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A longitudinal WISN analysis in Ajmer District, Rajasthan (2021-2024) examines systematic deficiencies in the human resource norms of Indian Public Health Standards (IPHS) at 24x7 primary and secondary health centres as part of a critical evaluation

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Abstract

Background

Indian Public Health Standards (IPHS) were introduced to improve infrastructure and staffing in public sector health facilities. However, staffing norms remain largely population-based and may not adequately capture variations in service demand, geographic accessibility, and continuous service delivery requirements in rural settings.

Objective

To estimate workload-based staffing requirements using the World Health Organization Workload Indicators of Staffing Need (WISN) methodology and examine longitudinal trends in staffing adequacy in public health facilities.

Methods

A longitudinal secondary data analysis was conducted across 108 public health facilities in Ajmer district, Rajasthan, between 2021–22 and 2023–24. Service utilisation data and workforce records were obtained from administrative health information systems. Cadre-wise staffing requirements were calculated using WISN ratios and categorised into workload pressure levels.

Results

Outpatient attendance increased by approximately 10% and inpatient admissions by over 50% during the study period, whereas antenatal registrations and institutional deliveries declined. Persistent vacancies were observed across cadres, particularly among nursing and paramedical staff. In 2023–24, WISN ratios indicated critical shortages among Medical Officers (0.42), Staff Nurses (0.45), Pharmacists (0.12), and Laboratory Technicians (0.31). Longitudinal analysis demonstrated progressive deterioration in staffing adequacy, with a majority of facilities experiencing high workload pressure.

Conclusion

Current IPHS staffing norms may underestimate workforce requirements for continuous service delivery in rural healthcare facilities. Incorporating workload-based workforce planning approaches into routine health system management could improve staffing distribution and strengthen primary healthcare performance.

Introduction

Primary healthcare services in India are delivered through a network of Primary Health Centres (PHCs) and Community Health Centres (CHCs), which provide essential preventive, promotive, and curative care to a large proportion of the population (1,2). To standardise service delivery, the Government of India introduced Indian Public Health Standards (IPHS), which specify minimum requirements for infrastructure, human resources, and service availability (1,3).

Despite revisions, IPHS staffing norms continue to rely primarily on population coverage criteria and may not adequately reflect contextual determinants such as workload intensity, geographic dispersion of settlements, shift-based service provision in 24-hour facilities, and predictable staff absenteeism due to leave and training commitments (4). These limitations may contribute to operational challenges in sustaining emergency and maternal health services in rural areas.

The World Health Organization's Workload Indicators of Staffing Need (WISN) methodology provides a systematic approach to workforce planning by linking service utilisation with activity-specific time standards and available working time (5). Previous studies conducted in Indian states and other low- and middle-income countries have demonstrated that WISN-based assessments can identify workforce shortages and support evidence-based staffing decisions (7–10). However, longitudinal evidence examining trends in staffing adequacy over time remains limited.

This study aimed to evaluate systemic gaps between IPHS-recommended staffing norms and workload-based requirements using WISN analysis across public health facilities in Ajmer district, Rajasthan.

Methods

To estimate staffing needs according to actual service demand, the study used the Workload Indicators of Staffing Need (WISN) methodology developed by World Health Organization (5). The methodology consists of determining Available Working Time (AWT) per cadre after accounting for leaves, holidays, training and administrative work, identifying major components of workload and assigning enterprise-specific time standards.

For each activity, the total workload per year was multiplied by its own time standard into minutes, then divided by the AWT to get the number of people (FTE) needed. WISN ratio — **The WISN ratio of available**: *required staff was calculated and considered an objective measure of workload pressure.*

Study design and setting

A longitudinal analytical study was conducted using secondary administrative data from public health facilities in Ajmer district between April 2021 and March 2024. The district is characterised by semi-arid terrain and dispersed rural populations, which may influence healthcare access and workforce deployment.

Study facilities and data sources

A total of 108 public health facilities, including PHCs, CHCs, and district-level hospitals, were included. Service utilisation data were obtained from routine health information systems, while workforce data were retrieved from State/District administrative records. Data validation involved triangulation across multiple sources and verification at facility level.

WISN analysis

Cadre-wise staffing requirements were estimated using the WHO WISN methodology (5). Available working time was calculated after adjusting for leave, training, and administrative duties. Activity standards were derived from programme guidelines and facility observations.

WISN ratios were interpreted as indicators of workload pressure:

1. < 0.6 → critical shortage
2. 0.6–0.79 → moderate shortage
3. ≥ 0.8 → adequate staffing

Cadres analysed included Medical Officers, Staff Nurses, Pharmacists, and Laboratory Technicians.

Ethical considerations

The study used aggregated secondary data and received approval from the institutional ethics committee.

Results

Facility profile and service utilisation

After data validation, all 108 public health facilities were included in the final analysis (Fig. 1). Service utilisation patterns changed significantly over the three-year study period. The number of outpatient department (OPD) visits rose from 5.68 million in 2021–22 to 6.26 million in 2023–24, a net increase of about 10%. The growth was even more pronounced for inpatient admissions, which increased by over 50%, an apparent growing demand for facility-based care. Conversely, there was a 31% decline in antenatal care registrations and a 21% decline in institutional deliveries indicative of limited change in service-seeking behaviour or referral patterns (Table 1).

Workforce availability and workload pressure

Availability of human resource across all other cadres remained constrained throughout the study period. The vacancy rates varied between 9–17% for Medical Officers, but were much higher for Staff Nurses (39–47%) and paramedical staff (~ 40%). Such shortages were consistently seen across the types of facility, with small improvements over time (Fig. 2).

An analysis of Workload Indicator Staffing Needs (WISN) data for 2023–24 showed large gaps between needed and existing staffing. A total of 865 Medical Officers were required, while only 156 were available, yielding a WISN ratio of 0.42. A requirement of 1176 against an availability of just 163 (O.45r) Staff Nurses was the same way. Extreme high workload pressure for pharmacy service (negative ratio 0.12) and diagnostic services (negative ratio 0.31), even more accentuated among Pharmacists, Laboratory Technicians respectively (Table 2, Fig. 3).

Temporal and geographic patterns

WISN ratios for all cadres deteriorated over time from 2021–22 to 2023–24 (longitudinal analysis), indicating worsening staffing adequacy, as demand for services increased. There were also observed geographic disparities, as remote blocks had facilities with lower staffing ratios because of difficulties in workforce deployment and retention. More than two-thirds of facilities were under critical workload pressure, illustrating systemic constraints towards 24/7 service delivery (Fig. 4).

Discussion

Longitudinal data from this study provide the first local evidence of large shortages in rural public health workforce that are both substantial and persistent, with inflated need based on workload-based FTE gaps being substantially higher than IPHS sanctioned staffing levels. The results show a deterioration in staffing adequacy over time, suggesting an increasing gap between the level of service needed and the human resources available.

These results are consistent with prior studies in India and other low- and middle-income countries. As an example, nurse staffing ratios approached 0.5 using the dynamic WISN in Kerala, India (9), suggesting a similar magnitude of workload pressure. Similar studies in Odisha report over 40% shortage of workforce across the primary health care system (10). International applications of the WISN method in Ghana (7) and Ethiopia (8) have also found large staffing deficits, especially in front-line service delivery cadres.

However, this current study builds on that evidence base as it measures decreases in staffing adequacy across multiple time points instead of at a single time point. These imply that with rapidly changing service utilisation patterns, static staffing norms, especially population-based ones, like IPHS may serve less and less. Coupled with ongoing workforce shortages, the observed growth in inpatient admissions suggests increasing demand on health care providers and possible consequences for service quality or patient outcomes.

Contextual factors like geographic dispersion and workforce distribution are also uncovered by the study. WISN ratios were lower for facilities in rural locations, which was indicative of staff availability and retention problems due to accessibility. The findings highlight the shortcomings of applying department staffing standards that fail to consider local variation in service demand and the regional characteristics where services are delivered.

Incorporating workload-based planning methodologies (for example WISN) into normal health system decision-making processes is likely to improve workforce supply and service demand alignment [5]. Regularly re-evaluating staffing needs may allow for more responsive workforce planning, especially in high-burden and underserved areas.

Strengths

One of the major strengths of this study is that it uses the WISN which is an objective, standardised method recommended by WHO to estimate staffing needs based on the real workload. By considering patterns of service utilisation, time allocation, and staff availability, this approach provides a more meaningful estimate of workforce requirements than population-based norms.

Weaknesses

Second, the longitudinal design of the study enables the information over how staffing adequacy changes with service demand to be obtained. This represents a key strength over cross-sectional studies, which may overlook the dynamism of health system performance. Moreover, the analysis is further detailed by covering all public health facilities within the district.

Limitations

Use of secondary administrative data, which may be subject to under-reporting or standardization issues across facilities. These restrictions can lead to accurate workload delegates and file counts. The more robust primary data collection methods employed including direct time-motion studies may have availed the opportunity for further refinement of the standards set and estimates of workload.

Second, our results are limited to one district and may not be immediately generalisable to other contexts with different health system contexts. Differences in population characteristics, infrastructure, and workforce policy could shape workforce requirements. Multi-districts or state-level analysis should be considered in future work to increase external validity and policy implications.

Declarations

Author Contribution

MR: conceptualisation, analysis, drafting. KV: curation, visualisation. DM: framework, review. SP: oversight. AG: methodology, validation. YK: conceptualisation, review. All approved final manuscript.

Acknowledgement

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Data Availability

Aggregated data available from corresponding author on request; public via HMIS/PCTS/e-Aushadhi.

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Figures

Figure: Critical Evaluation of Indian Public Health Standards (IPHS) Human Resource Norms: Systemic Deficiencies in 24×7 Primary and Community Health Centres – A Longitudinal WISN Analysis from Ajmer District, Rajasthan (21–24)

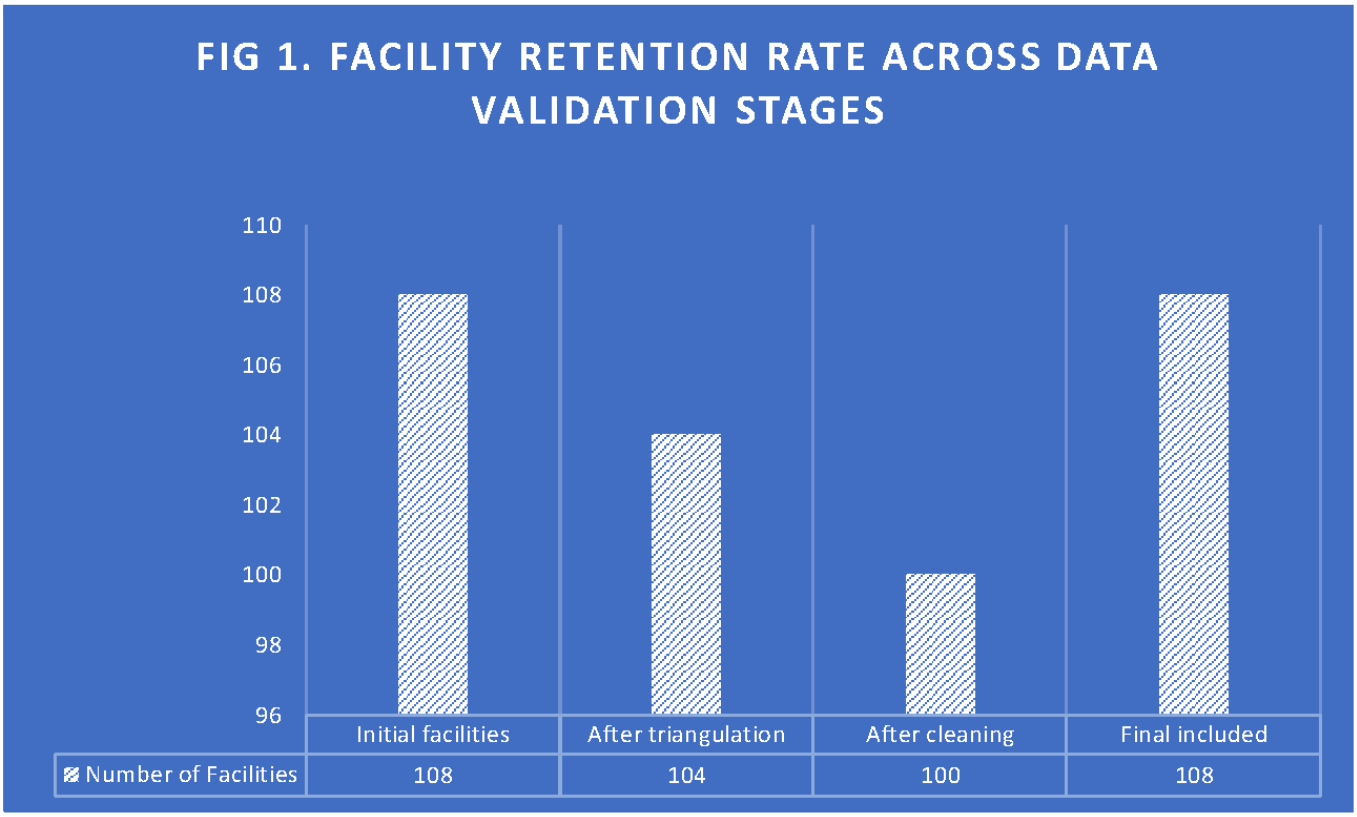
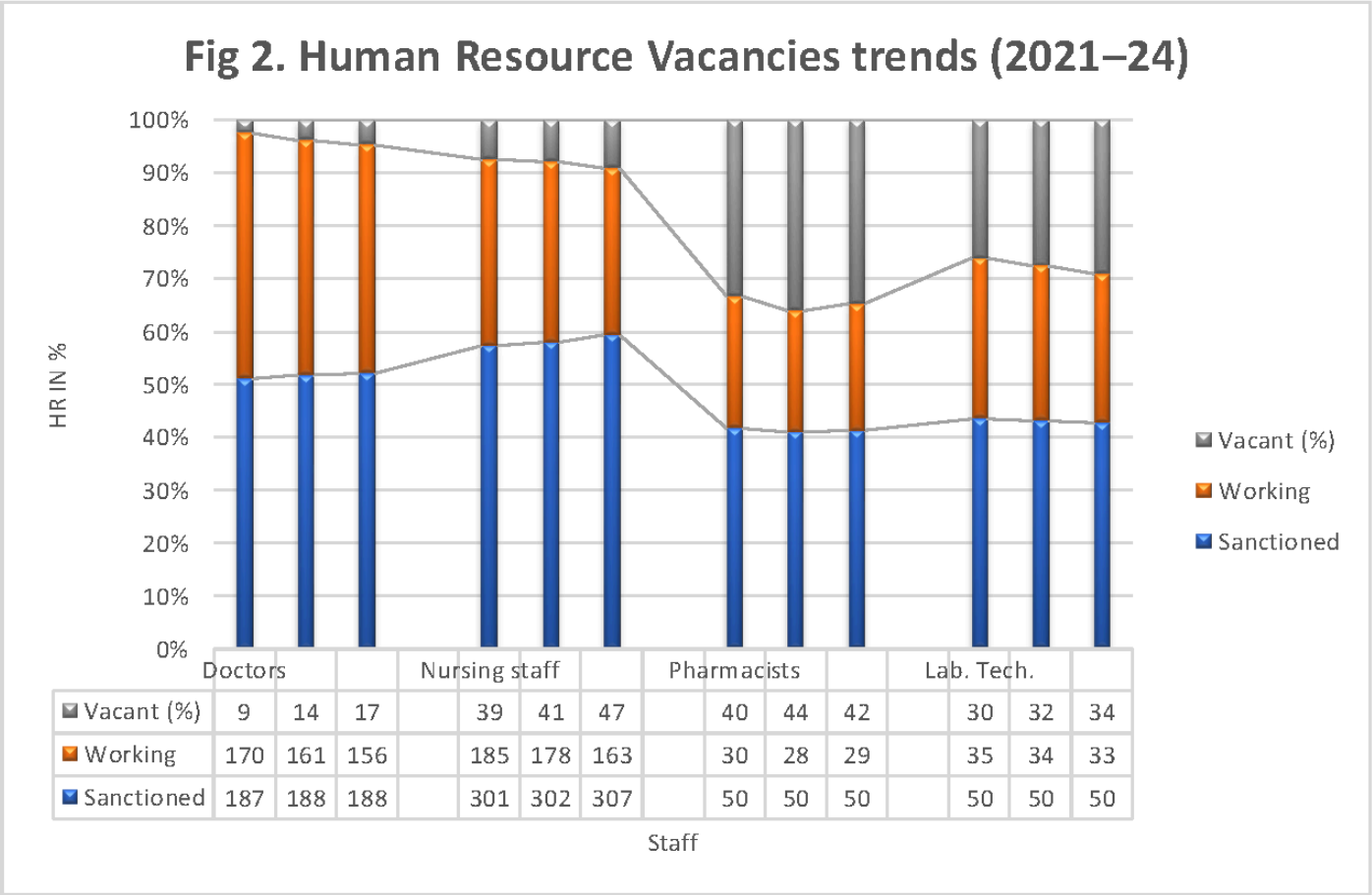


Fig 1. ***Facility Retention Rate Across Data Validation Stages***

Figure 1

See image above for figure legend



	Doctors			Nursing staff			Pharmacists			Lab. Tech.		
Vacant (%)	9	14	17	39	41	47	40	44	42	30	32	34
Working	170	161	156	185	178	163	30	28	29	35	34	33
Sanctioned	187	188	188	301	302	307	50	50	50	50	50	50

Figure 2

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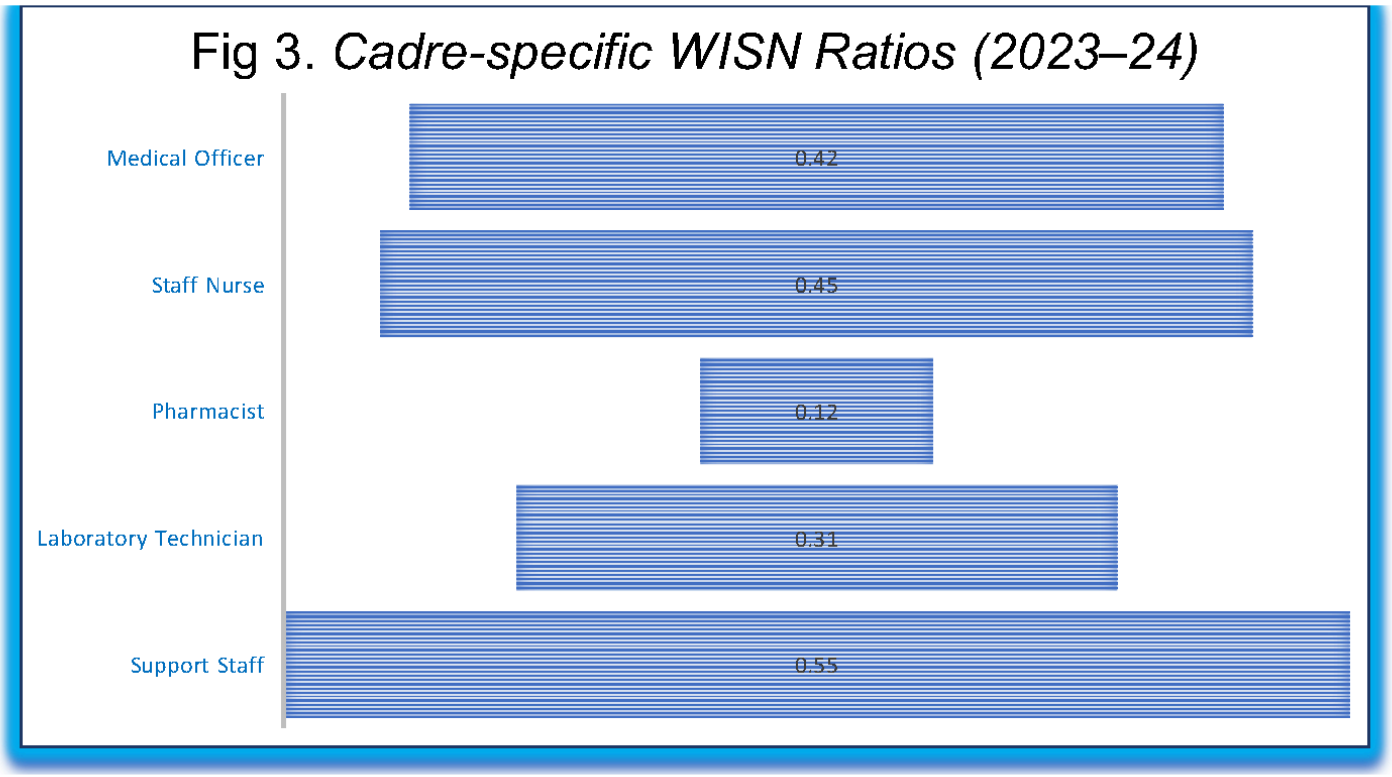


Fig 3. *Cadre-specific WISN Ratios (2023–24)*

Figure 3

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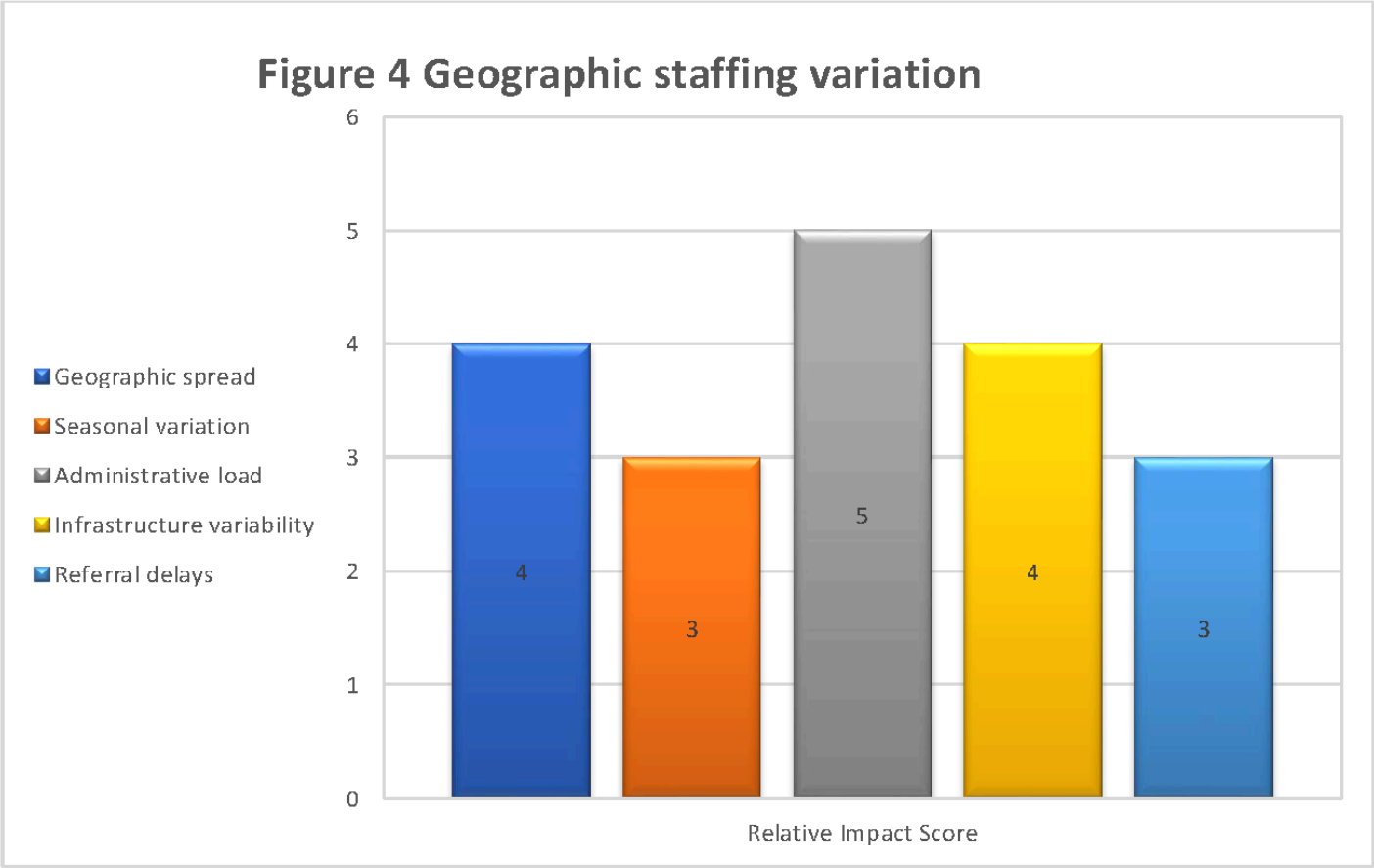


Figure 4 Geographic staffing variation

Figure 4

See image above for figure legend

Supplementary Files

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- Table.pdf
- EthicalapprovalDrMohammadRafique.jpg