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TRENDS AND RESEARCH FRONTIERS IN HEALTHCARE SERVICE QUALITY AND PATIENT SATISFACTION: A BIBLIOMETRIC PERSPECTIVE

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Abstract

Background:

Healthcare service quality and patient satisfaction are pivotal dimensions of health system performance, influencing treatment adherence, service utilization and overall health outcomes. With the rise of patient-centered care and digital health models, global research activity in this domain has expanded. However, a comprehensive mapping of this evolving domain remains limited.

Objective:

To map global research and publication trends, intellectual structures, and emerging frontiers in healthcare service quality and patient satisfaction from and to identify leading contributors, thematic clusters, and collaboration networks using bibliometric techniques on Web of Science records.

Methods: We searched the Web of Science Core Collection (SCI-EXPANDED, SSCI, ESCI) with a structured Boolean query (1990–2025). After de-duplication and screening, 1,306 English-language articles and reviews published 1994–2025 were included. Bibliometric analyses were conducted in RStudio and visualized with VOSviewer (v1.6.20). Co-authorship, keyword co-occurrence, citation, co-citation, and bibliographic coupling analyses were performed to examine productivity, impact, collaboration patterns, and thematic evolution.

Results: Research output rose staedily over the past three decades, peaking in 2025 (n=130). The most productive countries were the United States (15.4%), China (8.6%), and India

(8.3%). The leading publication venues by volume were the International Journal of Health Care Quality Assurance and BMC Health Services Research, while the International Journal for Quality in Health Care showed the highest mean citations per article. Keyword analysis confirmed persistent emphasis on "patient satisfaction", "service quality," and 'quality of care". Influential works by Mittal (1998), Dagger (2007), and Batbaatar (2017) secures the field's conceptual foundations. In the same period, mean citations per article declined as the literature broadened which is consistent with shorter citation windows and thematic dispersion.

Conclusion: Research on healthcare service quality and patient satisfaction expanded after 2015. The field has evolved from foundational service-quality measurement toward integrated models emphasizing digital transformation, patient experience, and value-based care. Hence, this review outlines the thematic frontiers shaping contemporary patient-satisfaction scholarship, along with implications of operationally fragmented domain requiring attention from the global researchers, clinicians, and managers.

Keywords: Healthcare service quality, Patient satisfaction, Bibliometric analysis, Web of Science, Research trends, Co-occurrence, Citation analysis, Co-authorship networks, Journals, Telemedicine

1. Introduction

Hospitals account for a large share of health expenditures worldwide and are experiencing increasing pressure to improve the efficiency and quality of their services. Healthcare is one of the job sectors with the highest levels of complexity in business models, given the heterogeneity of patients and care process (Nepomuceno et al., 2022). Within this context, healthcare service quality and patient satisfaction are widely used indicators of performance because of their close association with treatment adherence, service utilization, and improved health outcomes. Patient satisfaction, in particular, has gained prominence as a key performance indicator of healthcare services and an important determinant of care-seeking behaviour (Ferreira et al., 2023). Patient satisfaction is a patient's reaction to several aspects of their service experience. Assessing patient satisfaction provides valuable insights about daily hospital care and quality. It is an independent dimension of care quality that includes internal aspects of hospital care as well as dimensions such as communication, empathy, accessibility, and responsiveness (Bleich, 2009). Hospitals consume several inputs (human

resources, pharmaceuticals, equipment) to produce high-value outputs (outpatient visits, surgical operations). Hence, hospital efficiency analysis is about measuring the competence with which inputs are converted into valuable outputs (Hoehn et al., 2016). Over the past three decades, a growing body of literature has addressed various dimensions of service quality, measurement tools such as SERVQUAL, Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) and patient-reported experience measures (PREMs). These tools assess key dimensions such as tangibility, reliability, assurance, responsiveness, and empathy (Bernardo et al., 2022). At the same time, the rapid evolution of healthcare delivery models including the expansion of telemedicine and digital health platforms has reshaped both the concept and assessment of service quality (Persis, 2025).

Bibliometric analysis offers a powerful approach to systematically map and synthesize this expanding body of literature and helps to analyse large volumes of published data to provide insights into research productivity, collaboration networks, and knowledge structures as well as helps in understanding global research trends and emerging research frontiers in the field of healthcare service quality and patient satisfaction. Unlike narrative reviews, bibliometric studies apply quantitative methods to publication metadata enabling the identification of influential authors, journals, and countries as well as the detection of intellectual structures and thematic clusters within a field. Mapping not only provides a retrospective overview but also reveals knowledge gaps and future directions. Previous bibliometric investigations in healthcare have demonstrated the value of this approach in clarifying research landscapes (Sweileh, 2022). But there are relatively few literatures and are most often constrained by narrower time windows, sub-domain focus, or limited network analyses.

This study examines trends and research frontiers in healthcare service quality and patient satisfaction providing an up-to-date bibliometric perspective. The primary objective of this research is to map global research trends and emerging research frontiers in healthcare service quality and patient satisfaction. The secondary objectives are to characterize the intellectual structures and thematic evolution and the collaboration networks among researchers and institutions.

1. Materials and Methods

2.1 Data Source

Web of Science (WoS) core collection (SCI-EXPANDED, SSCI, and ESCI) was chosen as the sole data source for analysis. WoS is a platform owned by Clarivate Analytics and is the

largest and most comprehensive core journal citation index data service platform covering a wide range of disciplines and studies (Clarivate Analytics, 2025). WoS was selected because of its rigorous indexing standards, extensive coverage of high-impact journals and compatibility with bibliometric software tools such as VOSviewer. The selected period was from 01 January 1990 to 24 September 2025. Records were exported on 24 Sep 2025 as plain-text files with full records and cited references. The search targeted research on healthcare service quality and patient/patient-experience satisfaction (the complete Boolean string and export fields are provided in the Appendix - A. No human subjects or personal data were involved.

2.2 Study scope and screening

For this review, four types of analyses were performed: First, co-authorship analysis to identify influential researchers and collaborative networks in the field. Second, keyword co-occurrence analysis to determine research hotspots and emerging themes. Third, citation analysis to assess the most cited articles and journals. Fourth, co-citation and bibliographic coupling analysis to reveal intellectual structures and research frontiers.

Document types were limited to articles and reviews in English. Before analysis, we removed retracted publications and non-relevant records identified during screening. Screening proceeded in two passes: (1) Automated de-duplication (exact): duplicates by WoS UT, DOI, and exact title were removed; and, (2) Near-duplicate and relevance review (manual and rule-based): we inspected the duplicates review file and applied a hand-curated exclusion list. After de-duplication and exclusions, the final corpus comprised 1306 records (articles and reviews) spanning 1994-2025. A PRISMA-style flow diagram and the exclusion list are provided in Appendix-B.

2.3 Software environment

All preprocessing and bibliometric computations were performed in RStudio 4.4.0 using the following packages: *bibliometrix* (core parsing and networks) (Aria & Cuccurullo, 2017), *dplyr, tidyr, stringr, readr* (data wrangling I/O), *ggplot2* (plots), *igraph* (graph operations and metrics), *SnowballC* (optional stemming for overlap checks), and *purrr* (iterative utilities). Visualization-ready maps were then built in VOSviewer version 1.6.20 for publication figures. VOSviewer enables the creation of network maps based on co-authorship, keyword co-occurrence, co-citation, and bibliographic coupling.

2.4 Data preparation in R

WoS Core Collection records were merged and parsed in R (bibliometrix) using *bibliometrix::convert2df*. Author Keywords (DE) were used as the primary term field; where DE was missing we mapped to Keywords Plus (ID). Keyword strings were lower-cased and stripped of punctuation and excess spaces, and a light, rule-based harmonization aligned close synonyms without altering meaning (client satisfaction to patient satisfaction; tele-health/tele health to telemedicine; perceived service quality/SERVQUAL model to service quality). The same synonym table was also supplied to VOSviewer via the thesaurus file. Descriptive performance statistics, including annual output and growth, document types, citation averages, prolific sources and authors, and corresponding-author countries, were computed with *bibliometrix* and *tidyverse* functions. To keep maps interpretable, a data-driven minimum frequency was tuned to retain approximately 60–120 terms (capped near 200 in dense cases). Trend-topic trajectories were derived by counting yearly occurrences, computing recent activity (2019–2025), CAGR and linear slope since 2019, ranking a composite growth score, and plotting time-series after removing country names and generic labels to emphasize interpretable concepts.

1.

a. **VOSviewer maps**

Clean WoS text and the same thesaurus were imported into VOSviewer using association-strength normalization. Author-keyword co-occurrence used fractional counting with a minimum of five occurrences (124 terms retained after harmonization). Co-authorship networks were mapped for countries with fractional counting and a nine-document minimum (final map of 42 countries), and for authors with a stricter document threshold; when prompted, only the largest connected set was displayed. Co-citation of references used a 45-citation minimum (37 items retained). Overlay visualizations colored nodes by average publication year are used to highlight recent themes over years. Further, bibliographic coupling of documents used 39 minimum citations with 157 items retained. All PNG/SVG figures and cluster/item CSVs were archived. “Anonymous” labels in co-citation reflect WoS entries lacking identifiable first authors and were retained as exported.

2.6 Reproducibility

Scripts are organized sequentially with every intermediate dataset and all parameters and thresholds recorded in filenames or companion CSVs to ensure full reproducibility.

1. **Results**

A total of 1,306 publications on patient satisfaction were retrieved from the WoS database, contributed by 4,951 unique authors affiliated with 84 countries. The number of articles increased markedly from 69 in 1994-2004 to 981 in 2015-2025, indicating a substantial rise in research output over time. Similarly, the mean number of authors per article (AU/A) rose from 2.9 to 4.02, reflecting a steady growth in collaborative authorship. The number of contributing countries also expanded from 14 in the early period to 82 in the most recent decade suggesting increasing global participation in the field. However, citation impact shows a declining trend. The mean citations per article (TC/A) decreased from 78.7 in 1990–2004 to 12.6 in 2015–2025, while citations per unique author (TC/AU_unique) fell from 27.15 to 3.12, possibly reflecting the recency of recent publications and the dilution effect of expanding research output. Table 1 summarizes the publication output, authorship patterns, country participation, and citation impact of research on patient satisfaction across three custom periods (1990–2004, 2005–2014, and 2015–2025).

Table 1

Summary of Bibliometric Indicators of Patient Satisfaction Research, 1990–2025

Period	A	AU_unique	AU/A (unique/A)	C_unique	TC	TC/A	TC/AU_unique
1990–2004	69	200	2.90	14	5,430	78.70	27.15
2005–2014	256	868	3.39	41	10,180	39.77	11.73
2015–2025	981	3,947	4.02	82	12,323	12.56	3.12
Total period	**1,306**	**4,951**	**3.79**	**84**	**27,933**	**21.39**	**5.64**

Note. A = number of articles; AU_unique = number of unique authors; AU/A = mean number of unique authors per article; C_unique = number of countries; TC = total citations; TC/A = mean citations per article; TC/AU_unique = mean citations per unique author.

3.1 Publication trend (annual output)

The annual number of publications on healthcare service quality and patient satisfaction showed a steady increase from 1994 through 2025 as depicted in Figure 1 with a compound annual growth rate (CAGR) of 11.90% over the entire 31-year period. During the early years, research activity remained limited, with fewer than ten publications per year until the early 2000s, followed by a gradual increase in output after 2010. A marked rise in publication activity was observed after 2015 (CAGR:10.7% between 2015-2025), indicating growing academic engagement with patient-centered quality research. The highest annual output to date was recorded in 2025 (n = 130) as of the data extraction date (September 24, 2025), with sustained high productivity in recent years (2019 = 91; 2020 = 91; 2021 = 105; 2022 = 125; 2023 = 96; 2024 = 116). The most recent period (2019–2025) showed a CAGR of 6.10%, reflecting continued expansion at a moderated pace compared to earlier growth phases.

Figure 1

Annual number of publications on healthcare service quality and patient satisfaction, 1994–2025.

Note. Data represent records retrieved from the WoS database as of September 24, 2025 (n = 1,306).

3.2 Top universities/hospitals by publication output and citation impact

Institutional contributions to patient satisfaction research indicate divergent patterns in output versus impact. Table 2 shows Johns Hopkins University leads in publication volume (21 articles, h-index = 18), followed by the University of London (19 articles) and the University of California System (14 articles). However, citation impact rankings reveal different leaders. The University of Sannio achieves the highest average citations per article (370.0) from 3 publications, followed by Temple University (346.0, 2 articles) and Mongolian National University of Medical Sciences (307.5, 2 articles). This divergence suggests two institutional strategies: sustained high-volume output (Johns Hopkins, University of London with 20-27

year span) versus concentrated high-impact collaboration (University of Sannio, Temple University). Geographic diversity spans North America, Europe, Asia, Australia, and Africa, indicating global engagement with patient satisfaction scholarship. The Pennsylvania Commonwealth System serves exceptional efficiency with 134.0 average citations across 12 publications.

Table 2

Top 10 Institutions by Publication Output and Citation Impact in Patient Satisfaction Research

Rank	**Institution**	**Articles**	**Total Citations**	**Avg Cit/Art**	**h-index**	**Years Span**
By Publication Output						
1	Johns Hopkins University	21	1,005	47.9	18	20
2	University of London	19	930	49.0	16	27
3	University of California System	14	679	48.5	12	31
4	National Institute of Technology (NIT System)	13	361	27.8	11	15

5	Pennsylvania Commonwealth System (PCSHE)	12	1,608	134.0	10	27
6	King Abdulaziz University	12	368	30.7	5	13
7	University of Sydney	12	364	30.3	8	17
8	University of Texas System	12	161	13.4	7	13
9	University of Gondar	11	302	27.5	9	9
10	Jimma University	11	67	6.1	5	9
By Citation Impact (Average Citations per Article)						
1	University of Sannio	3	1,110	370.0	4	8

2	Temple University	2	692	346.0	2	20
3	Mongolian National University of Medical Sciences	2	615	307.5	2	3
4	Ulaanbaatar State University	2	615	307.5	2	3
5	Northwestern University	3	810	270.0	3	21
6	University of Western Australia	2	486	243.0	2	10
7	University of York - UK	2	432	216.0	4	6
8	University of Eastern Finland	3	621	207.0	3	12
9	Indian Institute of Technology (IIT) - Madras	2	397	198.5	4	12

10	Tampere University	2	387	193.5	6	5

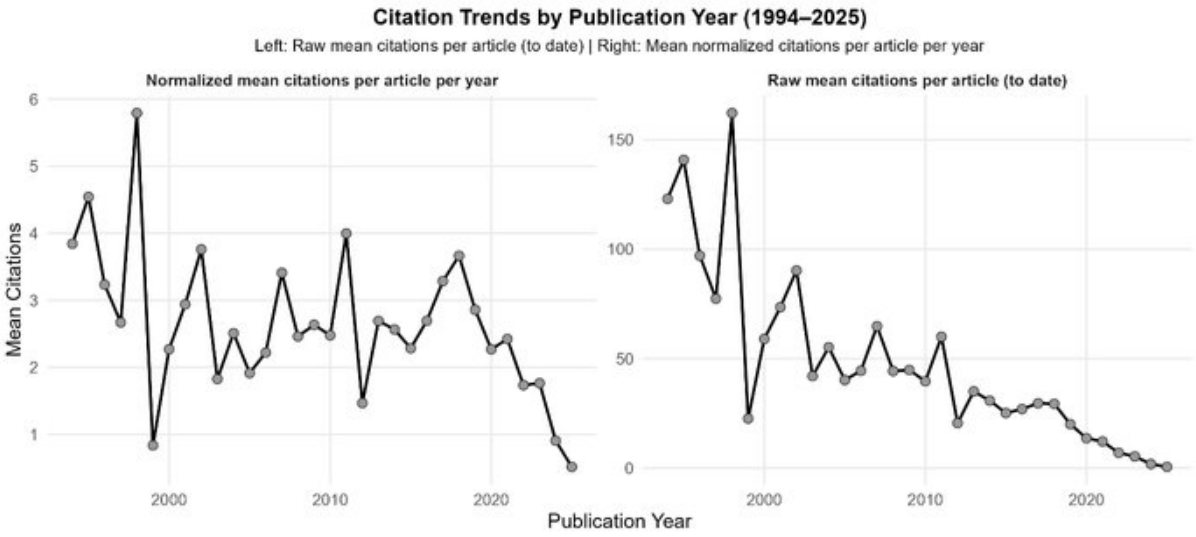
Note. Cit/Art = citations per article. Institutional affiliations extracted using bibliometrix's metaTagExtraction function (AU_UN field). Full counting methodology applied: each institution receives credit for each unique document. Institutions with fewer than 2 articles excluded. Years Span indicates publication activity range within corpus (1995–2025). h-index calculated at institution level within corpus.

3.3 Citation Trends (1994–2025)

The temporal distribution of citation impact is presented in Figure 2. A comparison of raw and normalized citation trends revealed an overall decline in citation rates over time. Spearman's rank correlation indicated a significant negative association between publication year and normalized mean citations per article ($\rho = -0.42$, $p = 0.016$), suggesting a moderate reduction in citation velocity in more recent years. The correlation between publication year and raw mean citations per article was considerably stronger ($\rho = -0.89$, $p < 0.001$), indicating the expected citation-window bias favoring older publications. The divergence between rising output and declining mean citations per article likely reflects both shorter citation windows for recent studies and thematic dispersion as the field broadens post-2015.

Figure 2

Raw and normalized citation trends by publication year, 1994–2025.



Note. Left panel shows raw mean citations per article (to date). Right panel shows mean normalized citations per article per year (citations divided by years since publication). Spearman's ρ = −0.42 (p = 0.016) for normalized citations and ρ = −0.89 ($p < 0.001$) for raw citations.

3.4 Top Contributing Authors (Authorship Impact)

Across the dataset (n = 1,306), the 20 most prolific authors each published 4-6 papers (median = 4; mean = 4.25) and held h-indices ranging from 2 to 4 (median = 3) as depicted in Table 3. Together they contribute 6.51% of the corpus. The most productive contributor was Hussain A (NP = 6; h = 4; TC = 127; span 2019-2025). Among the NP ≥ 5 group, Yu Y (NP = 5; h = 4; TC = 160; span 2018-2025) and Cudney Ea (NP = 5; h = 3; TC = 149; span 2019-2024) showed the highest overall citation totals. The highest total citations within the top-20 list were observed for Andaleeb Ss (TC = 500; NP = 4; h = 3; 2000–2014), who also showed the highest citations per paper (125.00). These data indicate concentrated productivity in a small group of authors with heterogeneous citation visibility across portfolios.

Table 3

Top 20 contributing authors: productivity and impact indicators

Author	NP	h-index	Total citations	Citations/article	Span (yrs)	Years active

HUSSAIN A	6	4	127	21.17	2019–2025	7
YU Y	5	4	160	32.00	2018–2025	8
CUDNEY EA	5	3	149	29.80	2019–2024	6
SINGH D	5	2	18	3.60	2020–2022	3
ANDALEEB SS	4	3	500	125.00	2000–2014	15
LEE H	4	4	433	108.25	2004–2021	18
MALIK SA	4	4	317	79.25	2016–2018	3
MOGHAVVEMI S	4	4	158	39.50	2016–2022	7
HWANG J	4	4	122	30.50	2019–2019	1

BOSS EF	4	4	105	26.25	2012–2014	3
JAMEEL A	4	3	91	22.75	2019–2025	7
GUPTA D	4	4	80	20.00	2011–2015	5
LIS CG	4	4	80	20.00	2011–2015	5
JAIN AK	4	3	64	16.00	2019–2023	5
GROOT W	4	2	63	15.75	2016–2025	10
PAVLOVA M	4	2	63	15.75	2016–2025	10
PRYBUTOK VR	4	4	57	14.25	2012–2017	6
SWAIN S	4	3	55	13.75	2017–2021	5
BAHADORI M	4	3	45	11.25	2015–2019	5

KENNEDY DM	4	3	40	10.00	2011–2019	9

Note. NP = number of publications (full counting). h-index computed for each author within the study corpus. "Citations/article" is TC_total ÷ NP. "Span (yrs)" is the first-last publication year for the author in this corpus; "Years active" = span length.

3.5 Geographic Distribution and Collaboration Patterns

The top 10 countries by fractional publication count along with their collaboration patterns measured through MCP (Multi-Country Publications) and SCP (Single-Country Publications) are shown in Table 4. The United States leads with 201 fractional publications followed by China (113) and India (109). The MCP rate reveals distinct collaboration behaviours across countries. Australia (49.25%), Malaysia (48.39%), and the United Kingdom (43.14%) demonstrate high international collaboration intensity, while India (19.67%) and Ethiopia (19.23%) show more domestically-focused research output.

Table 4

Top producing countries: full vs. fractional output and collaboration (1994–2025)

Country	Documents (full)	Share (fractional, %)	MCP	SCP	MCP rate (%)
United States	257	201 (15.4)	102	155	39.69
China	142	113 (8.6)	54	88	38.03
India	122	109 (8.3)	24	98	19.67

United Kingdom	102	76 (5.8)	44	58	43.14
Australia	67	49 (3.7)	33	34	49.25
Malaysia	62	46 (3.5)	30	32	48.39
Iran	60	50 (3.8)	18	42	30.0
Turkey	60	51 (3.9)	16	44	26.67
Ethiopia	52	47 (3.6)	10	42	19.23
Taiwan	42	35 (2.7)	13	29	30.95

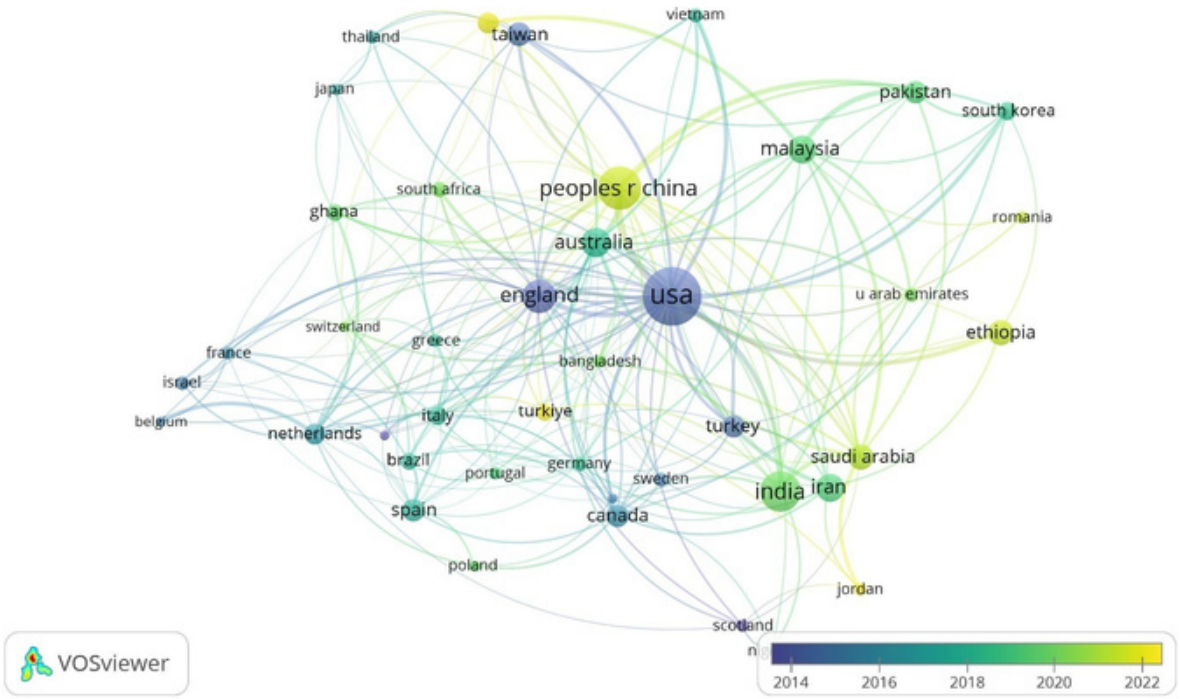
Note. Full counting credits each country once per paper; totals across countries can exceed the number of papers. Fractional counting credits $1/k$ to each of the k countries on a paper; shares therefore sum to 100% of the corpus. MCP rate = multi-country publications ÷ documents (full counting).

The country co-authorship network (VOSviewer) shows a multi-hub structure led by the United States, with strong regional hubs in China, England, and India (Figure 3). A dense European cluster (Italy–Spain–Germany–France–Netherlands) and an Asia–Pacific cluster (China, Malaysia, South Korea, Taiwan, Thailand, Vietnam) present robust internal ties,

while the United Kingdom and Australia act as bridges between clusters. Overlay coloring indicates that recent growth is concentrated in Asia and Africa (China, Malaysia, India, Ethiopia), whereas North America and Western Europe dominated earlier years.

Figure 3

Layout produced in VOSviewer using fractional counting with a threshold of ≥ 9 documents (42 countries). Node size = publication volume; link thickness = collaboration strength; color = mean publication year.



3.6 Journals and sources

Table 5 presents the top 10 most productive journals in patient satisfaction research. The International Journal of Health Care Quality Assurance leads with 62 articles (2,007 citations, h-index = 22, m-index = 1.158), followed by BMC Health Services Research (55 articles, 1,219 citations) and PLOS ONE (30 articles, 694 citations). While the International Journal for Quality in Health Care achieves the highest mean citations per article (56.75) across its 30-year span, the International Journal of Environmental Research and Public Health exhibit

the most accelerated impact trajectory (m-index = 1.571) within only 7 active years. Publication output concentrates in specialized health services and quality management journals alongside open-access multidisciplinary platforms, with h-index values ranging from 4 to 22, reflecting varied journal positioning strategies and selective publication practices in patient satisfaction research.

Table 5

Top 10 journals by number of articles (1994–2025)

Rank	Journal	Articles	Total citations	Mean citations/article	h-index	g-index	m-index	First year	Last year
1	International Journal of Health Care Quality Assurance	62	2,007	32.37	22	43	1.158	2005	2023
2	BMC Health Services Research	55	1,219	22.16	19	34	0.950	2006	2025
3	PLOS ONE	30	694	23.13	11	26	0.786	2012	2025
4	International Journal of Pharmaceutical and Healthcare	28	331	11.82	10	17	0.909	2015	2025

	Marketing								
5	Healthcare	25	73	2.92	4	6	0.667	2020	2025
6	International Journal of Environmental Research and Public Health	21	320	15.24	11	17	1.571	2016	2022
7	International Journal for Quality in Health Care	20	1,135	56.75	14	20	0.452	1995	2025
8	International Journal of Healthcare Management	20	376	18.80	9	19	0.692	2013	2025
9	International Journal of Quality & Reliability Management	17	379	22.29	10	17	0.714	2012	2025

10	Journal of Health Management	17	208	12.24	7	14	0.467	2011	2025

Note. Journal counts are based on WoS "SO" (Source). h/g/m indices are computed within this corpus; m-index = h-index ÷ years active in the corpus (Last Year - First Year + 1).

3.7 Keyword and Co-occurrence Analysis

After normalization and conceptual filtering, the most frequently occurring author keywords were patient satisfaction (n = 419) and service quality (n = 288) reflecting the field's strong emphasis on patient-centered outcomes and service evaluation as shown in Table 6. Secondary clusters included quality of care (n = 108), patient experience (n = 62), and the measurement construct SERVQUAL (n = 62). Terms such as customer satisfaction (n = 49), patient loyalty (n = 47), and quality improvement (n = 36) focused attention to consumer perspectives and improvement science. Emerging yet focused concepts like patient-centered care (n = 22) and healthcare services (n = 20) extended the literature toward integrated care and system-level quality.

Table 6

Core conceptual author keywords and domains (1994–2025)

Rank	**Keyword**	**Conceptual domain**	**Count**
1	Patient satisfaction	Patient-centered outcomes	419
2	Service quality	Service evaluation / measurement	288

3	Quality of care	Clinical/care quality	108
4	Patient experience	Experience measurement	62
5	SERVQUAL	Measurement instrument / model	62
6	Customer satisfaction	Consumer perspective	49
7	Patient loyalty	Loyalty / retention	47
8	Quality improvement	Improvement science / QI	36
9	Patient-centered care	Care model / approach	22
10	Healthcare services	Health services context	20

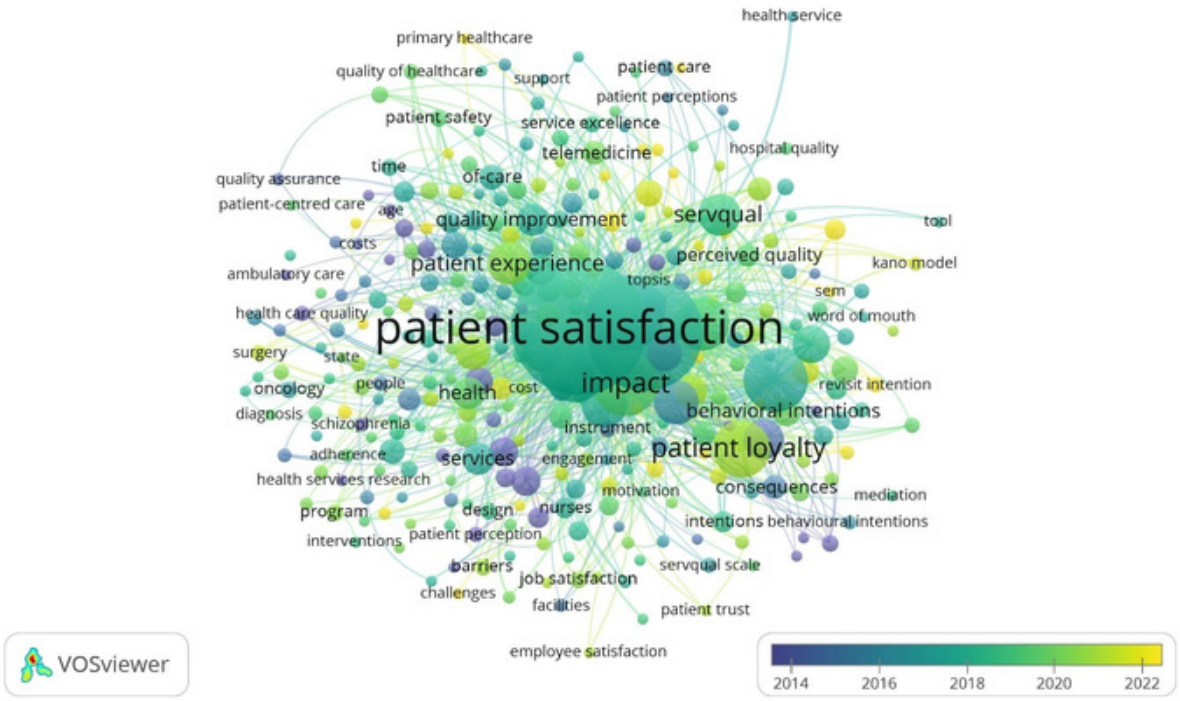
Note. Author keywords (DE) were normalized and filtered to retain conceptual descriptors; generic terms like "model," "impact," "hospital," "quality," and "satisfaction" were excluded. Variants were collapsed (healthcare quality/quality of healthcare to quality of care; healthcare service quality to service quality).

Further, the co-occurrence analysis of keywords was performed with all keywords as the unit of analysis as depicted in Figure 4. A minimum occurrence threshold of 5 was applied which

reduced the dataset from 4156 keywords to 315 that met the criteria. The resulting network displays clusters of frequently co-occurring keywords with node size indicating frequency of use and colors representing distinct thematic clusters over time. This structure demonstrates the conceptual organization of the field where foundational themes such as patient satisfaction, service quality, and care are central while newer clusters point to emerging topics and methodological approaches.

Figure 4

Overlay Visualization co-occurrence network of keywords (minimum occurrence ≥5)



3.8 Temporal Evolution of Emerging Themes

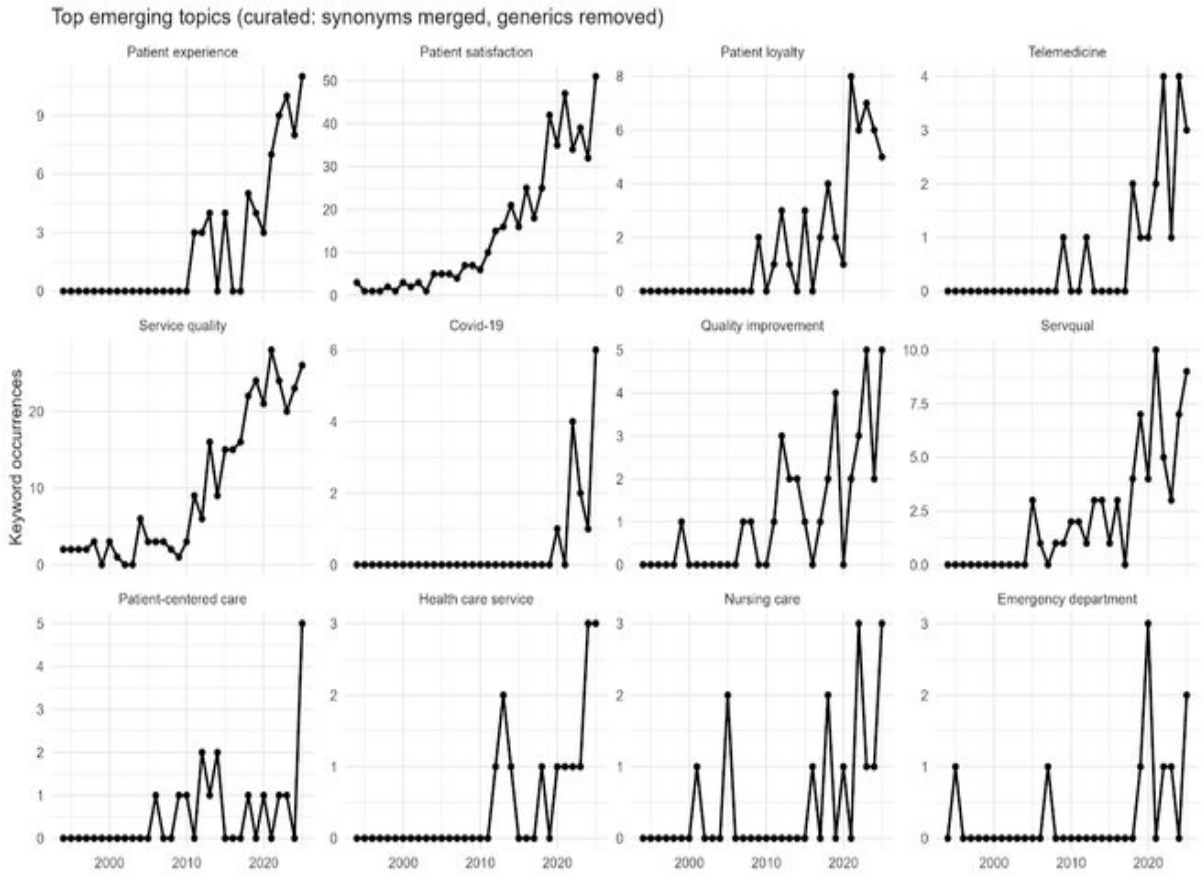
Figure 5 illustrates the temporal trajectory of emerging keywords in patient satisfaction research from 1994 to 2025. The analysis reveals three distinct evolutionary phases.

The foundational phase (pre-2010) was dominated by service quality and SERVQUAL constructs, establishing core measurement frameworks. Between 2010 and 2019, the field expanded toward patient-centered care, nursing care, and quality improvement reflecting a paradigm shift from provider-centric to experiential satisfaction metrics.

A sharp thematic inflection occurred post-2020, marked by the rapid emergence of COVID-19 (100% recent publications) and telemedicine (80% recent share, 20.1% CAGR), demonstrating the pandemic's transformative impact on healthcare delivery models. Concurrently, patient experience (18.4% CAGR) and patient loyalty (16.5% CAGR) exhibited accelerated growth, signaling heightened emphasis on continuity of care and consumer-driven expectations. These patterns indicate a field evolution from measurement standardization (1990s-2000s) through experiential enrichment (2010s) to digital transformation and personalization (2020s).

Figure 5

Temporal evolution of emerging themes in patient satisfaction research (1994-2025)



3.9 Most Influential Publications

Table 7 identifies the 10 most influential publications in patient satisfaction research. Mittal et al. (1998) leads with 689 citations, followed by Batbaatar et al.'s (2017) systematic review (490 citations) and Dagger et al.'s (2007) service quality model (481 citations). The highly cited corpus spans 23 years (1995-2018), with five pre-2000 publications demonstrating foundational influence, including Thompson and Sunol's (1995) expectations framework (374 citations). Citation counts range from 294 to 689, indicating relatively distributed intellectual impact compared to fields with extreme citation concentration. Journal diversity is notable, including marketing, public health, service research, and healthcare-specific outlets, reflecting patient satisfaction research's interdisciplinary character. Entries, such as Meesala and Paul (2018, 295 citations) suggest continued field vitality and theoretical evolution.

Table 7

Top 10 Most Cited Articles in Patient Satisfaction Research

Sr. No.	Year	Title	Authors	Source	Citations	Citations Per Year
1	1998	The asymmetric impact of negative and positive attribute-level performance on overall satisfaction and repurchase intentions	Mittal, V	Journal of Marketing	689	24.61
2	2017	Determinants of patient satisfaction: A systematic review	Batbaatar, E	Perspectives in Public Health	490	54.44
3	2007	A hierarchical model of health service quality:	Dagger, TS	Journal of Service	481	25.32

		Scale development and investigation of an integrated model		Research		
4	2001	Service quality perceptions and patient satisfaction: A study of hospitals in a developing country	Andaleeb, SS	Social Science & Medicine	390	15.6
5	1995	Expectations as determinants of patient satisfaction: Concepts, theory, and evidence	Thompson, AGH	International Journal for Quality in Health Care	374	12.06
6	1996	Effects of actual waiting time, perceived waiting time, information delivery, and expressive quality on patient satisfaction in the emergency department	Thompson Da et al.	Annals of Emergency Medicine	344	11.47
7	2009	Factors affecting patient satisfaction and	Naidu, A	International Journal of	299	17.59

		healthcare quality		Health Care Quality Assurance		
8	2002	The factor structure of customer satisfaction: An empirical test of the importance grid and the penalty–reward–contrast analysis	Matzler, K	International Journal of Service Industry Management	299	12.46
9	2018	Service quality, consumer satisfaction and loyalty in hospitals: Thinking for the future	Meesala, A and Paul, J	Journal of Retailing and Consumer Services	295	36.88
10	2000	Patient satisfaction with hospital care: Effects of demographic and institutional characteristics	Young, GJ	Medical Care	295	11.35

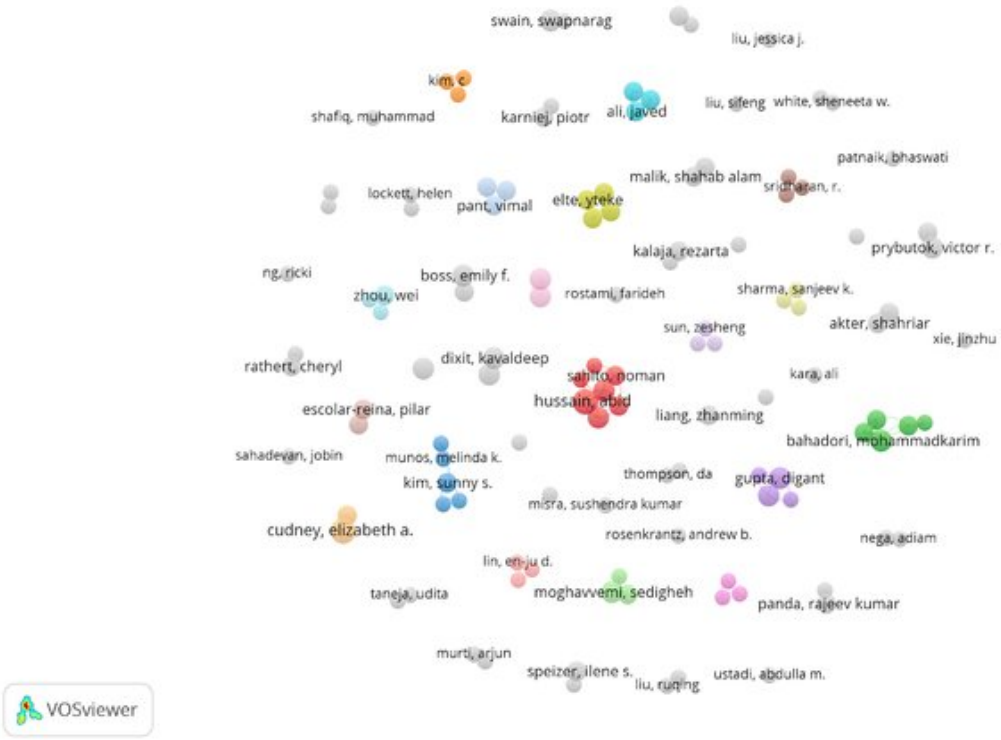
3.10 Co-authorship mapping analysis

The co-authorship analysis was conducted with authors as the unit of analysis using bibliographic data from the dataset as represented in Figure 6. The author co-authorship network (fractional counting; min. 2 documents; 120 authors) is highly fragmented (57 clusters; 95 links; total link strength = 125). Most collaborations occur in small, localized

teams (pairs/triad). This suggests limited cross-team integration, site specific survey, and an opportunity for multi-center collaborations.

Figure 6

Co-authorship network visualization (minimum documents ≥2; minimum citations ≥1).



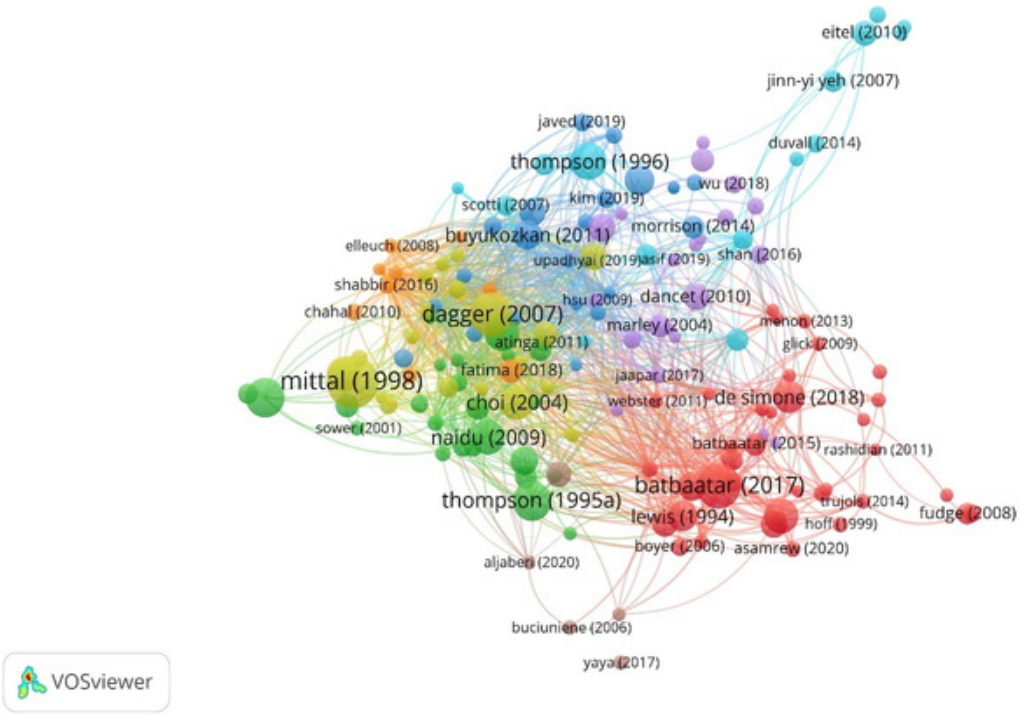
3.11 Journal citations and publications mapping analysis

We mapped the intellectual structure using VOSviewer (bibliographic coupling, unit of analysis: documents; association-strength normalization; fractional counting). To ensure interpretability we set a minimum of 39 citations per document, retaining 157 items in the largest connected component (links = 5,793, total link strength = 1,758, 8 clusters). The map reveals two central streams: (i) service-quality measurement and scale development/validation (Dagger 2007, Mittal 1998, Thompson 1995a/b, Naidu 2009), and (ii) patient experience/satisfaction syntheses and determinants (Batbaatar 2017, De Simone 2018, Young 2000). Peripheral but well-connected clusters relate to implementation and hospital/ED performance (Eitel 2010; Yeh 2007) that bridge measurement traditions with

quality-improvement research. The dense coupling and extensive cross-links indicate a cohesive literature in which measurement, experience, and operational quality increasingly co-evolve. The tight web of inter-cluster edges and the absence of large isolated components suggest a mature integrated field rather than fragmented subdomains.

Figure 7

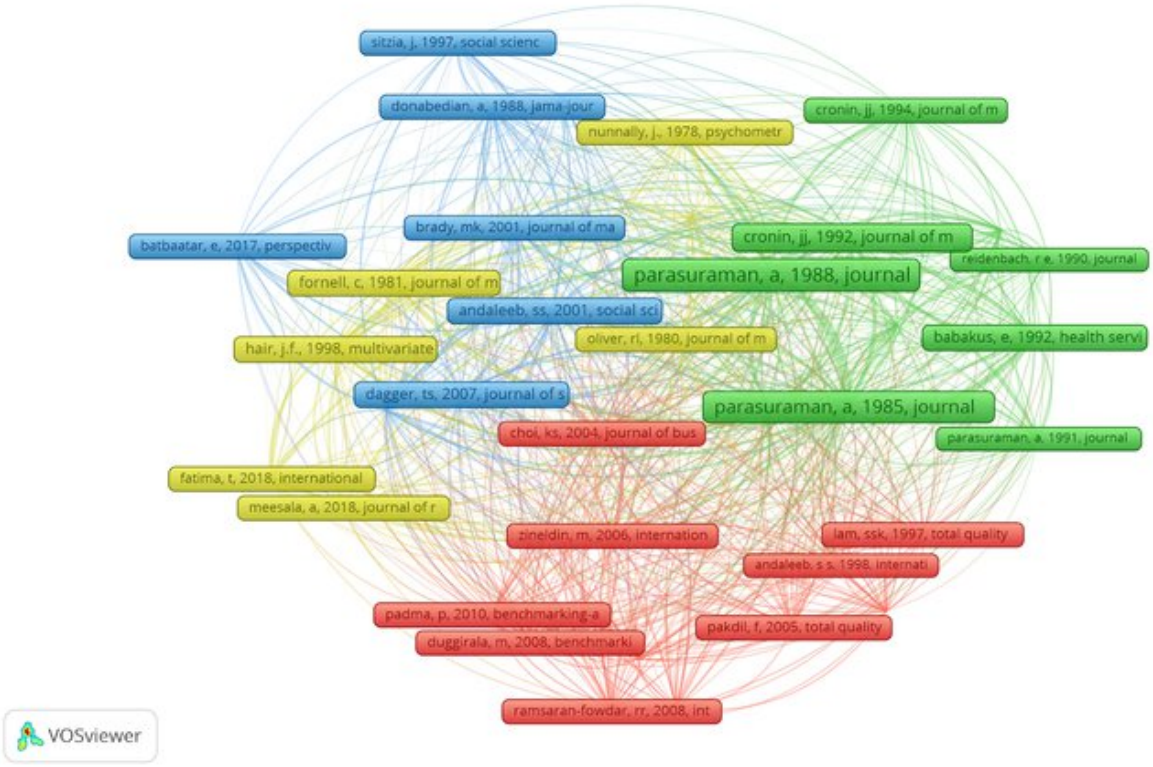
Bibliographic coupling network of documents



The co-citation analysis as depicted in Figure 8 was further conducted with cited references as the unit of analysis. A minimum threshold of 45 citations per reference was applied. Out of a total cited references in the dataset 37 met the inclusion threshold. The map shows that contemporary patient-satisfaction studies are intellectually grounded in classic marketing service-quality theory, operationalized through psychometric rigor, and translated to clinical settings via healthcare-tailored scales. The high centrality of Parasuraman (1985, 1988) and Cronin (1992) indicates these works remain the primary links across clusters while Donabedian links the service-quality canon to healthcare quality-of-care traditions.

Figure 8

Co-citation network of cited references (minimum citations ≥45)



1. Discussion

This bibliometric analysis of 1,306 WoS-indexed articles on healthcare service quality and patient satisfaction (1994-2025) shows a sustained and accelerating growth of research activity particularly in the last five years (peak in 2025). As evidenced by the prominence of terms like patient satisfaction and service quality in author keywords, the topical focus is still on measurement, perceptions, and service quality models. Our findings indicate a significant rise in research and publication output, from 69 articles during 1994-2004 to 981 articles in 2015-2025, reflecting an increase in academic interest. Similar results were reported by (Ferreira et al., 2023), who noted a steady rise in the number of publications and articles regarding patient satisfaction since 2000. A bibliometric analysis of health policies predicated on patient satisfaction revealed a rise in publications during the 2000-2020 timeframe (Grasso et al., 2021). The CAGR of about 11.9% over the 31 years also backs up this trend. This is in

line with the larger trend of quality and satisfaction research becoming more important in healthcare as service delivery becomes more patient-centric (Grasso et al., 2021). The increasing mean number of authors per article (from 2.90 to 4.02) also suggests growing team-based collaboration. Our results indicate that, despite the increase in the number of articles and publications, the average citations per article and per author have declined. The mean citations per article dropped from 78.7 in 1990-2004 to 12.6 in 2015-2025. While increase in publication volume is an important indicator of field maturity, our observed decline in mean citations per article (from 78.7 to 12.6) suggests two phenomena. First, recently published studies are too new to get as many citations as older papers and the growing number of publications could render the citation density. Previous bibliometric research in analogous fields indicates that citation window bias and thematic dispersion influence these trends (Grasso et al., 2021; Man et al., 2024). The negative Spearman correlation between publication year and normalized citations ($\rho = -0.42$, $p = 0.016$) further supports this interpretation.

Our results show that the top 20 authors published only 4-6 papers each (median = 4) and that h-indices within this corpus ranged from 2 to 4. The most productive author Hussain A (NP = 6, h = 4) spans 2019–2025, whereas older authors such as Andaleeb SS (NP = 4, h = 3, span 2000–2014) carry higher citation totals (~500) albeit on fewer papers. This suggests a field with many authors contributing a few articles rather than a single author. (Ferreira et al. 2023) found that 157 articles published between 2000 and 2021 were attributed to different contributors and they also observed a small number of extremely productive authors. This suggests that the discipline is still decentralized rather than dominated by a small number of well-known academics.

Our analysis shows 84 countries contributed to the corpus. The top fractional shares are the United States (15.4 %), China (8.6 %), and India (8.3 %). The co-authorship network indicate regional hubs (Europe, Asia–Pacific) with the United States as a dominant central node and recent growth concentrated in Asia/Africa (China, Malaysia, India, Ethiopia) whereas earlier years were dominated by North America and Western Europe. (Grasso et al. 2021) indicated that the United States was the foremost contributor and highlighted significant international collaboration despite the limited research on patient satisfaction in the economic and management sectors.

Our research found that the top productive journals were International Journal of Health Care Quality Assurance (62 articles, 2,007 citations), BMC Health Services Research (55 articles,

1,219 citations), and PLOS ONE (30 articles, 694 citations). IJQHC had the most citations per article, with an average of 56.75 citations per article. The fact that a small number of journals publish most of the output in this field suggests that the publishing ecosystem is stable. Ferreira et al. (2023) also asserts that the most productive sources were health-services quality journals and that papers on measurement and scale development are the most common. We also found that IJHCQA journal has the most articles and citations, which shows that it is an agreeable place to publish research in the field. This may influence submission strategies for authors seeking visibility. At the same time, the higher mean citations in IJQHC suggest that fewer but more highly cited articles appear in that journal which may reflect a higher selectivity or higher impact audience.

The keyword count in our study shows that "patient satisfaction" (419 occurrences) and "service quality" (288) dominate. Other frequent terms include perceptions, model, quality, care, healthcare, impact, customer satisfaction. These core terms align with the foundational body of literature on SERVQUAL, HCAHPS and patient-experience metrics (Bernardo et al., 2022). Co-occurrence mapping identified clusters around measurement, experience/loyalty, and digital/telemedicine themes, which mirror the domain's transition from structural/service-quality measurement to experiential and digital paradigms. This is consistent with earlier review on Service quality in the healthcare sector by (Darzi et al., 2023). Our study further documents three phases: foundational (pre-2010) dominated by service quality and SERVQUAL constructs, expansion (2010–2019) toward patient-centred care and quality improvement, and a post-2020 inflection driven by COVID-19, telemedicine, patient experience, loyalty (with high CAGR for telemedicine ~20.1%). This three-phase pattern is consistent with other bibliometric findings such as the infusion of telehealth research in home health services (Güdük, 2025) and the surge of telemedicine during COVID-19 (Lan et al., 2022).

Bibliographic coupling and co-citation analyses show that the field rests on two main streams. First, service-quality measurement/scale development (Mittal 1998, Dagger 2007, Thompson & Sunol 1995) and second, patient experience/satisfaction determinants (Batbaatar 2017, Young 2000). The centrality of classic marketing/service-quality work (Parasuraman, Cronin) in the co-citation map confirms the theoretical roots of this literature.

In comparison to previous bibliometric or systematic reviews our study covers a longer period (1990–2025) compared with other studies. A study by (Ferreira et al., 2023) included studies from 2000–2021 and ended up with 157 articles. Our review captures the surge post-

2020 (telemedicine, COVID) which many earlier reviews did not yet fully examine. Some earlier reviews for example Health Policies Based on Patient Satisfaction emphasised policy-making and economic/management scarcity in the domain, that is, fewer studies on the economics of patient satisfaction (Grasso et al., 2021). Our study extends prior work by providing an up-to-date bibliometric mapping including digital health/telemedicine themes, broader co-author/network analyses, and detailed metrics (country fractional counts, MCP rates).

1. **Implications**

For researchers, the dispersion of topics alongside a fragmented author network argues for multi-institutional collaborations, shared instrument libraries, and comparative designs (cross-country or cross-setting analyses) to consolidate evidence and enhance generalizability. For policymakers and managers, the growth of experience/loyalty themes suggests prioritizing communication quality, continuity, and digital touchpoints in quality strategies.

1. **Limitations & Future Directions**

Because we analyzed only WoS core collection and English language documents the field's footprint in Scopus and PubMed may not be fully captured. Author name disambiguation was limited, some author metrics may conflate individuals. Keyword harmonization and threshold choices (for co-occurrence and networks) can influence map granularity. Citation-based indicators are subject to time-window bias and field norms; all h/g/m indices were computed within this corpus and should not be compared directly with global journal metrics.

Conclusion

This bibliometric review shows that research on healthcare service quality and patient satisfaction has expanded considerably over the past three decades with a marked rise in output after 2015. The analysis reveals that most contributions originate from USA, China and India. A limited set of journals led by the International Journal of Health Care Quality Assurance and BMC Health Services Research have served as central outlets for this body of work while highly cited publications continue to shape its theoretical and methodological foundations. The thematic structure of the field remains centered on patient satisfaction, service quality, and measurement models, though post COVID-19 pandemic year have seen greater attention to digital health and telemedicine. The decreasing citation averages of recent publications reflect shorter exposure times rather than reduced relevance. The findings

indicate a maturing research area characterized by steady international collaboration, diversification of methods, and the evolution of patient-centered quality assessment frameworks. Hence, the field of healthcare service quality and patient satisfaction appears cohesive conceptually yet operationally fragmented in collaboration indicating a timely opportunity for integrative projects that connect measurement, experience, and outcomes across settings and regions.

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Article Information and Declarations

Declaration of Generative AI and AI-Assisted Technologies in the Writing Process

During the preparation of this work, the authors used Google Bard and ChatGPT to enhance the language quality and readability of certain sections, if necessary, of the manuscript. After

using these tools all authors thoroughly reviewed and edited the content as necessary and take full responsibility for the integrity and accuracy of the final publication.

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Biography

The authors Dr. Kriti Tambi (PGDHM, BDS), Anubhav Sukhwani (MTM, PGD-IHM), and Garvit Chopra (MBA, PMP®) bring complementary strengths in analytics, hospital operations, and quality systems that strengthens the rigor of this bibliometric review.

Dr. Kriti Tambi serves as Assistant Medical Superintendent and Head of Quality at CK Birla Hospitals–RBH, Jaipur, leading quality governance, KPI monitoring, infection control, and clinical pathway formulation across specialties. Previously at SDMH Jaipur, she directed quality assurance and contributed to national and international quality forums. A certified internal auditor for NABH and active participant in JCI-aligned initiatives, she is pursuing a PhD in General Management, reflecting her commitment to evidence-based hospital administration and continuous improvement.

Anubhav Sukhwani is Vice President (Unit Head) at CK Birla Hospitals–RBH, Jaipur, where he manages overall P&L and is spearheading a major expansion from 300 to 550 beds alongside branding, clinician onboarding, and operational excellence programs. With 20+ years across premier healthcare networks (Shalby Hospitals; Max Healthcare), he has led multi-site growth, NABH/NABL initiatives, cost optimization, and market repositioning. His academic training stretch across law, hospitality, and management including leadership development through the CK Birla Group Chairman Circle.

Garvit Chopra is a data-driven business analyst with a cross-sector background in healthcare, technology, and energy, skilled in business process analysis, cost-benefit modelling, Agile project management, and decision support. He leads a business unit, applying analytics and requirements gathering to optimize workflows for life-sciences research.

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Appendix – A: WoS Search Query

```
TS=(
 ("patient satisf*" OR "patient experience*" OR "experience of care"
  OR "consumer satisf*" OR "client satisf*"
  OR "HCAHPS" OR "CAHPS" OR "Press Ganey" OR "patient-reported experience"
  OR "patient reported experience" OR "patient-reported experience measure*" OR PREM*
  OR "Picker Patient Experience" OR "Picker Patient Experience Questionnaire" OR "PPE-15"
  OR "Patient Satisfaction Questionnaire" OR "PSQ-18")
 AND
 ("service quality" OR "quality of service" OR SERVQUAL OR healthequal
  OR "perceived service quality" OR "service excellence")
 AND
 (healthcare OR "health care" OR hospital* OR clinic* OR "primary care"
  OR "emergency department*" OR "intensive care" OR ICU
  OR inpatient* OR outpatient* OR "medical service*" OR "health service*")
)
NOT TS=(hospitality)
AND PY=1990-2025
AND DT=(ARTICLE OR REVIEW)
AND LA=(English)
```