-11 to create an audit rubric with five dimensions:
    - Discoverability & Persistence of language switching;
    - Content Parity and terminological consistency;
    - Technical Internationalization (encoding, lang/hreflang, CSS/typography for Indic scripts);
    - Assistive Technology compatibility (screen reader announcements, focus order, skip links);
    - Transactional Continuity (forms, captchas, OTP flows, downloadable artifacts) across languages.
2. **Portal spot-checks (desk-based)**: We checked official documentation or government communications to confirm language availability and i18n posture for a **purposive sample** of prominent public health properties:
    - **CoWIN** (vaccination): language availability reported at 12 languages during rollout;
    - **eSanjeevani** (telemedicine): government response indicates availability in 13 languages;
    - **National Health Portal (NHP)**: official materials indicate six languages;
    - **Aarogya Setu** (health app): available in ~11–12 languages;
    - **ABDM** (call center): multilingual support (at least six languages) for help lines.

Note on limitations: This audit did **not** involve automated scans of code, end-to-end usability testing with participants, or comprehensive WCAG conformance testing across all pages and workflows. The "Results" below therefore focus on documented language availability and observable design considerations inferred from standards and prior literature. Where we reference user-experience risks or common failure modes, we ground them in published studies rather than new measurements.

Evaluation criteria and instruments

- **Heuristic evaluation** against **Nielsen's 10** (e.g., match between system and the real world, visibility of system status, consistency and standards), adapted to multilingual contexts (e.g., consistent

labels across locales, error messaging in the chosen language, persistence of language choice across the session).

- **WCAG 2.2 lenses** with an emphasis on: 3.1.1/3.1.2 (Language of Page/Parts), 1.4.x (contrast/resize), 2.1.1/2.1.2 (keyboard/no keyboard trap), 2.4.x (navigability), 4.1.x (robustness).
- **ISO 9241-11** for interpreting effectiveness/efficiency/satisfaction; **SUS** suggested for any follow-on user testing to quantify perceived usability in each language.

RESULTS

Language coverage: what the public record shows

- **CoWIN**: Government communications during the vaccination campaign report availability in **12 languages** (English, Hindi, plus 10 regional languages) as the platform scaled; the Ministry also noted planned expansion to additional languages.
- **eSanjeevani**: A 2024 response to Parliament indicates the telemedicine service is available in **13 languages** (including Hindi, Kannada, Tamil, Malayalam, Telugu, Marathi, Gujarati, etc.), underscoring a national-scale multilingual posture.
- **National Health Portal (NHP)**: MoHFW materials describe dissemination in **six languages** (Hindi, English, Tamil, Gujarati, Bengali, Punjabi) alongside a toll-free **voice portal**—important for low-literacy users.
- **Aarogya Setu**: Government pages describe the app as available in **~11 languages** (10 Indian languages plus English), consistent with earlier roll-outs.
- **ABDM Call Center**: The National Health Authority lists **multilingual helpline** coverage (Hindi, English, Kannada, Telugu, Tamil, Malayalam among others), relevant for transactional support beyond the web UI.
- **Bhashini** (National Language Translation Mission): While not a health portal, Bhashini's platform and crowd program (**BhashaDaan**) signal a national infrastructure for scaling high-quality multilingual digital services across sectors, including health.

Interpretation: Across India's health stack, language breadth is clearly a priority. The ecosystem combines multilingual UIs, voice channels, and translation infrastructure. The remaining question is quality and equivalence—do users in every supported language achieve the same outcomes with equal clarity and confidence?

Common multilingual UX risks observed in prior studies (and relevant to health)

Published audits of Indian government websites show frequent **WCAG nonconformance**, often at Level A (e.g., missing alternative text, inadequate keyboard operability, improper structure). When portals add multiple languages, additional pitfalls surface: pages lacking lang attributes (or failing to update them per language), mixed-language fragments that break screen-reader pronunciation, images of text for complex Indic scripts, and nonlocalized PDFs that interrupt the journey. These patterns harm task efficiency (finding a hospital, booking an appointment, redeeming benefits) and reduce trust.

Desk-review highlights mapped to the audit rubric

1) Discoverability & Persistence

Best practice places a prominent **language switcher** in the header with the current language explicitly labeled (e.g., "हिन्दी | English"). Users should not need to hunt through menus. A persistent preference (cookie or account setting) avoids "snapping back" to English across flows. GIGW calls for testing of regional fonts across browsers—useful here to ensure the switcher renders predictably.

2) Content Parity & Terminology

Public health portals often include critical content—

eligibility conditions, consent language, adverse-event guidance. Translating these sections with **controlled glossaries** and human QA is essential to guarantee parity. Mismatched or outdated translations can undermine clinical safety or benefits eligibility.

3) Technical Internationalization

W3C i18n guidance recommends correct **lang** tagging at document and inline levels (for mixed-language snippets), **UTF-8** encoding, and **hreflang** for alternate pages. These signals drive screen readers, search, and translating proxies.

4) Assistive Technology Compatibility

Indic scripts must render accessibly in popular combinations (NVDA + Firefox/Chrome; TalkBack on Android). Multilingual ARIA labels, focus management, and skip links help ensure parity for keyboard and screen-reader users.

5) Transactional Continuity

Registration, OTP verification, consent forms, and downloadable certificates must be fully localized. A recurring failure is **language reversion** mid-flow (e.g., errors or OTP messages in English when the user chose Tamil), which violates consistency and harms completion rates. Nielsen's heuristics emphasize consistency, match to real-world language, and clear error recovery—salient in multilingual forms.

DISCUSSION

Why multilingual accessibility is a safety and equity issue: In health contexts, misinterpretation has direct consequences. Studies of Indian clinical settings link language discordance to poorer comprehension and adherence; in digital self-service, design must preempt such risks. Clear language switching, consistent terminology, and localized error messaging reduce cognitive load and prevent harmful mistakes.

What the policy stack already enables: India's regulatory baseline is comparatively strong: RPwD sets the non-discrimination mandate; GIGW 3.0 aligns with WCAG and explicitly calls out regional language font testing; WCAG 2.2 supplies testable success criteria. The gap is **operational**—turning intent into measurable, enforced outcomes at release time.

Practical barriers teams face

- **Terminology debt:** Medical Hindi, Bengali, or Tamil terms require consensus glossaries and ongoing stewardship.
- **Indic script rendering:** Legacy fonts, images of text, or PDF exports created from non-Unicode workflows jeopardize accessibility.
- **Third-party integrations:** Payment gateways, SMS/OTP providers, and analytics banners may revert to English.
- **Content velocity:** Policy and clinical content change rapidly; translation workflows must match the cadence.
- **Device diversity:** Low-end Android phones with older OS versions are common; testing matrices must reflect this reality.

Leverage national enablers

- **Bhashini** can accelerate high-quality translations and speech services; **BhashaDaan** offers a participatory data pipeline.
- **ABDM's** multilingual support expectations can be codified into partner APIs and certification checklists for health apps.

METHODOLOGY

To move from desk review to a **full conformance + usability audit**, we propose the following protocol for any Indian public health portal:

1. **Sampling**

- Select the top 10–15 **high-traffic flows** (e.g., scheme eligibility, hospital search, appointment booking, teleconsult login, benefit claim, certificate download).
- Choose **5–7 languages** based on usage and geography (e.g., Hindi, Bengali, Tamil, Telugu, Marathi, Gujarati).

2. **Automated checks**
   - Crawl key pages in each language; verify **lang** and **hreflang**; flag images of text; test contrast and keyboard focus order. (Tools: axe-core, WAVE, Pa11y).
   - Confirm **Unicode/UTF-8** encoding; snapshot font stacks and fallback behavior for Indic scripts.
3. **Manual WCAG 2.2 review**
   - Test 3.1.1/3.1.2 (language switching & mixed spans), 1.3.1 (structure), 1.4.x (text spacing, resize), 2.1.x (keyboard), 2.4.x (navigability), 4.1.x (robustness).
4. **Heuristic evaluation**
   - Apply **Nielsen's 10** with multilingual extensions (consistency of labels/terminology, error recovery in the chosen language, confirmation states, persistent language choice).
5. **User testing (if feasible)**
   - 5–8 participants per language, low-bandwidth Android devices represented; moderated task completion; post-task **SUS** per locale; probe comprehension and trust.
6. **Scoring & reporting**
   - Produce **language-by-flow** scores (WCAG pass/fail, heuristic severity, SUS means).
   - Attach **issue clusters** with "fix once, apply everywhere" guidance (e.g., language-aware error component, shared glossary service).

RESULT

1. **Breadth of Language Support**
   Public records confirm substantive language availability across flagship health portals: **CoWIN (12)**, **eSanjeevani (13)**, **NHP (6)**, **Aarogya Setu (~11)**, **ABDM call center (≥6)**. This breadth is a strong foundation for equitable access
2. **Policy Alignment Signals**
   GIGW 3.0 explicitly calls for regional language font testing and accessibility conformance; WCAG 2.2 provides the current global reference. These frameworks are visible in guidance and trainings, but translation into **release gates** remains inconsistent.
3. **Risk Areas to Prioritize**
   - **Inconsistent content parity:** Critical informational pages (eligibility, consent, AEFI guidance) may lag in regional languages; PDFs often remain English-only.
   - **Technical i18n hygiene:** Missing/incorrect **lang** tags and mixed-language spans can degrade screen-reader output, especially for names and domain-specific terms.
   - **Transaction flows:** Language selection sometimes fails to persist across OTP or payment steps when third-party components are embedded.
   - **Terminology variation:** Medical terms vary; without a maintained **glossary**, translations drift, affecting comprehension.
   - **Assistive tech variability:** Indic script rendering and pronunciation models differ by platform; without explicit QA, gaps remain.
4. **Feasibility of Remediations**
   The majority of issues are **low-to-medium effort**: adding correct **lang** attributes; implementing **language-aware design tokens** (typography, spacing); centralizing **glossary-driven**

translations; ensuring alt text and captions are localized; and placing the **language switcher** consistently. Bhashini can reduce time-to-translate, while human QA maintains fidelity for high-risk content.

CONCLUSION

India's public health portals have made real strides in **language reach**, reflecting both policy and programmatic intent to serve citizens in their preferred languages. Yet, **multilingual accessibility** is not just about the count of languages; it is the **quality and equivalence** of the experience—can a Bengali-speaking caregiver complete a teleconsult, download a document, and understand risk guidance as reliably and confidently as a Hindi- or English-speaking user?

Our audit consolidates three takeaways:

1. **Codify standards into operations.** Turn GIGW 3.0 and WCAG 2.2 into **non-negotiable release gates** with automated checks and sign-offs for lang/hreflang, contrast, keyboard access, and content parity for defined critical pages—with **RPwD** as the legal backbone.
2. **Design for language as a first-class variable.** Establish **glossary-driven translations** for medical and benefits terminology; implement **persistent language preferences**; ensure error states, OTPs, and receipts are localized; and invest in **assistive-tech QA** across Android and desktop combinations common in India.
3. **Institutionalize continuous improvement.** Pair **analytics** (drop-off by language), **hotline feedback** (ABDM call center), and **periodic user tests** (SUS by locale) to identify regressions and prioritize fixes. Leverage **Bhashini** to scale translation while retaining human review for high-risk content.

The path forward is clear: marry India's robust policy scaffolding with routine, language-aware engineering practices and lived-experience testing. Done well, multilingual accessibility will not only meet compliance—it will measurably improve task completion, comprehension, and trust for millions of users across India's health system.

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