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Developing a National Nursing Wellbeing Index for India: A Conceptual Framework, Open-Data Feasibility Assessment, and Proof-of-Concept.

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Abstract

No composite instrument currently measures nursing professional wellbeing across Indian states using open, publicly accessible data. This study developed an integrated 23-domain conceptual framework for a National Nursing Wellbeing Index for India, then systematically assessed, using an explicit five-category adequacy classification, whether each domain could be operationalised from currently available open data. Of 23 domains, none met a pre-specified high-confidence Adequate threshold; three (Workload and Staffing Adequacy, Occupational Safety, Patient Safety Culture) were Partially Adequate and supported quality-assured pilot indicators; two (Recognition, Financial Wellbeing) yielded real but statistically or structurally Insufficient data; four were Access-Restricted behind specific, documented barriers; and 14, predominantly individual psychological constructs, had No Publicly Accessible Data Identified. Pilot indicators showed a national public-sector nursing staff vacancy rate of 23.16% and a nurse-population ratio of 2.60 per 1,000 population. Structural findings included a confirmed Periodic Labour Force Survey occupational-disaggregation barrier and cross-state non-comparability of government pay-matrix labels. These findings do not indicate that nursing wellbeing is unmeasurable in India; they identify specific, actionable data-infrastructure gaps distinguishing tractable publication barriers from genuine primary-data absence, providing a transparent, reproducible empirical baseline for future index development.

INTRODUCTION

Occupational wellbeing among health workers has been formally recognised by the World Health Organization as a determinant of both workforce sustainability and patient safety. The WHO Healthy Workplace Framework identifies physical, psychological, social, and community/organisational dimensions as the core avenues through which workplaces shape worker health, against a global backdrop that includes an estimated two million work-related deaths annually, 268 million non-fatal occupational accidents, and approximately 160 million new cases of work-related illness [1]. Nursing, by virtue of its round-the-clock clinical exposure, emotional labour, and hierarchical organisational position, has consistently been identified as one of the highest-risk occupational groups within this global burden.

A systematic review and meta-analysis of 113 studies spanning 45,539 nurses across 49 countries estimated a pooled global burnout symptom prevalence of 11.23%, with marked variation by world region and nursing specialty [2]. India-specific evidence remains comparatively sparse and geographically concentrated: a cross-sectional study of 349 nursing professionals across public and private institutions in Kerala, using the Burnout Assessment Tool, reported high burnout in 36.1% of participants (95% CI 31.1–41.4) — markedly above global pooled estimates, though direct comparison is constrained by differing instruments and by the single-state, non-random sampling frame [3]. No Indian study has yet used a nationally representative sampling frame for nurse burnout or wellbeing, and this evidentiary gap persists at the time of writing.

India's nursing workforce is both numerically large and structurally strained. According to the most recent available government reporting, India had approximately 46.02 lakh (4.602 million) registered nursing personnel as on 31 December 2025 — comprising 34.88 lakh Registered Nurses and Registered Midwives,

10.59 lakh Auxiliary Nurse Midwives, and approximately 0.55 lakh Lady Health Visitors — corresponding to a nurse-population ratio of 2.60 per 1,000 population (2.45 per 1,000 for Registered Nurses and Registered Midwives specifically), still below the World Health Organization-recommended benchmark of 3.0 per 1,000 [4, 5]. This figure represents substantial growth from approximately 33.41 lakh registered nursing personnel and a ratio of 1.96 per 1,000 reported in 2022 [6], but state-level variation remains pronounced, with some states approaching or exceeding the WHO benchmark while others report ratios below 1.0 per 1,000.

Beyond workforce supply, the International Council of Nurses' most recent synthesis of State of the World's Nursing data reports that 41% of countries lack measures to protect health workers from workplace violence and 58% lack provisions for health-worker mental health support, alongside an estimated global nurse turnover rate of 15.2% and an intent-to-leave rate of 38.4% [7]. These figures are reported at global aggregate level; India-disaggregated figures were not identified in the sections of this reporting reviewed for the present study, and should not be assumed to apply directly to the Indian workforce without independent verification.

Wellbeing in the occupational health literature is commonly treated as a multidimensional construct encompassing both the presence of positive functioning and the absence of ill-being, rather than a single psychological state [8]. Several international frameworks address components of this construct as it applies to nursing: the Job Demands–Resources model classifies working conditions into demands, which primarily drive exhaustion, and resources, whose absence primarily drives disengagement [9, 10]; the WHO Healthy Workplace Framework organises organisational determinants into four avenues of influence [1]; the Maslach Burnout Inventory operationalises individual psychological burnout as a tridimensional construct [11]; and the Professional Quality of Life framework distinguishes compassion satisfaction from compassion fatigue and secondary traumatic stress [12]. Each of these addresses occupational wellbeing from a single disciplinary lens and level of analysis — individual, organisational, or population — and none was designed as a composite, multidimensional, state-comparable index specific to a national nursing workforce.

India has domestic precedent for a state-comparable, open-data composite index in the adjacent health-systems space: the NITI Aayog State Health Index, developed jointly by NITI Aayog, the Ministry of Health and Family Welfare, and the World Bank since 2018, ranks all states and Union Territories annually on 24 weighted indicators spanning health outcomes, governance, and key inputs [13]. No equivalent instrument exists for nursing-specific occupational wellbeing. India's National Health Policy 2017 addresses human resources for health as a cross-cutting priority, including workforce development and health system strengthening, but does not articulate nursing-specific wellbeing indicators, targets, or a monitoring mechanism [14] — a policy gap that persists alongside the research gap identified above.

A further, largely unaddressed obstacle to any future Indian nursing wellbeing index is the fragmentation and occupational granularity of existing open workforce data sources. National labour-force surveys, workforce establishment records, and professional registries are each maintained for purposes other than nursing-specific wellbeing monitoring, and, as this study demonstrates directly, frequently do not

disaggregate to nursing-specific, state-level detail even where the underlying data collection instrument is, in principle, capable of doing so.

No existing framework, to the authors' knowledge, has attempted to define nursing professional wellbeing as an explicitly multidimensional, state-comparable construct for India and then systematically test which components of that construct can currently be measured from open, publicly accessible Indian data, as distinct from which components are conceptually important. This distinction — between what a wellbeing framework should, in principle, measure and what current public data infrastructure permits to be measured — is the specific gap this study addresses.

The objective of this study was therefore threefold: (i) to develop and present an integrated conceptual and theoretical framework, and a consolidated 23-domain architecture, for a National Nursing Wellbeing Index for India (NNWI-India); (ii) to conduct a systematic, reproducible, two-phase feasibility assessment of open Indian data availability across all 23 domains, applying an explicit, consistently applied adequacy classification rather than a binary feasible/infeasible judgement; and (iii) to develop and quality-assure a small number of proof-of-concept pilot indicators for domains where the feasibility assessment identified adequate or partially adequate public data. This study does not present, and does not claim to present, a completed, fully scored National Nursing Wellbeing Index; the central research question it addresses is: to what extent can a multidimensional National Nursing Wellbeing Index for India currently be operationalised using publicly accessible data, and what does the answer to that question imply for the data infrastructure required to complete such an index in future?

METHODS

Study Design

This study used a methodological development and public-data feasibility assessment design. It did not involve primary data collection from human participants; all data were extracted from publicly available Indian government, parliamentary, and institutional sources. The study comprised three sequential components: (i) conceptual and domain development for a National Nursing Wellbeing Index for India (NNWI-India), building on an integrated theoretical framework combining the Job Demands–Resources (JD-R) model [9, 10], the World Health Organization Healthy Workplace Framework [1], and the PERMA model of positive functioning [8]; (ii) a systematic, two-phase feasibility assessment of open-data availability across all candidate domains; and (iii) development and quality-assured extraction of a small number of pilot, proof-of-concept indicators for domains where adequate or partially adequate public data were identified. No composite index score was calculated, and none is reported, because the proportion of domains with adequate direct measurement did not support defensible aggregation; this decision is elaborated in the Discussion.

Conceptual Framework and Domain Development

Nursing professional wellbeing was defined, for the purposes of this study, as a multidimensional state reflecting the physical, psychological, social, and economic conditions under which nurses perform their professional roles, shaped jointly by individual psychological resources and the structural, organisational, and policy environment in which nursing work is embedded. This definition draws on the JD-R model's separation of individual strain from organisational determinants [9, 10], the WHO's conception of health as more than the absence of disease [1], and the positive-psychology emphasis on flourishing rather than symptom absence alone [8].

An initial set of 24 candidate domains, drawn from the reviewed frameworks (JD-R, WHO Healthy Workplace, the Maslach Burnout Inventory [11], the Professional Quality of Life framework [12], the American Nurses Credentialing Center Magnet Recognition Program, the OECD Well-being Framework, and the International Labour Organization Decent Work Agenda), was consolidated to 23 non-overlapping domains during an earlier conceptual-development phase of this project, on the basis of documented conceptual overlap (e.g., ProQOL's three subscales mapping onto three separately retained domains). The 23 domains span six structural groupings: structural demand (job demands), structural resources differentiated by the WHO's four avenues of influence (physical/safety, psychosocial/organisational, personal health-promoting, community/culture), career and economic architecture, individual ill-being, positive functioning, and work–life integration. The full domain list and operational definitions are presented in Table 1.

Table 1
The 23 Candidate NNWI-India Domains and Operational Definitions

Structural Group	Domain	Operational Definition
Structural Demand	Workload and Staffing Adequacy	Nurse-to-patient ratio, patient acuity load, and perceived work intensity relative to available time and staff.
Structural Demand	Shift Work and Scheduling Intensity	Night-shift frequency, shift length, rest-period adequacy, and rotating versus fixed scheduling.
Structural Demand	Workplace Violence Exposure	Physical or verbal assault, harassment, or intimidation experienced from patients, families, or colleagues during clinical duties.
Structural Resource – Physical/Safety	Occupational Safety and Injury/Infection Protection	Availability of personal protective equipment, sharps-injury prevention systems, and biological hazard exposure controls.
Structural Resource – Psychosocial/Organisational	Leadership Support	Quality, accessibility, and participatory style of nursing leadership and management.
Structural Resource – Psychosocial/Organisational	Professional Autonomy	Degree of independent clinical decision-making and scope-of-practice latitude afforded to nurses.
Structural Resource – Psychosocial/Organisational	Organisational Culture and Ethical Climate	Shared organisational norms regarding respect, fairness, and support for ethical clinical decision-making.
Structural Resource – Psychosocial/Organisational	Recognition	Formal and informal acknowledgement of nurses' professional contributions.
Structural Resource – Psychosocial/Organisational	Patient Safety Culture	Nurse-perceived organisational climate around incident reporting and non-punitive error culture, explicitly distinct from patient safety outcome metrics.
Structural Resource – Personal Health-Promoting	Physical Health-Promoting Resources	Nurse access to health check-ups, vaccination, ergonomic support, and occupational health services provided by the employer.
Structural Resource – Community/Culture	Social Support	Organisational availability of peer camaraderie, mentorship, and community-of-practice structures among nursing staff.

Note. Domains were consolidated from an initial set of 24 candidates identified from reviewed theoretical frameworks (JD-R, WHO Healthy Workplace Framework, Maslach Burnout Inventory, Professional Quality of Life framework, PERMA, American Nurses Credentialing Center Magnet Recognition Program, OECD Well-being Framework, International Labour Organization Decent Work Agenda) during an earlier conceptual-development phase of this project.

Structural Group	Domain	Operational Definition
Structural Resource – Community/Culture	Diversity and Inclusion	Equitable treatment and representation across gender and other demographic characteristics within the nursing workforce.
Career and Economic Architecture	Financial Wellbeing and Remuneration	Adequacy, timeliness, and sector-equity (public vs. private) of nurse compensation relative to cost of living.
Career and Economic Architecture	Job Security	Contract permanency, regularisation status, and protection against arbitrary termination.
Career and Economic Architecture	Career Progression and Continuing Professional Development	Availability of structured promotion pathways and access to continuing nursing education/certification.
Career and Economic Architecture	Digital Readiness	Nurse access to, and proficiency with, digital health infrastructure, including electronic health records and the Health Professional Registry.
Individual Ill-Being	Burnout	Emotional exhaustion, depersonalisation, and reduced personal accomplishment.
Individual Ill-Being	Compassion Fatigue / Secondary Traumatic Stress	Distress arising from prolonged exposure to patients' suffering and trauma.
Positive Functioning	Positive Emotion and Engagement	Experience of joy, hope, and absorption/flow in clinical work.
Positive Functioning	Relationships and Social Connectedness	Individually experienced quality of professional relationships and sense of connection at work.
Positive Functioning	Meaning and Professional Value	Sense that one's nursing work serves a purpose larger than oneself and is valued by society.
Positive Functioning	Accomplishment and Compassion Satisfaction	Sense of achievement and mastery in clinical work, combined with positive satisfaction derived from helping others well.
Work–Life	Work–Life Integration	Perceived balance and compatibility between clinical work demands and personal/family life.

Note. Domains were consolidated from an initial set of 24 candidates identified from reviewed theoretical frameworks (JD-R, WHO Healthy Workplace Framework, Maslach Burnout Inventory, Professional Quality of Life framework, PERMA, American Nurses Credentialing Center Magnet Recognition Program, OECD Well-being Framework, International Labour Organization Decent Work Agenda) during an earlier conceptual-development phase of this project.

Data-Source Identification: A Two-Phase Strategy

Open-data availability was assessed for all 23 domains in two sequential phases, and this distinction is preserved throughout the manuscript rather than presented as uniform search effort across domains.

Phase 1 (desk-based evidence mapping) consisted of a structured literature and documentation review, conducted during the conceptual-development stage of this project, to identify whether any open administrative or survey data source could plausibly exist for each domain in the Indian context, and to make an initial judgement of data availability (rated Adequate, Partial, or Inadequate at that stage). For domains judged to be inherently primary-survey or self-report psychological constructs with no conceivable administrative proxy (for example, burnout, compassion fatigue, and the four PERMA-derived domains), this Phase 1 judgement was subsequently tested with a live, independent search.

Phase 2 (live verification) consisted of a fresh, independent, dated search and access attempt, conducted for a subset of nine domains for which Phase 1 had identified at least a plausible candidate open-data source: Workload and Staffing Adequacy, Occupational Safety and Injury/Infection Protection, Patient Safety Culture, Recognition, Digital Readiness, Shift Work and Scheduling Intensity, Diversity and Inclusion, Financial Wellbeing and Remuneration, and Job Security. Phase 2 involved direct web-based search and retrieval, government-portal navigation. The remaining 14 domains were not independently re-searched in Phase 2; their final classification (Table 2) therefore rests on the original Phase 1 desk-based judgement, and this is stated explicitly against each such domain rather than implied to carry equivalent evidentiary weight to the Phase-2-verified domains.

Table 2
23-Domain Open-Data Feasibility Matrix (Condensed) — full matrix with all 11 extraction fields provided as Supplementary Material S1

#	Domain	Indicator / Construct	Phase 2 Live Search?	Resolution Achieved	Classification	Basis
1	Workload & Staffing Adequacy	Vacancy Rate (PHC + CHC); Nurse-Population Ratio	Yes	36/36 states (Vacancy); 20–31/36 (NPR, by time point)	Partially Adequate	Real primary data, near-complete coverage, but rural public-sector only; NPR has documented QA exclusions.
2	Shift Work & Scheduling Intensity	Avg. Weekly Hours (PLFS, NCO)	Yes	National only, broad category	Access-Restricted	Published PLFS tables cannot isolate nursing; microdata registration-gated.
3	Workplace Violence Exposure	(none constructed)	No (Phase 1 only)	N/A	No Publicly Accessible Data Identified	No dataset disaggregates violence by victim occupation; not re-searched in Phase 2.
4	Occupational Safety & Injury/Infection Protection	NQAS Certification Rate	Yes	36/36 states	Partially Adequate	Real, complete coverage, but facility accreditation proxy, not nursing-specific safety outcome.
5	Leadership Support	(none constructed)	No (Phase 1 only)	N/A	No Publicly Accessible Data Identified	Primary-survey construct; no administrative proxy conceived.
6	Professional Autonomy	(none constructed)	No (Phase 1 only)	N/A	No Publicly Accessible Data Identified	Regulatory text describes entitlement, not measured practice.
7	Organisational Culture & Ethical Climate	(none constructed)	No (Phase 1 only)	N/A	No Publicly Accessible Data Identified	Primary-survey construct; no administrative proxy conceived.

Note. *"Phase 2 Live Search?" distinguishes domains independently re-verified with a fresh, dated search in this study (Yes) from domains whose classification rests on the original Phase 1 desk-based literature assessment only (No). Shading: yellow = Partially Adequate; orange = Insufficient; red = Access-Restricted; grey = No Publicly Accessible Data Identified. No domain met the pre-specified Adequate threshold.*

#	Domain	Indicator / Construct	Phase 2 Live Search?	Resolution Achieved	Classification	Basis
8	Recognition	Nightingale Award Rate	Yes	National only (15/yr)	Insufficient	Real, verified, but too sparse to normalise across 36 states.
9	Patient Safety Culture	Facility Quality-Certification Coverage (shared NQAS)	Yes	36/36 states	Partially Adequate	Same source as Domain 4, explicit shared-source design; structural proxy, not culture measurement.
10	Physical Health-Promoting Resources	(none constructed)	No (Phase 1 only)	N/A	No Publicly Accessible Data Identified	No occupation-specific provision dataset identified.
11	Social Support	(none constructed)	No (Phase 1 only)	N/A	No Publicly Accessible Data Identified	Primary-survey construct; no administrative proxy conceived.
12	Diversity & Inclusion	Gender Composition (PLFS/NIC)	Yes	National only, not nursing-specific	Access-Restricted	Published tables don't isolate health/nursing; 5 uploaded state-wise files rejected (Decision Log).
13	Financial Wellbeing & Remuneration	Pay Scale Ratio (Central + 3-state pilot)	Yes	3/36 states (Tier-2)	Insufficient	Pay-matrix level labels not cross-state comparable (documented finding).
14	Job Security	Regular Employment Share (PLFS)	Yes (by analogy)	National only, broad category	Access-Restricted	Same structural PLFS barrier as Domains 2 & 12.
15	Career Progression & CPD	(none constructed)	No (Phase 1 only)	N/A	No Publicly Accessible Data Identified	CPD mandates public; participation statistics not centrally published.
16	Digital Readiness	HPR Enrolment Coverage	Yes	National aggregate only	Access-Restricted	Real national figure; state-wise dashboard

Note. *"Phase 2 Live Search?" distinguishes domains independently re-verified with a fresh, dated search in this study (Yes) from domains whose classification rests on the original Phase 1 desk-based literature assessment only (No). Shading: yellow = Partially Adequate; orange = Insufficient; red = Access-Restricted; grey = No Publicly Accessible Data Identified. No domain met the pre-specified Adequate threshold.*

#	Domain	Indicator / Construct	Phase 2 Live Search?	Resolution Achieved	Classification	Basis
						blocked by bot detection.
17	Burnout	(none constructed)	No (Phase 1 only)	N/A	No Publicly Accessible Data Identified	Only scattered single-state studies; no repeated national surveillance.
18	Compassion Fatigue / STS	(none constructed)	No (Phase 1 only)	N/A	No Publicly Accessible Data Identified	Primary-survey (ProQOL) construct; no administrative proxy conceived.
19	Positive Emotion & Engagement	(none constructed)	No (Phase 1 only)	N/A	No Publicly Accessible Data Identified	Primary-survey (PERMA) construct; no administrative proxy conceived.
20	Relationships & Social Connectedness	(none constructed)	No (Phase 1 only)	N/A	No Publicly Accessible Data Identified	Primary-survey (PERMA) construct; no administrative proxy conceived.
21	Meaning & Professional Value	(none constructed)	No (Phase 1 only)	N/A	No Publicly Accessible Data Identified	Primary-survey (PERMA) construct; no administrative proxy conceived.
22	Accomplishment & Compassion Satisfaction	(none constructed)	No (Phase 1 only)	N/A	No Publicly Accessible Data Identified	Primary-survey (PERMA/ProQOL) construct; no administrative proxy conceived.
23	Work–Life Integration	(none constructed)	No (Phase 1 only)	N/A	No Publicly Accessible Data Identified	PLFS hours-worked only an indirect, partial proxy already captured under Domain 2.

Note. *"Phase 2 Live Search?" distinguishes domains independently re-verified with a fresh, dated search in this study (Yes) from domains whose classification rests on the original Phase 1 desk-based literature assessment only (No). Shading: yellow = Partially Adequate; orange = Insufficient; red = Access-Restricted; grey = No Publicly Accessible Data Identified. No domain met the pre-specified Adequate threshold.*

Feasibility Adequacy Framework

Because a binary feasible/infeasible judgement would conflate several methodologically distinct situations, an explicit five-category classification framework was defined and applied consistently across all 23 domains. Two dimensions were assessed jointly for every domain: (a) construct-source existence — whether any plausible open administrative or survey data source exists in principle for the underlying construct in the Indian context, as opposed to a construct that is inherently a primary-survey or self-report measure with no conceivable administrative proxy; and (b) access outcome — for domains where a candidate source was identified, what was actually achieved when access, nursing-specific disaggregation, and state-level geographic resolution were attempted.

Combining these two dimensions produced five mutually exclusive final classifications, defined as follows and applied uniformly:

Adequate: a real, independently verified primary source was accessed, providing direct (non-proxy) measurement of the construct, covering at least 30 of 36 Indian states and Union Territories (≥ 83%), and current within one publication cycle of the source's own release schedule.

Partially Adequate: a real, independently verified primary source was accessed, but the resulting indicator did not meet the Adequate threshold on at least one dimension — specifically, where the indicator is a proxy rather than a direct construct measurement, where geographic coverage fell below the 83% threshold, or where population specificity was incomplete (for example, an all-healthcare-cadre figure rather than a nursing-specific figure).

Insufficient: a real, independently verified primary source was accessed and the data were nursing-specific and appropriately resolved, but the resulting dataset was judged statistically or comparably inadequate for index construction — for example, because the population of countable events was too small to support cross-state normalisation, or because a documented structural finding showed that superficially comparable values (for example, government pay-scale “level” labels) were not in fact comparable across states.

Access-Restricted: a specific data source is known or strongly believed to exist — typically because a national aggregate figure derived from the same source is publicly available, or because the source's existence is documented in the source's own published methodology — but state-level or nursing-specific disaggregation could not be retrieved within this study's tool and access constraints (for example, registration-gated microdata repositories, or dashboards protected by automated bot-detection systems).

No Publicly Accessible Data Identified: no plausible open administrative or survey data source was identified for the construct, either because none is known to exist in the Indian data landscape or because the construct is inherently a primary-survey measure (for example, a PERMA subscale) for which no administrative proxy has been proposed in the literature reviewed.

This classification was applied at the level of the constituent indicator where more than one indicator was attempted for a domain (for example, Occupational Safety and Patient Safety Culture both draw on National Quality Assurance Standards [NQAS] accreditation data as a shared, explicitly acknowledged proxy source;

see Results for the methodological rationale for this shared-source design and its implications for indicator independence).

The 23-Domain Feasibility Matrix

For every domain, eleven structured fields were extracted and recorded to produce a reproducible feasibility matrix (Table 2): domain name; underlying theoretical construct; intended indicator(s), where one was specified; the ideal data requirement against which feasibility was judged; named sources searched or consulted; whether a Phase 2 live search was conducted (yes/no, as defined above); the geographic resolution actually achieved; the population specificity actually achieved (that is, whether the resolved data were nursing-specific, all-healthcare-cadre, or broader); the final five-category classification; and a documented reason or basis for that classification, written so as to be independently checkable against the cited source. The complete matrix is provided as Supplementary Material.

Pilot Indicator Selection, Extraction, and Quality Assurance

Three domains met the Adequate or Partially Adequate threshold with sufficient state-level coverage to warrant full extraction as proof-of-concept pilot indicators: Workload and Staffing Adequacy (Public-Sector Nursing Staff Vacancy Rate and Nurse-Population Ratio), Occupational Safety and Injury/Infection Protection (NQAS Certification Rate), and Patient Safety Culture (using the same NQAS source, as a distinct, explicitly acknowledged proxy). These three domains are reported as pilot, proof-of-concept indicators, demonstrating that the study's extraction and quality-assurance methodology functions correctly where adequate source data exist; they are not presented, individually or collectively, as a completed National Nursing Wellbeing Index.

Data for the Public-Sector Nursing Staff Vacancy Rate were extracted directly, by manual table transcription, from Tables 37 and 76 of Health Dynamics of India (Infrastructure & Human Resources) 2023-24, published by the National Health Systems Resource Centre and the Ministry of Health and Family Welfare, Government of India [15], reporting Required, Sanctioned, In Position, Vacant, and Shortfall nursing-staff counts at Primary Health Centres and Community Health Centres in rural areas, as on 31 March 2024, for all 36 states and Union Territories. The indicator was calculated as (Sanctioned − In Position) / Sanctioned × 100, combined across the two facility types, consistent with the operational definition specified in an earlier phase of this project. States and Union Territories for which either facility type was recorded as ‘Not Applicable’ in the source were handled explicitly — excluded from the combined calculation where both facility types were Not Applicable, or calculated from the single available facility type with this handling documented — rather than treated as zero.

Data for the Nurse-Population Ratio were extracted from three primary government sources spanning four time points (December 2020, December 2022, and two points in 2025) [16, 17, 18, 4, 5], including Indian Nursing Council registration figures reported in Government of India parliamentary replies and the Indian Nursing Council Annual Report 2024-25. Cross-source and cross-time-point quality assurance was performed for every state value, following the principle that primary sources may themselves contain

internal errors that must be identified and documented rather than silently smoothed over. Where a state value showed an implausible year-on-year change (for example, a single-year collapse inconsistent with any plausible attrition mechanism), the value was flagged and, where a documented alternative explanation was available (row-duplication in the source table, or a footnoted data year predating the nominal column year), the state was either excluded from that time point or the flagged explanation was recorded alongside the retained value. This quality-assurance process identified five states with documented data-quality concerns and two further states with an unresolved inter-source numerical conflict, all reported in full in the Results and Supplementary Material rather than adjusted without disclosure.

Data for the NQAS Certification Rate were extracted from a National Health Systems Resource Centre government presentation (May 2025) reporting certified-facility counts for all 36 states and Union Territories [19].

All three pilot indicators were rescaled to a common 0–100 range using min–max normalisation across reporting units, following the same normalisation principle used in the United Nations Development Programme's Human Development Index [20]; for indicators where a higher raw value represents worse wellbeing (vacancy rate), the normalised score was inverted so that 100 uniformly represents the most favourable end of the scale. No further aggregation, weighting, or composite scoring across these three pilot indicators was performed, consistent with the study's decision not to report a composite NNWI score at this stage of development.

Feasibility Testing of the Periodic Labour Force Survey as a Candidate Data Source

Because the Periodic Labour Force Survey (PLFS), conducted by the National Statistical Office, Ministry of Statistics and Programme Implementation, was identified in Phase 1 as a plausible candidate source for four domains (Shift Work and Scheduling Intensity, Diversity and Inclusion, Financial Wellbeing and Remuneration, and Job Security), its feasibility was tested directly and systematically for one domain, Financial Wellbeing and Remuneration, before being extended by documented structural analogy to the remaining three. A 14-criterion test protocol was applied, assessing: the relevant PLFS round and published table availability; the National Classification of Occupations (NCO) code applicable to nursing; the ability to isolate nurses within published tables; state-level occupational disaggregation; earnings, employment-status, and hours-worked variable availability; sample size; whether unit-level microdata registration was required; whether such microdata were realistically accessible within this study's tool constraints; whether resulting estimates would be statistically defensible; and applicable NCO classification limitations. Each domain was classified on a four-level scale (A, directly usable; B, usable after defensible derivation; C, usable only at national or regional level; D, not suitable), following a protocol specified in advance of testing.

Data Provenance and Source-Rejection Protocol

During the course of this study, several externally supplied datasets (uploaded spreadsheets purporting to contain state-wise nurse salary, gender-composition, or employment-security data) were evaluated against the same evidentiary standard applied to all other sources in this study: traceability to a named, checkable primary source. Datasets found to be self-described as modelled or indicative, or found to contain no traceable source attribution on direct inspection, were formally rejected and are not used as evidence anywhere in this manuscript. Every rejection, and the specific reasoning for it, was logged contemporaneously in a decision log (Supplementary Material) to prevent inadvertent reintroduction of rejected material. Where a specific, narrow, checkable factual claim was embedded within an otherwise-rejected dataset (for example, a stated Central Government recruitment quota), that individual claim was independently re-verified against its own primary source before being accepted; the surrounding, non-verifiable dataset was not thereby validated. This claim-level rather than file-level evaluation principle was applied consistently and is documented in full in the Supplementary decision log.

Reporting Guideline

No existing EQUATOR Network reporting guideline precisely matches the design of this study, which combines conceptual framework development with a public-data feasibility assessment rather than corresponding to an interventional, observational-epidemiological, or systematic-review design in the conventional sense. In the absence of a more specific applicable guideline, reporting transparency principles for the descriptive data-availability audit components of this study were adapted, where applicable, from the STROBE Statement for observational studies [21].

Ethical Considerations

This study did not involve human participants, primary data collection, or the use of identifiable individual-level data; all data analysed were derived from publicly available, aggregate, secondary government, parliamentary, and institutional sources, as cited throughout this manuscript. Institutional ethics committee approval was therefore not required.

RESULTS

Overview of Data Availability Across the 23 Domains

Of the 23 candidate NNWI-India domains, none met the pre-specified Adequate classification (real, direct, non-proxy measurement covering ≥ 30 of 36 states and Union Territories, current within one publication cycle). Three domains were classified Partially Adequate (Workload and Staffing Adequacy; Occupational Safety and Injury/Infection Protection; Patient Safety Culture); two were classified Insufficient (Recognition; Financial Wellbeing and Remuneration); four were classified Access-Restricted (Shift Work and Scheduling Intensity; Diversity and Inclusion; Job Security; Digital Readiness); and 14 were classified No Publicly Accessible Data Identified. The complete domain-by-domain classification, with named sources and documented reasoning, is provided in Table 2 and Supplementary Material S1.

Of the 23 domains, 9 (39%) underwent an independent, dated, live search and access attempt in this study (Phase 2); the remaining 14 (61%) — predominantly the individual ill-being and positive-functioning domains derived from the Maslach Burnout Inventory [11], the Professional Quality of Life framework [12], and PERMA [8] — were not independently re-searched and retain their classification from the original conceptual-development phase (Phase 1) of this project. This distinction is preserved throughout and should not be read as implying equivalent search effort across all 23 domains.

Pilot Indicator 1: Workload and Staffing Adequacy

Public-Sector Nursing Staff Vacancy Rate

Data were extracted from Health Dynamics of India (Infrastructure & Human Resources) 2023-24 [15], Tables 37 and 76, reporting nursing-staff Required, Sanctioned, In Position, Vacant, and Shortfall counts for Primary Health Centres (PHCs) and Community Health Centres (CHCs) in rural areas, as on 31 March 2024, for all 36 states and Union Territories. Combining the two facility types nationally, 93,995 nursing posts were sanctioned against 72,225 posts in position, yielding a national combined vacancy rate of 23.16%.

State-level combined vacancy rates ranged from a deficit of − 2.14% (Nagaland, reflecting a source-confirmed surplus at Community Health Centres) to 60.15% (Bihar), with a median of 11.77% across 34 states/Union Territories with usable data (mean 16.81%). Four states/Union Territories (Arunachal Pradesh, Mizoram, Tripura, Delhi) recorded 0% (full staffing at reported posts); two states (Madhya Pradesh, − 1.46%; Nagaland, − 2.14%) recorded a net surplus, independently confirmed against the source's own surplus (‘*’) notation rather than treated as a data error. Chandigarh was excluded from the combined calculation because both facility types were recorded as ‘Not Applicable’ in the source; Delhi's combined figure reflects PHC data only, because Delhi's CHC entry was recorded as ‘Not Applicable.’ The five highest-vacancy states/Union Territories were Bihar (60.15%), Odisha (54.51%), Jharkhand (49.17%), Uttar Pradesh (44.09%), and Punjab (43.53%).

Nurse-Population Ratio

Nurse-population ratio data were compiled from four government primary-source time points: two Rajya Sabha parliamentary replies (data as on 31 December 2020 and 31 December 2022) [16, 17], the Indian Nursing Council Annual Report 2024-25 [18], and a further Rajya Sabha reply reported to have been answered on 21 July 2026 (data as on 31 December 2025), independently corroborated across two separate news reports directly quoting the parliamentary record [4, 5]. The national nurse-population ratio across this series rose from below the World Health Organization-recommended benchmark of 3.0 per 1,000 population in earlier years to 2.60 per 1,000 (2.45 per 1,000 for Registered Nurses and Registered Midwives specifically) as on 31 December 2025, with a reported national total of 46.02 lakh registered nursing personnel (34.88 lakh Registered Nurses/Registered Midwives, 10.59 lakh Auxiliary Nurse Midwives, and approximately 0.55 lakh Lady Health Visitors).

A structured quality-assurance protocol, applying outlier and internal-consistency screening to every state value across time points, identified data-quality problems requiring explicit action in 5 of 30 comparable states/Union Territories in the three-source trend: Jammu and Kashmir and Rajasthan's nominal most-

recent columns were found, via the source's own footnotes, to report data years earlier than the preceding time point; Jharkhand's most-recent figures were identical to the adjoining Jammu and Kashmir row, consistent with a table-extraction duplication error; Maharashtra's most-recent Auxiliary Nurse Midwife count showed an approximately 97% single-period decline inconsistent with any plausible attrition mechanism; and Odisha's most-recent figure was footnoted as January 2023 data showing an internally inconsistent decline from a source value recorded eleven months earlier. For each of these five, the earlier, verified time-point value was retained as the working figure rather than the nominally more recent but unreliable entry. A further five states (Karnataka, Kerala, Madhya Pradesh, Punjab, Uttar Pradesh) showed large increases from a baseline that was identical across two successive source reports (indicating a stale, unrevised administrative figure); these were flagged for verification but not excluded, since an increase from a genuinely stale baseline is not, by itself, evidence of error.

The addition of the fourth, most recent time point provided further, independent quality-assurance value. It corroborated the direction (though not the excluded magnitude) of Karnataka's previously flagged increase, and it independently supported two of the five original exclusion decisions: Jammu and Kashmir's data were confirmed, in the Ministry's own newer reply, to remain unavailable beyond 31 December 2021, and Maharashtra's newer reported ratio was consistent with the pre-exclusion 2022 figure rather than the excluded, implausible 2023-labelled figure. The fourth time point also surfaced two new, unresolved inter-source conflicts not previously identified: Telangana and Bihar both showed lower nurse counts in the newer source than in the Indian Nursing Council Annual Report figure for the same state, a direction inconsistent with ordinary workforce growth and not attributable to a single-source error, since the newer figures were independently corroborated across two separate reports. These two conflicts are reported as open and unresolved rather than adjudicated by assumption.

Pilot Indicator 2: Occupational Safety and Patient Safety Culture (Shared Source)

National Quality Assurance Standards (NQAS) facility certification data, reported in a National Health Systems Resource Centre government presentation dated 20 May 2025 [19], provided complete coverage of all 36 states and Union Territories — the only pilot indicator with full geographic coverage. State-level certification percentages ranged from 0% to 94% (Dadra and Nagar Haveli and Daman and Diu), with a median of 15.5% and a mean of 19.5%.

This dataset was used, by explicit and disclosed design, as the evidentiary basis for two conceptually distinct domains: Occupational Safety and Injury/Infection Protection, and Patient Safety Culture. This is not the presentation of two independent datasets; both indicators draw on the same underlying facility accreditation source, because NQAS assessment criteria incorporate both physical/infection-control safety standards (relevant to Occupational Safety) and incident-reporting and non-punitive error-culture standards (relevant to Patient Safety Culture) within a single certification process. Both indicators are therefore classified Partially Adequate rather than Adequate: certification status indicates that a facility has been assessed against a defined standard at least once, which is a proxy for underlying safety and culture conditions rather than a direct, continuous measurement of either construct, and a facility's certification

status does not distinguish which specific criteria (safety versus culture) drove its rating. Because both indicators are derived from an identical source with perfect correlation by construction, they should not be treated as independent evidence when interpreting any future composite scoring that might draw on both; this is stated here as a limitation of the shared-source design rather than resolved by arbitrarily assigning different weights to an undifferentiated single source.

Domains Classified Insufficient

Recognition

The National Florence Nightingale Award, administered by the Ministry of Health and Family Welfare, recorded 15 recipients nationally in 2025 [22]. A home state could be identified from accessible secondary reporting for 7 of the 15 recipients, distributed across 7 different states/Union Territories (one recipient each). Even with complete attribution of all 15 recipients to a home state, a single year's award list distributed across 36 states/Union Territories would leave approximately 29 states/Union Territories at zero, which would not support statistically defensible cross-state normalisation. This domain is therefore classified Insufficient: a real, traceable, verified data source was accessed, but the resulting dataset does not support the intended indicator without either aggregating multiple years of award data or explicitly reporting recipient counts as a descriptive, non-normalised statistic.

Financial Wellbeing and Remuneration

A real, verified national benchmark was located for Central Government nursing posts: the 7th Central Pay Commission pay matrix places the Staff Nurse post at Level-7 (₹44,900–142,400 basic pay, pre-revised Pay Band-2 ₹9,300–34,800 plus Grade Pay ₹4,600, Group B), per Ministry of Finance notification dated 25 July 2016 [23]. Because the large majority of India's public-sector nurses are State Government rather than Central Government employees, each governed by a separate State Pay Commission, a targeted pilot search was conducted for three large states (Uttar Pradesh, Maharashtra, Tamil Nadu) to assess whether state-level pay data could support a comparable indicator.

Uttar Pradesh was found to have adopted the Central Government's 7th Pay Commission pay matrix directly for its Staff Nurse cadre (Level-7, identical rupee values to the Central scale), confirmed via convergent citation of a specific official recruitment advertisement number (UPPSC advertisement A-3/E-1/2023) across six independent secondary sources. Maharashtra and Tamil Nadu were each found to maintain independently structured state pay matrices — Maharashtra's Staff Nurse post corresponds to level S-13 of a 31-level state-specific matrix (S-1 to S-31), and Tamil Nadu's corresponds to a nominal ‘Level-7’ within its own 32-level matrix (the Tamil Nadu Revised Pay Rules, 2017) — in both cases with rupee values that differ from the Central Government's Level-7 despite partially overlapping nomenclature. This finding — that pay-matrix ‘level’ labels are not consistently comparable across Indian states — was independently confirmed for two of the three pilot states and is reported as a substantive methodological finding of this study (see Discussion). Because of this confirmed non-comparability, and because state-level coverage remains at 3 of 36 states/Union Territories at a lower (Tier 2, convergent-secondary-source) evidentiary confidence than the study's primary-sourced pilot indicators, Financial Wellbeing and Remuneration is classified Insufficient

rather than Partially Adequate: real data exist for a subset of states, but a naive 36-state indicator built by comparing pay-matrix level labels across states, without state-by-state conversion to actual rupee basic pay, would produce a systematically misleading ranking.

Domains Classified Access-Restricted

Four domains were classified Access-Restricted, meaning a specific source is known or strongly believed to exist but could not be resolved to state-level, nursing-specific data within this study's tool and access constraints.

Shift Work and Scheduling Intensity, Diversity and Inclusion, and Job Security share a common structural barrier, formally tested for the related Financial Wellbeing domain and extended by documented analogy to these three: the Periodic Labour Force Survey (PLFS), conducted by the National Statistical Office, publishes industry- and occupation-distribution tables only at broad category level (for example, a single residual ‘other services’ category subsuming all health-sector activity), with no state-level breakdown in the standard published series. This was confirmed directly by inspecting a Ministry of Statistics and Programme Implementation-sourced aggregation of PLFS industry-distribution tables [24]. Nursing-specific disaggregation exists, in principle, only within PLFS unit-level microdata, which is distributed by the National Statistical Office on a registration basis and was not accessible within this study's tool configuration. Applying the pre-specified 14-criterion PLFS feasibility test protocol (Table 3) to Financial Wellbeing and Remuneration as the designated test domain, PLFS was classified D (not suitable from published tables, this study's access) on the pre-specified four-level scale; this classification was extended by documented structural analogy, rather than independent re-testing, to Shift Work and Scheduling Intensity and Job Security, since both depend on the identical published-table structure.

Table 3
PLFS Feasibility Test — Financial Wellbeing and Remuneration (Designated Test Domain)

#	Criterion	Finding
1	**Appropriate PLFS round**	Annual PLFS rounds (National Statistical Office); most recent published Annual Reports reviewed. No round-specific barrier identified beyond findings below.
2	**Published tables available**	Yes — PLFS Annual Reports publish standard industry-distribution, employment-status, and earnings tables, but at broad category level only (see #3).
3	**Relevant NCO classification**	Nursing Professionals correspond to NCO-2015 code 2221 in principle. Standard published PLFS tables do not report at individual 4-digit NCO code level — only broad industry/occupation divisions.
4	**Ability to identify nurses in published tables**	No. Confirmed by direct inspection of a Ministry of Statistics and Programme Implementation-sourced aggregation of published industry-distribution tables; health activities (NIC 86) are not reported as a separate row in any published series located.
5	**State-level occupational disaggregation**	Not available for nursing specifically in published tables (national, rural/urban × gender only).
6	**Earnings/remuneration availability**	PLFS collects earnings by NCO code in principle; nursing-specific published tables were not located — same barrier as #3/#4.
7	**Employment-status variables**	PLFS collects status-in-employment (regular/casual/contract) by NCO code in principle; same access barrier applies.
8	**Hours-worked variables**	Published by broad occupation/industry category only; not nursing-specific.
9	**Sample size**	Not assessable from published tables — no NCO-2221-specific N is reported.
10	**Whether microdata registration/access is required**	Yes. PLFS unit-level microdata is distributed by the National Statistical Office on a registration basis.
11	**Whether microdata are realistically accessible in this study**	No. Registration-gated microdata repositories were not reachable within this study's tool configuration.
12	**Whether estimates would be statistically defensible if microdata were accessed**	Not determinable without access. Nursing-specific state-level cell sizes are plausibly small within an already-sampled survey, which is flagged as an open question for any future phase with microdata access.

Classification: Financial Wellbeing and Remuneration = D (Not suitable, from published tables and this study's access). Fails criteria #4, #5, #9. Could potentially become C (regional/national only) or B (usable after defensible derivation) if unit-level microdata access were obtained in a future phase — this is an access limitation of the current study, not proof that PLFS microdata itself is inadequate.

#	Criterion	Finding
13	**NCO classification limitations**	NCO-2015 separates ‘Nursing Professionals’ (2221) from ‘Nursing Associate Professionals’ (3221, includes ANM/LHV-type roles); which codes constitute ‘nurses’ for NNWI-India purposes has not yet been defined or documented.
14	**Whether the same limitations affect the other PLFS-dependent domains**	Yes for Financial Wellbeing and Remuneration (directly tested) and Diversity and Inclusion (independently confirmed via the NIC-industry route). Extended by documented structural analogy, not independent re-testing, to Shift Work and Scheduling Intensity and Job Security.
Classification: Financial Wellbeing and Remuneration = D (Not suitable, from published tables and this study's access). Fails criteria #4, #5, #9. Could potentially become C (regional/national only) or B (usable after defensible derivation) if unit-level microdata access were obtained in a future phase — this is an access limitation of the current study, not proof that PLFS microdata itself is inadequate.		

Digital Readiness was classified Access-Restricted on separate grounds: a real national aggregate figure for Health Professional Registry enrolment under the Ayushman Bharat Digital Mission is publicly reported (in excess of 190,000 registered health professionals as of June 2023, alongside 208,000 verified health facilities) [25, 26], but state-level, role-specific (nurse-only) figures exist only behind a live public dashboard that returned an automated bot-detection block on direct access attempts in this study.

Domains Classified No Publicly Accessible Data Identified

Fourteen domains were classified No Publicly Accessible Data Identified: Workplace Violence Exposure; Leadership Support; Professional Autonomy; Organisational Culture and Ethical Climate; Physical Health-Promoting Resources; Social Support; Career Progression and Continuing Professional Development; Burnout; Compassion Fatigue/Secondary Traumatic Stress; and the four PERMA-derived positive-functioning domains (Positive Emotion and Engagement; Relationships and Social Connectedness; Meaning and Professional Value; Accomplishment and Compassion Satisfaction); and Work–Life Integration. As stated above, none of these 14 domains underwent an independent Phase 2 live search in this study; their classification rests on the original Phase 1 desk-based literature assessment, which judged each to be either a construct with no conceivable open administrative proxy (the individual ill-being and positive-functioning constructs, which are inherently primary-survey/self-report measures) or a construct for which no dataset was identified despite a documented, if not independently re-verified, search of plausible candidate sources (for example, national crime statistics for Workplace Violence Exposure, found not to be disaggregated by victim occupation in any published Indian source reviewed).

Data Provenance: Externally Supplied Datasets

Six externally supplied datasets, purporting to contain state-wise nurse salary, gender-composition, or employment-security data, were evaluated against this study's evidentiary standard during the course of the project. All six were found, on direct inspection, either to be explicitly self-described by their own source as modelled or indicative rather than empirical, or to contain no traceable attribution to a checkable primary source, and were formally rejected; none contributed any state-wise numerical value to this manuscript. Within these rejected datasets, two narrow, specific, checkable factual claims were identified and

independently re-verified against their own primary sources, and are reported in the Discussion as accepted, standalone policy findings distinct from the rejected surrounding data: a private-sector nurse salary pay-parity recommendation from a Supreme Court of India-directed Expert Committee, independently confirmed via a Rajya Sabha parliamentary record [27] and a Delhi High Court judgment [28]; and an 80% female/20% male recruitment quota for Nursing Officer posts at the All India Institute of Medical Sciences, independently confirmed directly from the institution's own official recruitment notification [29]. Full reasoning for every acceptance and rejection decision is documented in Supplementary Material S2 (data provenance decision log).

DISCUSSION

Principal Findings

This study set out to answer a single question: to what extent can a multidimensional National Nursing Wellbeing Index for India be operationalised using currently available publicly accessible data? The answer, stated directly, is: partially, and unevenly. Of 23 conceptually justified domains, none met a pre-specified high-confidence Adequate threshold; three domains supported Partially Adequate pilot indicators with near-complete or complete state coverage; two domains yielded real, verified data that was nonetheless statistically or structurally insufficient for cross-state scoring; four domains were blocked by documented, specific access barriers rather than an absence of underlying data; and 14 domains, mostly individual-level psychological constructs, had no identified open-data pathway at all. This pattern is itself the principal finding of this study, not a preliminary step toward one.

Conceptual Validity Versus Empirical Feasibility

A central methodological distinction organises the interpretation of these findings, and it is worth stating explicitly rather than leaving implicit: the conceptual validity of the 23-domain NNWI-India framework and the empirical feasibility of measuring each domain from currently available Indian open data are two separate questions, and this study's findings speak almost entirely to the second, not the first.

The theoretical architecture underlying domain selection — integrating the Job Demands–Resources model's demand/resource structure [9, 10], the WHO Healthy Workplace Framework's four avenues of influence [1], and PERMA's positive-functioning counterweight [8] — was not tested empirically in this study and is not called into question by this study's findings. A domain such as Burnout, Leadership Support, or Meaning and Professional Value was classified No Publicly Accessible Data Identified because no administrative proxy for a primary-survey psychological construct exists in India's current open-data landscape, not because the construct is theoretically weak, clinically unimportant, or impossible to measure in principle. International literature, including the meta-analytic evidence on nurse burnout prevalence [2] and India-specific single-state evidence [3], demonstrates clearly that these constructs are measurable — they simply are not measurable at present from open administrative data at national or state scale in India, which is a data-infrastructure finding, not a construct-validity finding. This distinction matters for how the 14 No-Publicly-Accessible-Data domains should be read by policymakers and by future researchers: their

absence from any near-term open-data NNWI is a statement about what exists in public data repositories today, not a statement about what matters to nursing wellbeing.

Comparison with Existing Workforce and Wellbeing Measurement Approaches

The individual frameworks synthesised into NNWI-India's architecture were each designed for a different level of analysis and a different measurement modality. The Maslach Burnout Inventory [11] and Professional Quality of Life framework [12] are individual-level, primary-survey instruments; the JD-R model [9, 10] and WHO Healthy Workplace Framework [1] are organisational-level frameworks intended for workplace-level application; and population-level instruments such as the OECD Well-being Framework were built for statistical systems in OECD member states, of which India is not one. None of these was designed to function as an open-data, administratively sourced, state-comparable index, and this study's findings should not be read as a critique of any of them — rather, as confirmation that the specific combination NNWI-India attempts (multidimensional, state-level, open-data-only) has not previously been achieved for the Indian nursing workforce, and this study demonstrates concretely why.

India's own precedent for a state-comparable, open-data composite index in the health sector — the NITI Aayog State Health Index, developed jointly by NITI Aayog, the Ministry of Health and Family Welfare, and the World Bank, and first published in 2018 — draws its 24 indicators from health outcome, governance, and key-input administrative data streams that are collected specifically for that index's own annual reporting cycle, with a dedicated data-validation process involving direct state government sign-off [13]. NNWI-India, by contrast, was constructed entirely from data collected for other administrative purposes (workforce establishment records, parliamentary replies, accreditation registries) and repurposed for index construction. The comparative difficulty this study encountered in achieving comparable coverage is consistent with the interpretation that purpose-built administrative data collection, rather than repurposed secondary data alone, is what allows an index of the State Health Index's completeness; this is elaborated further below as a data-infrastructure implication rather than a limitation of this study's search methodology.

At the international level, the World Health Organization and International Council of Nurses' State of the World's Nursing reporting cycle identifies workplace violence protection and mental health support as areas where a large proportion of countries lack any protective measurement mechanism [7], a finding structurally consistent with this study's identification of Workplace Violence Exposure and the individual ill-being domains as unmeasurable from India's current open data — suggesting the gap identified here is not specific to India's data infrastructure alone, but reflects a broader, internationally documented under-measurement of these constructs at the workforce-monitoring level.

Methodological Findings: Structural Barriers in Indian Nursing Workforce Data

Beyond the domain-by-domain feasibility classification, this study identified two structural findings that extend beyond any single domain and are reported here as substantive methodological contributions in

their own right.

First, the Periodic Labour Force Survey, despite being a plausible candidate source for four domains (Financial Wellbeing and Remuneration, Shift Work and Scheduling Intensity, Diversity and Inclusion, and Job Security), was found, on direct and systematic testing, to be structurally incapable of supporting nursing-specific, state-level indicator construction from its published tables. This is not a finding that PLFS data are poor quality — the survey's unit-level microdata may well support exactly this kind of disaggregation — but rather that the standard published output tables aggregate occupation and industry to a level of generality (a single residual ‘other services’ category subsuming all health-sector activity) that makes nursing invisible as a distinct analytic category without registration-gated microdata access. Any future Indian nursing workforce research relying on PLFS for occupation-specific findings should anticipate this barrier and plan for microdata access from the outset, rather than assuming published tables will suffice.

Second, a three-state pilot investigation of government nurse pay scales (Uttar Pradesh, Maharashtra, Tamil Nadu) demonstrated that pay-matrix ‘level’ labels are not consistently comparable across Indian states. Uttar Pradesh has adopted the Central Government's 7th Pay Commission matrix directly, such that its Level-7 designation corresponds to identical rupee values as the Central Government scale; Maharashtra and Tamil Nadu, by contrast, each maintain independently structured, differently numbered state pay matrices, such that a nominally similar level label corresponds to different actual remuneration. This is a genuine, previously undocumented (in the sources reviewed for this study) comparability hazard for any future attempt to construct a national nurse remuneration indicator from administrative pay-scale data: an indicator built by comparing level labels across states, without state-by-state conversion to actual rupee basic pay, would produce a systematically misleading ranking that could pass superficial review while being substantively wrong. This finding is reported with appropriately bounded confidence — it rests on convergent secondary-source citation of specific official notification numbers for three states, not on direct reading of primary notification documents, which were not accessible within this study's tools — but the underlying structural mechanism (independent state pay commissions using independently numbered matrices) is a matter of public administrative record and is unlikely to be an artefact of this study's particular sources.

Policy-Relevant Findings Identified Outside the Core Feasibility Assessment

During the evaluation of externally supplied datasets for evidentiary quality (see Methods and Supplementary Material S2), two specific, narrow factual claims were identified, extracted from their unverifiable surrounding context, and independently re-confirmed against their own primary sources. Both are reported here as accepted findings distinct from, and not contributing to, this study's core feasibility classification, because both describe standing national policy rather than state-wise empirical data.

A Supreme Court of India-directed Expert Committee, convened by the Ministry of Health and Family Welfare, has recommended that private-sector nurse salaries be tiered to hospital bed capacity relative to

the corresponding State Government nurse salary: parity at hospitals with more than 200 beds, no more than 10% below at hospitals with more than 100 beds, no more than 25% below at hospitals with 50–100 beds, and a minimum of ₹20,000 per month at hospitals with fewer than 50 beds. This recommendation is documented in a Rajya Sabha parliamentary record [27] and has been the subject of Delhi High Court litigation concerning non-compliance [28]. Its relevance to this study is as a real, binding-in-principle regulatory benchmark for the private–public nurse wage gap that underlies the Financial Wellbeing domain; the existence of documented non-compliance litigation is itself evidence that formal policy machinery and measured, enforced outcomes are two distinct things worth monitoring separately, reinforcing this study's broader distinction between what exists on paper and what can currently be measured.

Separately, a Central Institute Body decision, in force since 27 July 2019 and confirmed as still active in the most recent (2026) recruitment cycle, reserves 80% of Nursing Officer recruitment seats at the All India Institute of Medical Sciences and participating Central Government institutes for female candidates and 20% for male candidates [29]. This is a real, Central-Government-level gender policy directly relevant to the Diversity and Inclusion domain, though it is a single-institution recruitment rule rather than population-level workforce composition data, and does not resolve this study's Access-Restricted classification for that domain.

Implications for Policymakers, Workforce Planners, and Professional Bodies

For the Ministry of Health and Family Welfare, the National Nursing and Midwifery Commission, and State Nursing Councils, this study's findings point toward a specific, actionable data-infrastructure agenda rather than a general call for more data. Three domains (Recognition, Career Progression and Continuing Professional Development, and Digital Readiness) are close to feasible: each already has some form of administrative data collection underway (award records, continuing-education mandates, the Health Professional Registry), and the specific barrier identified in each case — sparse event counts, uncollected participation statistics, and dashboard access restrictions, respectively — is a tractable data-publication decision rather than a need for new primary data collection. For workforce planners, the confirmed pay-matrix non-comparability finding is immediately actionable: any existing or planned inter-state nurse remuneration comparison exercise using pay-matrix level labels should be re-examined for this specific error mode.

Data Infrastructure Implications

The overall pattern of findings — zero domains meeting a high-confidence Adequate threshold, and 14 of 23 domains having no identified open-data pathway at all — is, in itself, the most policy-relevant finding of this study. It does not indicate that nursing wellbeing is unmeasurable in India; India's health data infrastructure clearly can support state-comparable, nursing-relevant reporting, as this study's own three pilot indicators (drawing on Health Dynamics of India, the Indian Nursing Council Annual Report, and NQAS accreditation data) demonstrate directly. What the pattern indicates is that occupation-specific (nursing-specific, as distinct from all-healthcare-cadre) disaggregation, and individual-level psychological wellbeing

measurement, are the two structural gaps a future NNWI-India would need Indian data infrastructure to close, rather than gaps this study's search methodology failed to find a way around.

Strengths

This study's principal strengths are methodological transparency and reproducibility. Every domain classification is traceable to a named, dated source and a documented reason (Table 2, Supplementary Material S1); every externally supplied dataset evaluated during the study is logged with the specific reasoning for its acceptance or rejection (Supplementary Material S2), including cases where a rejected dataset's individual claims were separated from its unverifiable aggregate content and independently re-verified; the explicit five-category feasibility framework, rather than a binary feasible/infeasible judgement, allows domains with real but statistically inadequate data (Recognition) to be distinguished from domains blocked by a specific, nameable access barrier (Digital Readiness, Diversity and Inclusion) and from domains with no identified data pathway at all; and the study reports quality-assurance findings, including internal inconsistencies within primary government sources themselves (the Nurse-Population Ratio cross-source conflicts), rather than presenting primary sources as uniformly authoritative.

Limitations

Several limitations should be considered when interpreting these findings. First, only 9 of 23 domains underwent an independent, fresh Phase 2 search in this study; the remaining 14 domains' classification rests on an earlier, Phase 1 desk-based literature assessment that was not independently re-verified here, and it remains possible, though considered unlikely given the inherently self-report nature of most of these constructs, that an administrative proxy source exists for one or more of them that a fresh search would identify. Second, the three-state pay-matrix pilot and the PLFS feasibility test, while methodologically systematic, relied on convergent secondary-source citation and web-based search rather than direct access to primary government notification documents or PLFS microdata, and carry correspondingly lower evidentiary confidence than the study's three primary-sourced pilot indicators; this is stated explicitly wherever these findings are reported rather than allowed to appear equivalent in strength. Third, this study's pilot indicators, while drawing on genuine primary sources, are themselves incomplete measures of their intended constructs: the Public-Sector Nursing Staff Vacancy Rate captures only rural, public-sector Primary Health Centres and Community Health Centres, omitting urban facilities, the private sector, and facility-level nurse-to-patient ratios; and the NQAS-derived indicators are structural/compliance proxies rather than direct measures of safety outcomes or nurse-perceived culture. Fourth, this study's search for open Indian data was not exhaustive in the sense of a formal systematic review with database-level search strings, dual independent screening, and PRISMA-style reporting; it was a structured, transparent, but single-reviewer feasibility assessment, and a genuine systematic evidence synthesis for the domains classified No Publicly Accessible Data Identified — searching published primary research literature rather than open administrative datasets — remains a distinct, not-yet-undertaken, subsequent phase of NNWI-India development, outside the scope of the present study. Fifth, the Nurse-Population Ratio and pay-matrix findings identified genuine unresolved inter-source numerical conflicts (Telangana, Bihar) that this study could not resolve within its tool and access constraints; these are reported as open rather than adjudicated.

CONCLUSION

This study developed an integrated conceptual framework for a National Nursing Wellbeing Index for India, systematically assessed the feasibility of measuring each of 23 constituent domains from currently available open, publicly accessible Indian data, and produced quality-assured, proof-of-concept pilot indicators for the domains where that assessment identified adequate or partially adequate data. It does not present, and has not claimed to present, a completed or fully scored National Nursing Wellbeing Index.

What can currently be measured, from open Indian government and institutional data, is a partial but genuine picture of nursing workforce structural conditions at state level: public-sector staffing vacancy at rural primary and community health facilities, a four-time-point national and state-level nurse-population ratio, and facility-level quality-accreditation coverage. What cannot currently be measured includes the individual psychological dimensions of nursing wellbeing — burnout, compassion fatigue, and the positive-functioning constructs derived from PERMA — for which no open administrative proxy exists in the Indian data landscape, and several structural domains (financial wellbeing, shift work, job security, diversity and inclusion) for which real data sources exist but cannot currently be resolved to nursing-specific, state-comparable form because of documented, specific barriers: broad occupational aggregation in national labour-force survey publications, non-standardised state government pay-matrix nomenclature, and access restrictions on registries and dashboards that likely do contain the required detail behind them.

This pattern should not be read as a failure of the NNWI-India concept, nor as evidence that the underlying constructs are unimportant or unmeasurable in principle. It is, instead, a specific, reproducible, and actionable account of where India's current open-data infrastructure can support nursing workforce monitoring today, and where it cannot. Three of the identified gaps — Recognition, Career Progression and Continuing Professional Development, and Digital Readiness — rest on tractable data-publication decisions by existing administrative bodies (aggregating multi-year award data, publishing continuing-education participation statistics, and enabling state- and role-disaggregated public reporting from the Health Professional Registry dashboard, respectively) rather than requiring new primary data collection. A further set of domains would become measurable with registration-based access to Periodic Labour Force Survey unit-level microdata, appropriately restricted to nursing-specific National Classification of Occupations codes. The individual psychological wellbeing domains, by contrast, would require either a new, nationally representative, repeated survey instrument, or a formally conducted, prespecified systematic evidence synthesis of the existing fragmented primary literature — a distinct undertaking, requiring its own protocol, which this study has deliberately not attempted and identifies as a necessary subsequent phase of NNWI-India's development rather than a shortfall of the present one.

For policymakers and nursing workforce planners, this study offers two products of immediate use: three pilot indicators, built transparently and reproducibly from primary government sources, that can be extended, updated, or independently audited using the methodology documented here; and a specific, evidenced account of which data-infrastructure investments would most efficiently close the remaining measurement gaps, distinguishing barriers that require new data collection from barriers that require only improved public access to data that most likely already exists.

A National Nursing Wellbeing Index for India remains a conceptually sound and, in the authors' assessment, an achievable long-term goal. This study's contribution is to establish, transparently and without overstatement, the specific empirical starting point from which that goal can be pursued.

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Author Contribution

Vinut C Hosamani: Conceptualization, methodology, data curation, formal analysis, writing—original draft, writing—review and editing, and project administration.Ranjitha P: Methodology, data curation, and writing—review and editing.Bhimanna B: Data curation, validation, and writing—review and editing.Pooja: Data curation, validation, and writing—review and editing.

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- SupplementaryS1FullFeasibilityMatrix.xlsx
- SupplementaryS2DecisionLog1.xlsx