Measuring capacity to provide quality care: Revisiting the Service Readiness Index in Malawi

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Background

Improving health outcomes and effective coverage in low-and-middle-income countries requires addressing health service quality gaps, but measuring this is complex. With funding for global health at risk, prioritizing funding and robustly measuring facility quality is increasingly critical.

WHO's Service Readiness Index (SRI) is among the most commonly applied tools in monitoring, evaluation, and research and calculated by averaging each of five domains' scores equally [1]. The SRI focuses on the prerequisite structural quality (or more specifically readiness), which is particularly important to track in under-resourced settings where the minimum infrastructure for functional health services may not be consistently or equitably distributed [2, 3]. The instrument collects tracer indicators for five identified domains of service readiness: basic amenities, basic equipment, infection prevention, diagnostic capacity and medicines in stock. The proportion of items present is calculated for each domain, and the five domains are averaged to produce the service readiness index score.

While there is robust face-validity in the included indicators, little work has been done to empirically evaluate the domains or validity of the composite score.

Methods

We fit factor analyses in Mplus and Stata to Malawi's 2013-2014 SRI data, chosen because it included a complete census of health facilities. We used exploratory structural equation modeling, which permits the flexibility of exploratory factor analysis and model fit statistics and diagnostics available in confirmatory factor analysis. Because all items were dichotomous, we fit models to tetrachoric correlation matrices using mean-and-variance-adjusted weighted least squares. We analyzed each SRI domain separately to identify the number of factors per domain and assess items for retention. We then ran a model on those items retained across all domains. We ran Spearman correlations to assess whether domain-specific factor scores were correlated with the overall SRI score. We limited analyses only to hospitals, health centers, and clinics, which should provide the full range of services.

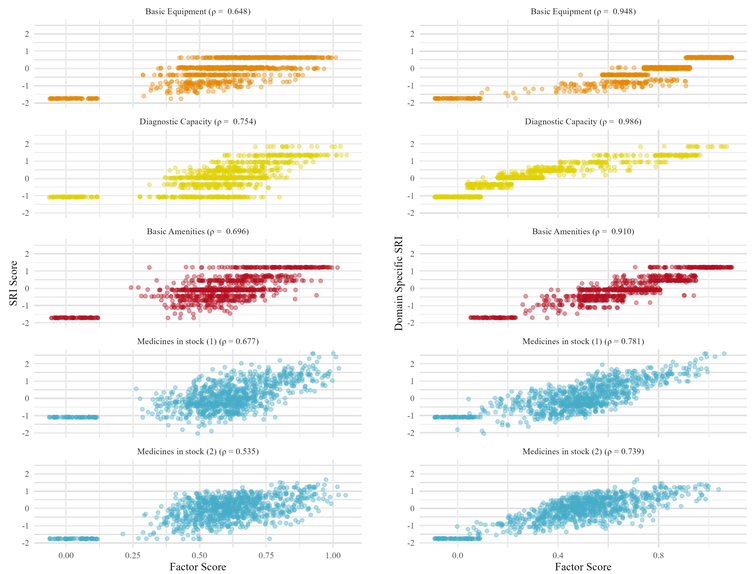

Figure 1. Comparison of SRI and domain-specific SRI with factor scores across domains.

Results

Domain-specific factor analyses generally indicated one factor per domain. One item (single-use syringes) was discarded as fully redundant with glove availability. One item (private visit space) did not load on the basic amenities factor. Diagnostic capacity represented a single factor, but the three urine dipstick diagnostics were redundant, so only pregnancy test was retained. Essential medicines loaded onto two factors, roughly representing commodities for basic and advanced services. Infection control had items that were too highly correlated for the exploratory SEM model to fit.

The single model including items retained from all SRI domains did not demonstrate a factor structure consisting of the domains; rather it best fit a two-factor solution that roughly aligned with basic and more advanced services. Model fit and reliability met accepted criteria. Domain-specific factor scores were moderately correlated with scores for the full SRI between 0.54-0.75, and generally high correlation with their domain-specific sum of item SRI scores (ρ= 0.74-0.99).

SRI Domains

Table 1. Spearman's rank correlation with the composite SRI and domain specific SRI scores

	Spearman's with full SRI	Spearman's with Domain Score
Basic Equipment	0.648	0.948
Diagnostic Capacity	0.754	0.986
Basic Amenities	0.696	0.910
Medicine in Stock (1)	0.677	0.781
Medicine in Stock (2)	0.535	0.738

Conclusion

The individual domains of the SRI are relatively coherent, though some indicators are redundant, while others may measure distinct factors. Factor scores are well correlated with their corresponding SRI domains, suggesting the simple sum of items within domains may be adequate. It is less clear what the composite SRI measures, facilities may be better evaluated on each domain relative to the level and type of services they are expected to perform.

This raises questions about how best to apply the general SRI in research applications and the limits of dimension reduction for such a complex construct. Instead, facilities may be better evaluated on each domain relative to the level and type of services they are expected to perform, within the context of referral facilities.

References

[1] World Health Organization. Service availability and readiness assessment (SARA): an annual monitoring system for service delivery : reference manual. WHO/HIS/HSI/2014.5 Rev.1. number-of-pages: 209. World Health Organization, 2014. URL: https://apps.who.int/iris/handle/10665/149025 (visited on 08/14/2022).

[2] Johanna Hanefeld, Timothy Powell-Jackson, and Dina Balabanova. "Understanding and measuring quality of care: dealing with complexity". In: Bulletin of the World Health Organization 95.5 (May 1, 2017), pp. 368–374. ISSN: 0042-9686. DOI: 10.2471/BLT.16.179309. URL: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5418826/ (visited on 06/04/2023).

[3] Yoko Akachi and Margaret E. Kruk. "Quality of care: measuring a neglected driver of improved health". In: Bulletin of the World Health Organization 95.6 (Feb. 21, 2016), p. 465. DOI: 10.2471/BLT.16.180190. URL: https://pmc.ncbi.nlm.nih.gov/articles/PMC5463815/ (visited on 10/18/2024).