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RESEARCH ARTICLE

CONSTRUCTION OF A COMPOSITE QUALITY INDEX FOR HEALTH INSTITUTIONS: AN ECONOMETRIC APPROACH

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Abstract: The present study attempts to construct a composite quality index by assessing the availability of quality standards for healthcare services using Indian Public Health Standards (IPHS) in all the district hospitals in Haryana and rank them based on the composite quality index for the period 2019-20. Data were collected from all district hospitals using a structured schedule based on IPHS norms and guidelines. The results of the study exhibited that, on IPHS quality standards, 8 district hospitals scored over 70 percent, 11 district hospitals scored between 60-70 percent, and 3 district hospitals scored under 60 percent. The overall mean score was 66.5 percent. Among all (twenty-two) district hospitals, Panchkula ranked first and Charkhi Dadri 22nd. The study concludes that observed quality standards in Haryana's district hospitals do not fully align with required standards for the period under consideration. As health is a state subject, it is time for the Government of Haryana to set its budgetary priorities to provide equitable and uniform healthcare facilities to its entire population.

Keywords: *Indian Public Health Standards, Composite Quality Index, Principal Component Analysis, District Hospitals, Haryana.*

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INTRODUCTION

Better health is vital to human happiness and well-being, as healthy populations live longer, are more productive, and contribute significantly to economic progress (Singh and Aggarwal, 2021a). Furthermore, people's health depends on the quality of education, healthcare they receive and their living standards. Among other things, the quality of healthcare depends on level of public expenditure on healthcare sector and adherence to various laid-down parameters and standards framed for the healthcare sector (Singh, 2018; Aggarwal and Singh, 2023). Therefore, for the growth of the healthcare sector and better provision of services, it is imperative to focus on the quality of healthcare services (Aggarwal and Singh, 2025).

In India, district hospitals form the backbone of secondary healthcare, serving as a vital link between primary health centres, community health centres, and tertiary care institutions. These hospitals play a pivotal role in ensuring accessible and affordable healthcare to a large segment of the population (GoI, 2022). People availing healthcare services in these hospitals play a role as messengers to spread a positive image of the hospitals (Singh and Aggarwal, 2021b). Increasing demands for healthcare institutions and the multidimensional nature of healthcare quality have prompted hospital administrators and policymakers to look for more efficient standards to deliver health services and improve patient satisfaction (Singh *et al.,* 2017).

In this context, a set of uniform standards known as the Indian Public Health Standards (IPHS) was framed in 2007 (revised in 2012 and 2022) for public health institutions in India. These standards, defined according to the type of health care facility and designated bed strength, aimed to improve the quality of health care delivery across institutions nationwide. The IPHS document outlines the services a District Hospital is expected to provide. These standards are the benchmarks for the quality expected of various components of public health care organizations and can be used to assess the performance of the health care delivery system. (MoHFW, 2012).

Given that healthcare relies heavily on investible resources, primarily from taxpayers' money, it is imperative to ensure the optimal utilization of every fund allocated to health. To this end, adherence to proper quality standards is essential. In this context, the construction of a Composite Quality Index (CQI) emerges as a systematic and quantitative approach to assess healthcare performance. A composite index typically summarizes several underlying individual indicators or variables. Such indices are valuable for identifying trends in performance and policies, drawing attention to specific issues, and thereby providing comprehensive information (Freudenberg, 2003).

The need for such an index is especially pronounced in Haryana, where district hospitals exhibit considerable heterogeneity in terms of infrastructure, service delivery, and clinical outcomes (GoH, 2022). According to NITI Aayog (2021), inter-district disparities in healthcare performance are often driven by unequal resource allocation and differences in administrative efficiency. A well-constructed CQI can thus serve as a diagnostic tool to identify underperforming districts and guide targeted policy interventions.

Conventional methods of evaluating hospital performance often rely on single indicators such as bed occupancy rates or doctor–patient ratios, infrastructure availability, human resources, service delivery, and patient outcomes. While these indicators provide useful insights, they fail to capture the multidimensional nature of healthcare quality.

As noted by the OECD (2008), composite indicators are particularly useful in summarising complex, multidimensional phenomena into a single, interpretable measure. NITI Aayog (2021) highlighting the importance of composite indices, states that they integrate multiple dimensions such as infrastructure, human resources, service delivery, and patient outcomes into a unified framework, facilitating inter-district comparison and evidence-based policymaking. In this context, constructing a CQI offers a comprehensive and systematic approach to evaluating healthcare institutions holistically. The application of econometric techniques, such as Principal Component Analysis and factor analysis, further enhances the index's objectivity and robustness by assigning statistically derived weights to its indicators (Greene, 2018).

Thus, the present study aims to construct a Composite Quality Index for district hospitals in Haryana, aligned with the Indian Public Health Standards for District Hospitals, using an econometric approach, and to provide a reliable ranking of these hospitals. The findings are expected to contribute to policy formulation by enabling targeted interventions aimed at improving efficiency, equity, and overall healthcare outcomes in the State.

LITERATURE REVIEW

Zaman and Laskar (2010) examined the quality of health services provided by PHCs based on IPHS criteria and found that the majority of PHCs under examination delivered services in compliance with IPHS recommendations. Nevertheless, no quality index was developed in this study. Similarly, Sodani and Sharma (2012) assessed the availability of assured medical and surgical services at PHCs in five districts of Rajasthan according to IPHS guidelines and found that about 90 percent of the PHCs under consideration had such services available.

This study did not develop any quality index. Using a sample of five randomly chosen PHCs in Bangalore, Srinath and Veena (2012) evaluated PHC compliance with IPHS standards for personnel, services, equipment, medications, and supplies. They found significant variances in their availability. However, this study did not create an IPHS-based quality index. Chauhan *et al.* (2016) selected seven CHCs and twelve PHCs from Shimla District in 2011–12 to assess the availability of medical staff, services, and infrastructural facilities using the IPHS guidelines. They revealed non-adherence to IPHS protocols. Nevertheless, this study did not create a composite index to rank the hospitals according to IPHS standards. Goel and Garg (2018) constructed a health infrastructure index for the state of Haryana, covering the 20-year period from 1991-1992 to 2011-2012. Nevertheless, this study did not use IPHS guidelines to develop a quality index. Using the Indian Public Health Standards, Aggarwal and Singh (2023) evaluated the quality of medical and surgical services provided at each of the district hospitals in Haryana. They also ranked the hospitals by developing a composite IPHS Index that took into account the variety and quantity of services offered.

The literature review did not identify any study attempting to rank healthcare institutions in Haryana based on a composite quality index using an econometric technique. Therefore, the present study aims to fill this gap by constructing a Composite Quality Index based on quality components as per the Indian Public Health Standards for DHs in Haryana, thereby enabling their ranking. Furthermore, this study also aims to suggest policy recommendations for improving the competency of DHs in providing quality services in Haryana.

Objectives of the Study

To construct a composite quality index based on availability of service quality components as per laid down Indian Public Health Standards for DHs in Haryana for overall ranking of DHs in Haryana. To suggest policy recommendation for improvement in the competency of DHs for quality services in Haryana.

MATERIAL AND METHODS

To collect primary data for the present study, a field survey was conducted in all twenty-two district hospitals in Haryana during 2019-20. Structured schedules, aligned with Indian Public Health Standards for district hospitals and differentiated by bed strength (100, 200, and 300 beds), were used, as shown in Fig. 1.

To construct the composite quality index for district hospitals in Haryana, the present study identified seven major quality standards (QSs) based on IPHS guidelines for DHs (Fig. 1) and assessed their availability. Figure 1 also details the expected and required number of components for district hospitals.

In Fig. 1, the values outside the parentheses, show the expected number of each quality standard, inside the parentheses, show bed strength of 100-, 200-, and 300-bedded DHs. For instance, the expected number of medical services (QS-1) for 100- and 200-bedded DHs is 55, and 60, for 300-bedded DHs.

A Composite Quality Index was constructed as an aggregation of selected components. Aggregations are typically calculated using a weight-based technique. In the present study, principal component analysis is used to calculate weights, drawing on various studies (Nicoletti *et al.*, 2000; OECD, 2008; Sharpe and Andrews, 2012; Fernando *et al.,* 2012; Singh and Gupta, 2013; Anand, 2014; Daka and Fandamu, 2016; Goel and Garg, 2018). The mathematical form of the CQI is shown in Eqn. (1).

$$CQI = \frac{\sum_{i=1}^{N} w_i v_i}{\sigma_i} \quad \ldots \quad (1)$$

(Where, w_i: weight of i^{th} variable; v_i: value of i^{th} variable; σ_i: standard deviation of i^{th} variable and N : number of variables).

In Eqn. (1), the *i*th variable's value is divided by its standard deviation (σi) to achieve unit variance, and this normalised value is then multiplied by its 'weight'. The following steps were taken to calculate the weight for CQI construction. First, individual quality standards were normalised using Eqn. (2).

$$NQS_{ij} = \frac{(X_{ij} - Min\ value)}{(Max\ Value - Min\ Value} X100 \quad \ldots \quad (2)$$

(Where; NQS_{ij} is normalized value of i^{th} observed quality standards for j^{th} district hospital; X_{ij} is the actual value of i^{th} observed quality standards for j^{th} district hospital, minimum value and maximum value of i^{th} observed quality standards).

The Kaiser-Meyer-Olkin (KMO) Measure and Bartlett's test were applied to assess the adequacy and sphericity of the sample. Principal Component Analysis (PCA) was then applied to the dataset to determine the number of underlying components. Component and domain weights were subsequently computed based on rotated component loadings.

Final weights were calculated from weighted scores, incorporating both component and domain weights. Finally, weighted quality standards were calculated using these final weights, and the Composite Quality Index was then constructed to rank the DHs in Haryana.

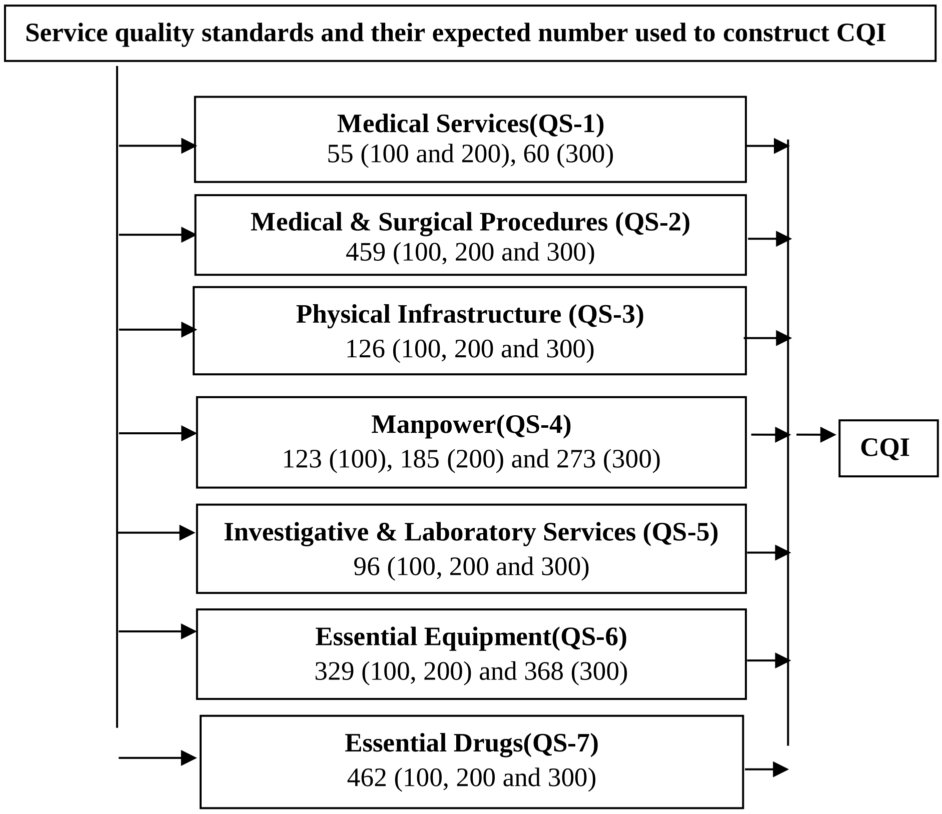


Figure 1: Classification and labeling of components used to construct CQI
Source: *Own compilation*

RESULTS AND DISCUSSION

Availability of Quality Standards

Compliance with quality standards was assessed against IPHS guidelines, considering the bed strength of the DHs. These hospitals were classified into three categories based on their bed strength: 100-bedded (11 hospitals), 200-bedded (9 hospitals), and 300-bedded (2 hospitals). Fig. 2-5 show that the overall quality standards (OQS) scores were 63.7 percent, 69.6 percent, and 67.8 percent for a 100-bedded, 200-bedded, and 300-bedded DH, respectively. The mean score for all the district hospitals was 66.5 percent, ranging from 41.5 percent for DH Charkhi Dadri to 78.2 percent for DH Panchkula, as shown in Fig.6. The lowest and highest values confirm the variation in observed quality standards across DHs.

Figure 2 : Observed quality standards as percent of the expected at 100 Bedded DHs

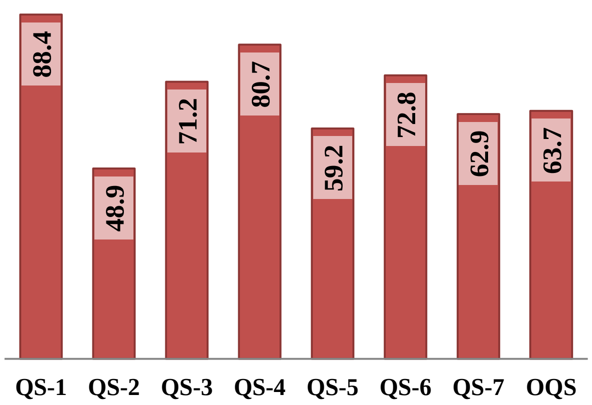


Figure 3: Observed quality standards as percent of the expected at 200 Bedded DHs

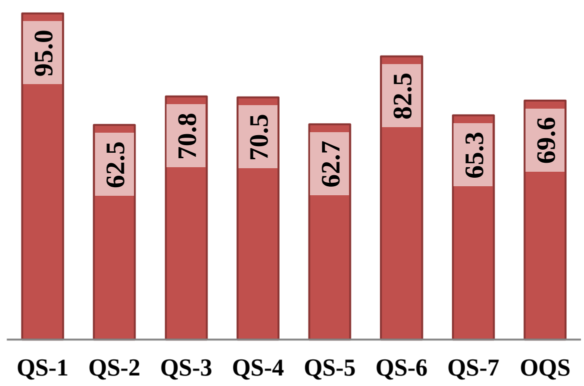


Figure 4: Observed quality standards as percent of the expected at 300 Bedded DHs

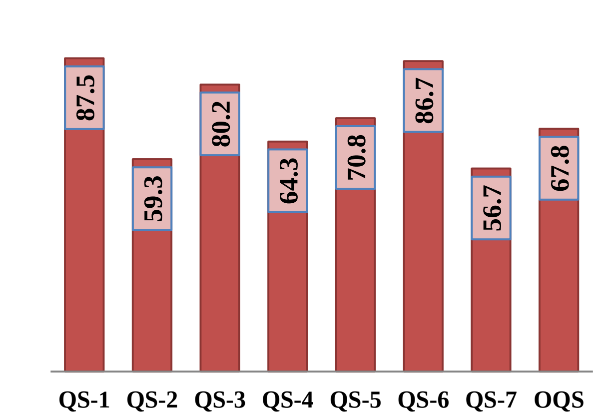
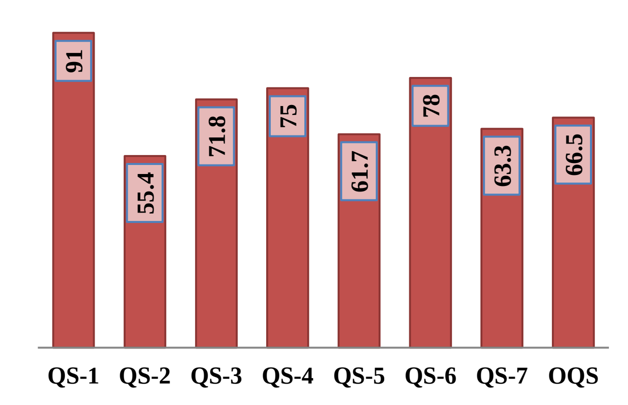


Figure 5: Observed quality standards as percent of the expected at all DHs

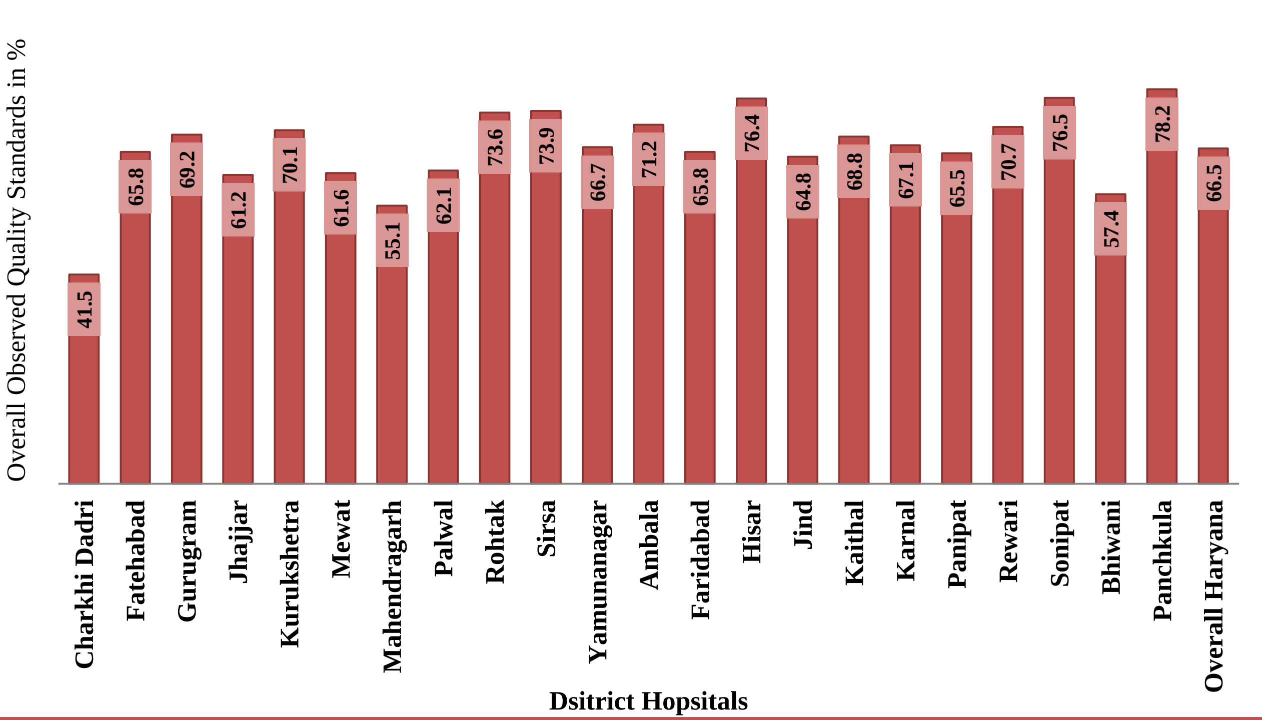


Source: *Own compilation*

As per Fig. 5, the availability of 'Medical Services (QS-1)' was 91 percent, 'Medical & Surgical Procedures (QS-2)' was 55 percent, 'Physical Infrastructure (QS-3)' was 72 percent, 'Manpower (QS-4)' was 74 percent, and 'Equipment (QS-6)' was 79 percent. The mean availability for 'Investigative & Laboratory Services (QS-5)' and 'Essential Drugs (QS-7)' was 63 percent each.

Figures 2-5 clearly indicate that, in the implementation of IPHS norms, Haryana demonstrated greater deficiencies in medical and surgical procedures (QS-2), investigative and laboratory services (QS-5), essential drugs (QS-7), and physical infrastructure (QS-3) compared to medical services (QS-1), equipment (QS-6), and manpower (QS-4).

Figure 6: Observed quality standards as percent of the expected at DHs in Haryana



Source: *Own compilation*

Construction of Composite Quality Index

Normalization of Individual Quality Standards

Original data on quality standards from QS-1 to QS-7 were in percentages. This data was normalised/ converted into the same measures by converting it into a specified range starting from 0 to 1 by using Eqn. (2). Cols. (2) to (8) of Table 1 show the normalised values of all the quality standards at district hospitals in Haryana.

Principal Component Analysis to Calculate Weights

After normalizing the data, the next step is to apply Principal Component Analysis (PCA) to calculate weights for the variables.

However, before applying PCA, it is necessary to test the adequacy of the sample. Hair ***et al.*** (2008) suggested applying the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity to the variables.

Table 1: Results of Normalised Quality Standards

District Hospitals (Bed Strength wise)		Normalised observed quality standards						
		NQS-1	NQS-2	NQS-3	NQS-4	NQS-5	NQS-6	NQS-7
S. No.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
100 Bedded								
1	Charkhi Dadri	0.000	0.000	0.070	0.000	0.206	0.000	0.402
2	Fatehabad	0.573	0.771	0.311	0.479	0.441	0.404	0.587
3	Gurugram	0.929	0.694	0.465	0.787	0.912	0.803	0.305
4	Jhajjar	0.784	0.424	0.241	0.394	0.825	0.837	0.282
5	Kurukshetra	0.784	0.683	0.689	0.724	0.384	0.624	0.661
6	Mewat	0.075	0.430	0.328	0.660	0.412	0.404	0.700
7	Mahendragarh	0.000	0.414	0.293	0.330	0.000	0.469	0.326
8	Palwal	0.573	0.868	0.328	0.606	0.266	0.450	0.000
9	Rohtak	0.929	0.777	0.846	1.000	0.794	0.860	0.311
10	Sirsa	0.784	0.785	0.637	0.787	0.441	0.896	0.554
11	Yamunanagar	0.573	0.736	0.276	0.511	0.441	0.763	0.373
200 Bedded								
12	Ambala	0.929	0.850	0.259	0.336	0.794	0.786	0.627
13	Faridabad	0.643	0.954	0.483	0.083	0.706	0.746	0.136
14	Hisar	0.784	0.930	0.413	0.787	0.384	0.732	0.739
15	Jind	0.502	0.721	0.259	0.345	0.294	0.814	0.311
16	Kaithal	0.859	0.909	0.000	0.373	0.412	0.860	0.355
17	Karnal	0.859	0.818	0.430	0.373	0.531	0.687	0.350
18	Panipat	0.784	0.624	0.413	0.294	0.678	0.814	0.436
19	Rewari	0.859	0.850	0.637	0.619	0.794	0.732	0.292
20	Sonipat	1.000	0.683	0.707	0.700	0.500	0.814	1.000
300 Bedded								
21	Bhiwani	0.325	0.527	0.207	0.138	0.588	0.712	0.136
22	Panchkula	0.694	1.000	1.000	0.564	1.000	1.000	0.360
Overall Haryana	***Mean***	0.647	0.702	0.422	0.495	0.537	0.691	0.420
	SD	0.301	0.230	0.246	0.255	0.251	0.224	0.229
	CV	46.5	32.8	58.1	51.5	46.8	32.3	54.4

Source: *Own compilation.; Note: Prefix 'N' before all the quality standards, indicates normalization of the series.*

The Kaiser-Meyer-Olkin (KMO) Measure and Bartlett's Test

The KMO measure must be greater than 0.50 for both the overall fit and individual factors (Hair *et al.,* 2008). Table 2 shows a significant KMO measure (0.695) and Bartlett's Test of Sphericity ($p<.001$) with 21 degrees of freedom, indicating that the sample size is adequate and the variables are sufficiently related to one another to run a meaningful PCA.

Table 2: Results of the KMO and Bartlett's Test

Test Statistics		Calculated Value
Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy		0.695
Bartlett's Test of Sphericity	Approx. Chi-Square	62.955
	Df	21
	Sig.	0.000

Source: *Own compilation.*

Total Variance Explained and Decision about Number of Components

After testing for adequacy and sphericity, PCA was applied with varimax rotation. The latent root method served as the primary criterion for factor extraction. By this criterion, only factors with latent roots (eigenvalues) greater than 1 were retained. The results of the total variance are shown in Table 3.

Table 3: Results of total variance explained

Comp (1)	Initial Eigen values (2)			Extraction Sums of Squared Loadings (3)			Rotation Sums of Squared Loadings (4)		
	Total	Percent of Variance	Cumulative Percent	Total	Percent of Variance	Cumulative Percent	Total	Percent of Variance	Cumulative Percent
1	3.560	50.852	50.852	3.560	50.852	50.852	3.213	45.898	45.898
2	1.364	19.492	70.344	1.364	19.492	70.344	1.711	24.445	70.344
3	0.683	9.751	80.095						
4	0.631	9.013	89.109						
5	0.342	4.890	93.998						
6	0.267	3.809	97.807						
7	0.153	2.193	100.000						

Source: *Own compilation.*
Note*: Extraction Method: Principal Component Analysis.*

In Table 3, col (4), labelled 'Rotation Sums of Squared Loadings', presents information on the factors extracted after rotation. The value under the 'cumulative percent' column indicates that the two extracted factors, with eigenvalues >1 (3.213 and 1.711), explain 70.34 percent of the total variance, thus highlighting their importance for further analysis. Thus, seven indicators have been reduced to two components/factors, which individually explain 45.898 percent and 24.445 percent of the variance, as shown in column (4) of Table 3.

Component Matrix and Loadings

Component loadings show the correlation between variables and the latent components and are further used to examine which component is formed with which combination of variables. Table 4 shows the component loadings, squared component loadings, and squared loadings scaled to a unity sum. Component loadings are obtained by running PCA. To check which indicator variable loads on which component, a criterion of component loadings greater than 0.5 is employed (Hair ***et al.,*** 2010).

In Table 4, col. (I) shows the labels of the quality standards. Col. (II), labelled 'Component Loadings', shows the rotated components' loadings (highlighted values based on the criterion of component loadings greater than 0.5) (Hair et al., 2010). Under this column, the first component is formed by the combination of variables, namely QS-1 (Medical Services), QS-2 (Medical & Surgical Procedures), QS-3 (Physical Infrastructure), QS-5 (Investigative & Laboratory Services), and QS-6 (Equipment), since these variables show high component loadings on the first component. Similarly, the second component is formed by the combination of variables, namely QS-4 (Manpower) and QS-7 (Essential Drugs). These variables have high component loadings on this component.

Col. (III), 'Squared component loadings,' are obtained by squaring the component loadings; they explain the amount of variation in the variables accounted for by the latent components. The explained variance of the two components is displayed below the matrix of 'squared component loadings'. This is attained by summing the squared component loadings for the first and second components, respectively. These values represent the two eigenvalues obtained after rotation, as calculated in col. (4) of Table 3. Thus, the total variance is the summation of the explained variance of the two components (3.213+1.711=4.924).

Col. (IV) of Table 4 shows 'squared loadings scaled to unity sum'. These are obtained by dividing the squared loadings in each component by the explained variance of the respective component and are labelled as 'domain weight'. The 'component weight' is calculated by dividing the explained variance by the total variance.

Table 4: Results of component loadings, squared component loadings, and squared Loadings scaled to unity sum

Quality Standards/ variables (I)	Component Loadings (II)		Squared Component loadings (III)		Squared Scaled to Unity Sum (Domain weight) (IV)	
	1	2	1	2	1	2
QS-1	**0.829**	0.289	0.687	0.084	0.214	0.049
QS-2	**0.789**	0.121	0.623	0.015	0.194	0.009
QS-3	**0.567**	0.546	0.321	0.298	0.100	0.174
QS-4	0.366	**0.776**	0.134	0.602	0.042	0.352
QS-5	**0.803**	-0.070	0.645	0.005	0.201	0.003
QS-6	**0.878**	0.091	0.771	0.008	0.240	0.005
QS-7	-0.180	**0.837**	0.032	0.700	0.010	0.409
Explained Variance			3.213	1.711	1.000	1.000
Total Variance			4.924			
Component Weight = Explained Variance/ Total Variance			0.652	0.348		

Source: *Own compilation based on field survey.*

Note: *Extraction Method: Principal Component Analysis, Rotation Method: Varimax with Kaiser Normalization, Rotation converged in 3 iterations. Columns under 'Component Loadings' are the output of PCA.*

Calculation of Weighted Scores of Quality Standards

Both the 'component weight' and 'domain weight' were used to calculate the final weights, from which the composite quality Index was constructed. These weights are shown in Table 5.

Table 5: Results of weighted scores of variables

Quality Standards/ Variables	Domain Weight	Component Weight	Weight Score =(2)*(3)	Resulting Weights =(4)/(0.878)
(1)	**(2)**	**(3)**	**(4)**	**(5)**
QS1	0.214	0.652	0.140	0.159
QS2	0.194	0.652	0.126	0.144
QS3	0.174	0.348	0.061	0.069
QS4	0.352	0.348	0.122	0.139
QS5	0.201	0.652	0.131	0.149
QS6	0.240	0.652	0.157	0.178
QS7	0.409	0.348	0.142	0.162
Sum			**0.878**	**1.000**

Source: *Own compilation based on field survey*

In Table 5, column (2), labelled 'domain weight,' shows the weight of the original variables/quality standards within their respective components. This weight is derived from squared loadings, scaled to a unity sum, as presented in column (IV) of Table 4. Each variable also possesses a component weight, corresponding to the component it belongs to, which forms the 'component weight' column. For instance, variable QS-1 falls under the first component, whose component weight is 0.652, as calculated in Table 4. Therefore, all variables have both a domain weight and a component weight. Next, the 'domain weight' and 'component weight' are multiplied to obtain the 'weight score,' presented in column (4) of Table 5. Subsequently, each 'weight score' is divided by the sum of all 'weight scores' in that column to derive the 'Resulting weights.' The final weights for each variable are thus obtained and displayed in the last column of Table 5, under the heading 'Resulting Weight.' The sum of weights in this column is 1. These weights were then used for a weighted aggregation of variables to calculate a composite quality index, shown in col. (9) of Table 6.

Ranking of DHs based on the CQI

Column (9) of Table 6 lists the values of the Composite Quality Index based on the weights calculated for all the DHs in Haryana. Since composite index scores usually range between 0 and 1, the CQI values were normalised using Eqn. (2) and are presented in Column (10) of Table 6. Normalised CQI scores were used to rank all DHs, first according to their sanctioned bed strength and then overall, as presented in Columns (11) and (12) of Table 6, respectively.

Among the eleven 100-bedded hospitals, DH Rohtak ranked first (CQI=3.136), followed by DH Gurugram (CQI=2.883) and DH Sirsa (CQI=2.881). DH Kurukshetra secured the fourth position (CQI=2.623), followed by Jhajjar (CQI=2.318), Yamunanagar (CQI=2.253), and Fatehabad (CQI=2.132). The DHs of Palwal, Mewat, Mahendragarh, and Charkhi Dadri were ranked eighth to eleventh, respectively, all with notably low CQI scores. Similarly, in the category of nine 200-bedded hospitals, DH Sonipat was assigned rank one (CQI=3.189), followed by DHs Hisar and Ambala at rank 2nd and 3rd (CQI=2.876 and 2.820, respectively). DHs Rewari, Panipat, Kaithal, Karnal, Faridabad, and Jind were assigned ranks from 4 to 9, respectively, with a lot of disparities in the obtained CQI scores. In the category of two 300-bedded hospitals, DH Panchkula ranked first (CQI =3.226), followed by DH Bhiwani (with a very low CQI score of 1.647). The obtained CQI score clearly indicates that the quality of health services in Haryana varies a lot among different districts, and all DHs require a lot of overhauling to match them at par with the laid down IPHS standards.

In the overall ranking shown in the column. (12) of Table 6, irrespective of sanctioned bed strength, DH Panchkula ranked one (CQI=3.226), closely followed by DHs Sonipat and Rohtak (CQI= 3.189 and 3.136), respectively. DH Charkhi Dadri was ranked 22nd (CQI=0.427) out of all the 22 DHs in Haryana. So, in both ways of ranking, DH Panchkula ranked first, whereas DH Charkhi Dadri ranked last.

Table 6: Weighted Quality Standards, Composite Quality Index and Ranking for DHs in Haryana

District Hospitals (Bed Strength wise)		Weighted variables or weighted quality standards							CQI	NCQI	R1	R2
		QS-1	QS-2	QS-3	QS-4	QS-5	QS-6	QS-7				
S. No.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
100 Bedded												
1	Charkhi Dadri	0.000	0.000	0.020	0.000	0.122	0.000	0.285	0.427	0.000	11	22
2	Fatehabad	0.302	0.481	0.087	0.261	0.262	0.322	0.416	2.132	0.609	7	16
3	Gurugram	0.491	0.434	0.130	0.430	0.542	0.640	0.216	2.883	0.877	2	4
4	Jhajjar	0.414	0.265	0.068	0.215	0.490	0.667	0.200	2.318	0.676	5	13
5	Kurukshetra	0.414	0.427	0.193	0.396	0.228	0.498	0.468	2.623	0.785	4	9
6	Mewat	0.039	0.269	0.092	0.360	0.245	0.322	0.495	1.823	0.499	8	18
7	Mahendragarh	0.000	0.259	0.082	0.180	0.000	0.374	0.231	1.126	0.250	10	21
8	Palwal	0.302	0.542	0.092	0.331	0.158	0.359	0.000	1.784	0.485	9	19
9	Rohtak	0.491	0.485	0.237	0.546	0.471	0.685	0.220	3.136	0.968	1	3
10	Sirsa	0.414	0.490	0.179	0.430	0.262	0.714	0.392	2.881	0.877	3	5
11	Yamunanagar	0.302	0.459	0.077	0.279	0.262	0.608	0.264	2.253	0.652	6	14
200 Bedded												
12	Ambala	0.491	0.531	0.073	0.184	0.471	0.626	0.444	2.820	0.855	3	7
13	Faridabad	0.340	0.596	0.135	0.045	0.419	0.595	0.096	2.226	0.643	8	15
14	Hisar	0.414	0.581	0.116	0.430	0.228	0.584	0.523	2.876	0.875	2	6
15	Jind	0.265	0.451	0.073	0.188	0.174	0.649	0.220	2.020	0.569	9	17
16	Kaithal	0.453	0.568	0.000	0.204	0.245	0.685	0.251	2.407	0.707	6	11
17	Karnal	0.453	0.511	0.121	0.204	0.315	0.548	0.248	2.400	0.705	7	12
18	Panipat	0.414	0.390	0.116	0.160	0.403	0.649	0.309	2.441	0.719	5	10
19	Rewari	0.453	0.531	0.179	0.338	0.471	0.584	0.207	2.764	0.835	4	8
20	Sonipat	0.528	0.427	0.198	0.382	0.297	0.649	0.708	3.189	0.987	1	2
300 Bedded												
21	Bhiwani	0.172	0.329	0.058	0.075	0.349	0.567	0.096	1.647	0.436	2	20
22	Panchkula	0.366	0.625	0.280	0.308	0.594	0.797	0.255	3.226	1.000	1	1

Source: *Own compilation based on field survey.*

Note: *Weighted variables are computed by multiplying each indicator by its respective weigh and then divide by indicator's standard deviation of normalized data set; NCQI=Normalized CQI; R1=Ranking of DHs (Bed Strength-wise); R2=Ranking of DHs (Overall).*

CONCLUSIONS AND POLICY IMPLICATIONS

The present study was designed to construct the Composite Quality Index by evaluating the availability of healthcare service quality standards and ranking district hospitals in Haryana according to the Indian Public Health Standards. Regarding the availability of quality standards, the results show that 8 DHs scored over 70 percent, 11 DHs scored between 60 and 70 percent, and 3 DHs scored less than 60 percent. The overall mean percentage score is 66.5 ranging from 41 percent to 78 percent. No single DH exhibited 100 percent availability of all prescribed IPHS quality standards. Regarding hospital rankings, the study highlights that District Hospital Panchkula ranked first, while District Hospital Charkhi Dadri ranked 22nd among the 22 district hospitals in Haryana. The study concludes that the observed quality standards do not fully align with the required quality standards in Haryana's district hospitals.

Therefore, the present study recommends urgent emphasis on systemic management, monitoring, and periodic review of the functioning of district hospitals in Haryana to ensure satisfactory healthcare services and the optimal functioning of these health institutions. As health is a state subject, it is time for the State of Haryana to prioritise in its annual budgets the provision of equitable and uniform healthcare facilities to its entire population.

Ethical Statement

The Institutional ethical approval and permission was obtained from the Department of Health and Family Welfare, Panchkula, Haryana. Privacy and confidentiality was maintained at all levels, during and after the field survey.

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