

RESEARCH ARTICLE

Comparative Analysis of HQS, JCI and HIMSS-EMRAM Quality Assessment Models Widely Used in Turkey

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Abstract

The standards developed for measuring quality ensure the management of the dynamic structure of health services, the reduction of uncertainties, and the prevention of errors since quality relies on measurement, evaluation, and continuous improvement. Additionally, the models used in measuring health service quality are divided into two: case-based and indicator-based. Using the document analysis method, this study compared the Joint Commission International (JCI), Healthcare Quality Standards (HQS) and Healthcare Information and Management Systems Society (HIMSS) – Electronic Medical Record Adoption Model (EMRAM) models, which are included in the indicator-based health quality measurement models, in terms of the concepts, processes, and standards featured in them. Within the scope of the study, a total of 1,141 standards from all three models were examined. Ethical approval was taken from local ethics committee on 10/08/2020. Upon the comparison, it was understood that the HQS and JCI models were more similar in "presence rates" than the HIMSS-EMRAM model in terms of concept (83%), process (66%), and standard (64%). It was concluded that HIMSS EMRAM standards can be used as a very useful tool for making improvements and identifying deficiencies in HQS and JCI processes.

Keywords: Medical Informatics, Healthcare Quality, Quality Indicators, Healthcare Standard, Healthcare Information Management.

Öz

Kalitenin ölçülmesi için geliştirilen standartlar; sağlık hizmetlerinin dinamik yapısının yönetilmesini, belirsizliklerin azaltılmasını ve hataların önlenmesini sağlamaktadır. Çünkü kalite; ölçme, değerlendirme ve sürekli iyileştirmeye dayalıdır. Sağlık hizmet kalitesinin ölçümünde kullanılan modeller de vaka bazlı ve gösterge bazlı olarak iki gruba ayrılmaktadır. Bu çalışmada, gösterge bazlı sağlık kalite ölçüm modelleri arasında yer alan Joint Comission International (JCI), Sağlıkta Kalite Standartları (SKS) ve Healthcare Information and Management Systems Society (HIMSS) – Electronic Medical Record Adoption Model (EMRAM) değerlendirme ölçütleri doküman incelemesi yöntemi kullanılarak içeriğleri kavram, süreç ve kriter açısından karşılaştırılmıştır. Çalışma kapsamında her üç dokümandan yer alan 974 değerlendirme ölçütü incelenmiştir. Yapılan karşılaştırma sonucunda, SKS ve JCI değerlendirme ölçütlerinin "varlık oranları" kavram (%83), süreç (%66) ve kriter (%64) bakımından HIMSS-EMRAM değerlendirme ölçüyüne göre daha benzer olduğu görülmüştür. Aynı zamanda HIMSS EMRAM kriterlerinin SKS ve JCI süreçlerinde iyileştirmeler yapılması ve eksikliklerin tespit edilmesi için çok faydalı bir araç olarak kullanılabileceği sonucuna varılmıştır.

Anahtar Kelimeler: Sağlık Bilişimi, Sağlık Bakım Kalitesi, Kalite Göstergeleri, Sağlık Bakım Standartları, Sağlık Bilgi Yönetimi.

Introduction

Quality is a set of activities carried out to offer a product or service at a low cost and in a way that can meet the needs of customers at the maximum level (Bakan et al., 2015). The concept of quality should be structured so that it covers all the services provided, enables the efficiency of the service to be measured, associates the processes with the results and is limited to technical, mechanical and scientific knowledge and is constantly changing(Arpat et al., 2014). **Service quality** is defined as the customer's general judgment about the superiority or excellence of a product or service(Devebakan, 2015). **Healthcare service quality**, on the other hand, refers to all efforts to prevent potential adverse circumstances on the health condition of individuals or to ensure the recovery of individuals(Aygar & Önsüz, 2017). Therefore, measuring and evaluating the quality of healthcare services is pivotal in terms of determining the areas for improvement in healthcare services and increasing the quality of the service provided. In this way, it is possible to provide a health service that covers all actors in health institutions and meets the expectations and needs (Kidak et al., 2015).

Case-based and indicator-based models are used to measure the quality of healthcare services in Turkey. This study discusses the Healthcare Quality Standards (HQS) and the Electronic Medical Record Adoption Model (EMRAM) developed by the Joint Commission International (JCI) and the Healthcare Information and Management Systems Society (HIMSS), which are indicator-based models. This study, which examines documents about JCI, HQS and HIMSS-EMRAM models by using the document analysis method, compares the concepts used by and the processes examined by these models, and the measurement criteria.

Healthcare Quality Standards (HQS) in Turkey National Quality Evaluation

The purpose of establishing HQS is to enhance the safety and satisfaction of both healthcare professionals and individuals who intend to make use of healthcare services, by following international developments, paying attention to the needs and expectations of patients, and making the services provided by health institutions and organizations measurable (Ertaş & Çelik, 2018). The Ministry of Health provides training to HQS evaluators on all processes related to the establishment, development, implementation and evaluation of these standards(Güdük & Kılıç, 2017). HQS evaluators are selected from individuals who have completed at least one basic medical undergraduate program and have 2 years of experience in the field.

Healthcare Quality Standards-Hospital was established in 2005. A pilot scheme was put into action in 2007. New standards were added in 2007 and 2008. In 2009, private hospitals were additionally included in the evaluation. HQS were revised in 2011 and 2015(Ertaş & Çelik, 2018). The latest version (version 6) was used by health institutions initially in 2020. When the 2005 and 2020 versions of the constantly updated HQSs are compared, it is understood that many improvements have been made.

The activities carried out concerning Healthcare Quality Standards (HQS) within the scope of the "Regulation on the Development and Evaluation of Healthcare Quality" to regulate the practices based on the establishment and development of the required standards, the evaluation of the practices adopted by health institutions, and the provision of quality service to meet the expectations are undertaken by the General Directorate for Healthcare Services, Department of Healthcare Quality Accreditation and Employee Rights Department (TC. Sağlık Bakanlığı, 2020; Uysal & Yorulmaz, 2018).

Healthcare Information Management System Society (HIMSS)

HIMSS was founded in 1961 in the US. The model developed by the society has been applied in private and public hospitals since its establishment. HIMSS continues to operate in 6 regions: America, Europe, Asia, Latin America, the Middle East, and the United Kingdom. HIMSS evaluators are selected from among those who have been trained in health and informatics-related occupational groups and have experience in their field(Güler et al., 2010).

HIMSS measures the extent to which the electronic health record (EHR) of healthcare providers is adopted to improve clinical care quality and patient safety. HIMSS, whose vision is to improve healthcare by making better use of technology and information, measures the stage (maturity) of health service providers according to HIMSS standards and shares these results with the entire health sector(Demir & Güler, 2022). HIMSS evaluates the institutions providing healthcare services from a different perspective, considers the proper use of health systems regarding technology, and completely relies on the concept of patient safety. This evaluation is based on an analytical questionnaire filled in by health institutions. If the result of the survey is stage 6 or 7 out of 7, the stage measured by the questionnaire is validated with an on-site visit upon the request of the hospital. shows that it is advanced. The validation of a hospital in accordance with level 6 or 7 standards indicates that the said hospital offers the proper treatment by prioritizing patient safety and is digitally advanced(HIMSS Europe, 2020).

Joint Commission International (JCI)

The first accreditation body in the health sector, JCI was established in 1950 as the "Joint Commission on Accreditation of Healthcare Organizations" (JCAHO). In addition, it is recognized as the Joint Commission International (JCI) in Turkey(Kaptanoğlu, 2011). The Joint Commission International (JCI) is an institutional and global organization for quality improvement and patient safety in healthcare.

JCI's reported mission is to continually improve public healthcare services in collaboration with other stakeholders by evaluating healthcare providers and inspiring them to excel in providing the highest quality, safe and effective care. Its vision is to ensure that all individuals experience the safest, highest quality and most valuable healthcare service anywhere and anytime. JCI provides services to hospitals and healthcare institutions that provide outpatient services, continuity of care (behavioural health, home health care), clinical laboratories, and nursing care centre services. JCI evaluators are clinicians who are experts in their field(JCI, 2017).

A set of JCI Standards Principles is formulated to guide the standards development process. JCI standards were accredited in 2011 by ISQua which leads the organizations conducting accreditation programs in the world. ISQua, which is also supported by the World Health Organization, leads the organizations that carry out accreditation programs in healthcare services. Within the scope of international accreditation programs, JCI was audited and accredited in June 2011 by the International Health Services Quality Society (ISQua) for its own audit process, quality and standards as part of i) the sets of standards used by institutions in their accreditation activities, ii) auditor training programs and iii) international common standards for external evaluators(Donahue & Vanostenberg, 2000; Kayral, 2018).

Equipped with expertise in infection control, drug safety, patient care and treatment, patient evaluation, and facility safety, JCI focuses on improving healthcare quality and on patient safety(JCI, 2017).

Literature Review

The literature includes a range of studies on the comparison of quality measurement models in healthcare services.

In the study conducted by Fu et al. in 2012, an online quality assessment system was developed to standardize different quality assessment approaches adopted in the US. In this system, the data from different quality assessments are standardized and compared to each other,

followed by the conduct of efforts for improvement(Fu et al., 2012).

In 2000, Donahue and Vanostenberg defined the components of the JCI accreditation program for hospitals and compared the four quality measurement models of their choice within the scope of the ExPeRT project, using the JCI standards and criteria along with the focus group interview method, and reported that such models had common characteristics(Donahue & Vanostenberg, 2000).

The study conducted by Tabrizi et al. in 2011 searched six systems in the SID, Ovid Medline & PubMed databases, including JCAHO from the US, the Canadian program of CCHSA, and the accreditation programs of the UK, Australia, New Zealand, and France. Upon this screening, the pros and cons of accreditation programs were revealed. The search was carried out based on the determined keywords. After the screening, 23 characteristics defining the pros and cons of different accreditation approaches were determined and a comparison was made based on these characteristics. The comparison demonstrated that the accreditation programs applied in the US and Canada are more advantageous(Tabrizi et al., 2011).

In the study conducted by Hussey et al. in 2004, the Commonwealth Fund International Quality Indicators Working Group collected data on 21 indicators that reflect medical care in Australia, Canada, New Zealand, the United Kingdom, and the United States. Indicators include five-year relative cancer survival rates, thirty-day case fatality rates after acute myocardial infarction and stroke, breast cancer screening rates, and asthma death rates. Upon this comparison, it is argued that each country has at least one area of care that it can learn from international experience(Hussey et al., 2004).

The study conducted by Yousefian et al. in 2013 compared the Excellence Model developed in Iran with the JCI criteria. As a result of the study, it is stated that all the requirements of the JCI accreditation system are covered by the Excellence Model developed, and it is argued that the

Excellence Model is highly comprehensive(Yousefian et al., 2013).

The study conducted by Şahin in 2020 compared HQS with the Healthcare Accreditation Standards (SAS) hospital standards and JCI standards by the document analysis method. When HQS and SAS are evaluated based on dimensions and departments, it is understood that the standards are similar but structured differently. The comparison demonstrated that the SAS-Hospital set standards were prepared for hospitals on a very comprehensive basis and were similar to the JCI standards in many aspects, with some sections being even more detailed(Şahin, 2020).

An assessment was conducted by Virginio and Dos Reis in 2019 to determine the relationships between JCI and EMRAM requirements. Experts were asked to approve and present their opinion on these relationships for the standards which a correlation was identified with. 127 relationships were found between JCI requirements and EMRAM and/or HIS (Healthcare Information System) requirements. It was understood that EMRAM has fulfilled many standards expected to be fulfilled by JCI. It is argued that the standards found in JCI but not in EMRAM will contribute to the improvement of the model(Virginio & Dos Reis, 2019).

Studies on this subject were screened in Web of Science, ScienceDirect, Google Scholar, Dergi Park and Sci-hub databases, and no study was found, which deals with HQS, JCI and HIMSS-EMRAM models in the comparison of quality measurement models and prefers the document analysis method as the research method.

Methodology

523 standards in the HQS-Hospital Version 6, 168 standards in the HIMSS-EMRAM Preparatory Guide 2020, and 450 standards in the 6th Edition of JCI Accreditation Standards for Hospitals were reviewed. The study used the document analysis method comparatively and the data were given a qualitative form. The documents were compared

and the results of this comparison were converted into numerical data (Figure 1).

Document analysis under the Comparative Method was carried out using two research methods specified by Yıldırım and Şimşek (Yıldırım & Şimşek, 2016):

1. Present or absent: If the determined concepts are present in the relevant documents, they are given the value of "1" and the value of "0" if absent. Thus, the qualitative data were quantified.
2. Percentage distribution: It was established how much share (in percentages) the determined concepts have in the related documents by score.

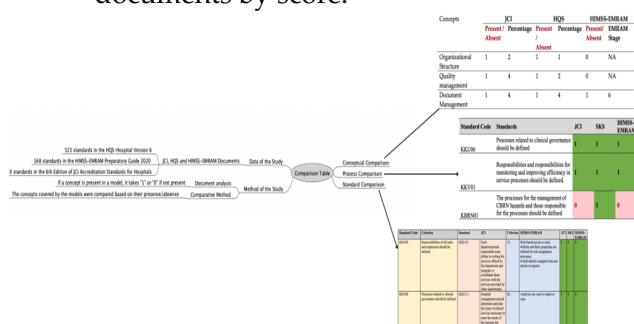


Figure 1. Tables Analysis Process

Conceptual Comparison: Models were conceptually compared by two methods. In the first model, the concepts covered by the models were compared based on their presence/absence. If a concept is present in a model, it takes "1" or "0" if not present. The second model considered how much the standards related to the concepts covered by the models scored out of 100. It has been tried to determine, how much the concepts covered by the models exist in the standards mentioned in the models as a percentage. Thus, the standards under the determined concepts were scored in percentages for any model.

Process Comparison: The items, which are among the standards of the JCI, HQS and HIMSS models and which question the existence of certain processes in the hospital (for example, closed-loop

medication administration, clinical decision support systems, pre-operative controls, etc.), though actually seeming to be standards, were discussed and the processes covered by these models were compared. The process comparison considered the existing processes in all three models based on their presence/absence. If a process is present in a model, it takes "1" or "0" if not present.

Standard Comparison: For N standards to be included in the combination of JCI, HQS and HIMSS-EMRAM models, the models in which these standards are present were determined and compared. The standards present in all models were discussed and compared based on presence/absence status. If a standard model exists, it is scored "1" or "0" if not present. For example, the standard coded SHBO4 of the HQS document says, "A care plan should be prepared for inpatients in line with their care needs". The standard coded COP2.1 of the JCI document says, "A patient-specific care plan should be prepared and documented for each patient." The standard 62 of the HIMSS EMRAM document questions the existence of the "Care Plan". Here, all three models question the existence of the "care plan" applied to the patients, asking different questions. In such a case, all three documents were deemed to include the standard and were scored "1".

Findings

While HQS and JCI documents are evaluated in percentages since they make a score-based evaluation, the HIMSS-EMRAM document cannot be incorporated into the calculation in percentages as it makes a level-based evaluation. Therefore, the calculation in percentages appears as (0%). However, the level at which the concepts discussed in the models correspond to the HIMSS-EMRAM document is given in Table 1.

Table 1. Conceptual Comparison Table of JCI-HQS and HIMSS-EMRAM Documents

Concepts	JCI		HQS		HIMSS-EMRAM	
	Present/Absent	Percentage	Present zAbsent	Percentage	Present/Absent	EMRAM Stage
Organizational Structure	1	2	1	1	0	NA
Quality management	1	4	1	2	0	NA
Document Management	1	4	1	4	1	6
Risk management	1	2	1	2	0	NA
Organizational Efficiency	1	2	1	1	0	NA
Undesirable Event Reporting System	1	2	1	2	0	NA
Disaster and Emergency Management	1	2	1	2	0	NA
Management of Chemical, Biological, Radiological and Nuclear Hazards	1	2	1	2	0	NA
Education Management	1	2	1	2	0	NA
Social Responsibility	0		1	1	0	NA
Patient Experience	1	2	1	2	0	NA
Access to Service	1	2	1	2	0	NA
End of Life Services	1	2	1	1	0	NA
Healthy Working Life	1	2	1	1	0	NA
Patient Care	1	4	1	4	1	1
Medication Administration	1	4	1	4	1	6
Prevention and Control of Infections	1	2	1	2	1	7
Cleaning, Disinfection and Sterilisation Services	1	4	1	4	0	NA
Transfusion Services	1	4	1	4	1	6
Therapeutic Apheresis Services	1	2	1	1	0	
Radiation Safety	1	2	1	2	1	1
Emergency Room	1	4	1	4	1	3
Operating Room	1	2	1	2	0	
Intensive Care Unit	1	4	1	4	1	7
Newborn Intensive Care Unit	0		1	4	1	6
Birth Services	0		1	2	1	6
Dialysis Unit	0		1	1	0	
Psychiatric Services	1	4	1	4	1	6
Community Mental Health Services	0		1	1	0	NA
Laboratories	1	4	1	4	1	1
Chemotherapy Services	0		1	2	0	NA
Organ and Tissue Transplantation Services	1	2	1	2	0	NA
Physical Medicine and Rehabilitation Services	1	2	1	2	1	6
Palliative Care Clinic	1	2	1	1	0	NA
Home Health Services	0		1	1	0	NA
Facility Management	1	2	1	1	0	NA
Hospitality Services	0		1	1	0	NA
Information Management System	1	4	1	4	1	2
Material and Device Management	1	2	1	1	0	NA
Medical Record and Archive Services	1	2	1	1	0	NA

Concepts	JCI		HQS		HIMSS-EMRAM	
	Present/Absent	Percentage	Present zAbsent	Percentage	Present/Absent	EMRAM Stage
Waste Management	1	2	1	2	0	NA
Outsourcing	1	2	1	1	0	NA
Disaster Recovery and Business Continuity	0		0		1	6
Governance - Clinical	0		0		1	6
Business Intelligence						
Health Information Exchange	0		1	1	1	4
Authentication Using Technology	0		0		1	6
Medical and Surgical Services	1	2	1	2	1	6
Clinical Documentation	1	2	1	2	1	3
Computerized Order Entry	1	2	1	1	1	4
Medical Documentation	0		0		1	6
Medical Device Integration	0		0		1	1
Medical Imaging - Interventional Radiology	1	2	1	1	1	1
Pharmacy	1	2	1	2	1	1
		100		100		

Table 2 shows the percentage distribution table for conceptual comparison. Here, the striking aspect is that 83% of the concepts contained in the HQS and JCI documents are present in both documents. This rate seems very high. Since the HIMSS-EMRAM model makes a level-based evaluation, the percentage cannot be given. Therefore, the presence and absence rates in the HIMSS-EMRAM model are *0% as given in Table 3. However, Table 2 shows what level the concepts in the HQS and JCI models correspond to in the HIMSS-EMRAM model conceptually.

Table 2. Conceptual Comparison Percentage Distribution of HQS, JCI and HIMSS EMRAM Documents

Models Compared	Presence Rate	Absence Rate
HQS-HIMSS EMRAM	0%*	0%*
HQS- JCI	83%	17%
JCI-HIMSS EMRAM	0%*	0%*
HQS-JCI-HIMSS EMRAM	0%*	0%*

Table 3 gives the percentage of presence/absence of words containing processes and algorithms in documents. According to the analysis, the presence rate of standards containing processes and algorithms is the highest (66%) in HQS and JCI documents. The lowest presence rate (20%) is in JCI and HIMSS-EMRAM documents. Among all three documents, the presence rate of the standards containing processes and algorithms is 19% and the absence rate is 81%. When these

rates are evaluated comparatively, the high rate of presence among HQS and JCI standards, which contain the words of process and algorithm, is due to the fact that hospitals question the existence of similar processes. While JCI and HQS seem more similar in terms of concepts, both are less similar to HIMSS EMRAM since they evaluate processes in hospitals from different perspectives. HIMSS EMRAM evaluates processes from a digital hospital perspective.

Table 3. Process Comparison Percentage Distribution of HQS, JCI and HIMSS EMRAM Documents

Models Compared	Presence Rate	Absence Rate
HQS-HIMSS EMRAM	21%	79%
HQS- JCI	66%	34%
JCI-HIMSS EMRAM	20%	80%
HQS-JCI-HIMSS EMRAM	19%	81%

The analysis shows that 64% of the standards in the HQS-JCI documents are present in both documents, as seen in Table 4. It is understood that the standards in JCI and HIMSS-EMRAM documents are present in both guides at a rate of 21%. This is the lowest rate obtained by pairwise comparisons following the analysis. When the presence/absence of a total of 974 models discussed as part of the study is analysed, it is understood that the standards exist in all three documents at a rate of 19%. When all three guides are evaluated comparatively, the high rate of standard

comparison between HQS and JCI is due to the fact that hospitals question the existence of similar processes.

Table 4. Standard Comparison Percentage Distribution of HQS, JCI and HIMSS EMRAM Documents

Models Compared	Presence Rate	Absence Rate
HQS-HIMSS EMRAM	21%	79%
HQS- JCI	64%	36%
JCI-HIMSS EMRAM	20%	80%
HQS-JCI- HIMSS EMRAM	19%	79%

Table 5.HQS, JCI and HIMSS-EMRAM Documents Concept, Standard and Process Comparison Percentage Distribution

Models Compared	Presence Rate	Absence Rate
Conceptual Comparison	0%*	0%*
Process Comparison	19%	81%
Standard Comparison	19%	81%

When the presence and absence rates were evaluated in line with 974 models discussed in the JCI, HQS and HIMSS EMRAM documents within the scope of the study, the presence rate was found to be 19% in the process comparison and the absence rate to be 81%. The presence rate in the standard comparison was 19% and the absence rate was 81% (Table-5). Since the HIMSS-EMRAM document makes a level-based evaluation, it cannot be included in the calculation in percentages. Therefore, the calculation in percentages appears as (0%*). When compared in terms of concept, process and standard, the absence rate is seemingly very low. The similarity rate of all three documents is considered low.

Discussion and Conclusion

This study examined HQS, HIMSS-EMRAM and JCI models which are indicator-based models used in healthcare quality measurement. With the analysis conducted within the scope of the study, all three models were compared in terms of the concepts, processes and standards contained in them. Considering the analysis results of all three models, it is understood that the "presence rate" (83%) of the concepts in HQS and JCI documents is high and similar in the conceptual comparison. Due to the level-based evaluation of the model in

HIMSS-EMRAM, the conceptual comparison could not be made, and the levels to which the concepts corresponded were determined. The "presence" rates (19%) obtained through process comparison and standard comparison are understood to be low. This shows that all three guides have varying standards when considered jointly. Conceptual comparison (83%), process comparison (66%) and standard comparison (64%) of JCI and HQS models were found to be the highest. We can interpret these results as JCI-HQS models are very similar in terms of concept, process and standard. The comparisons of HQS and JCI documents with the HIMSS-EMRAM model indicate that the rates of concept comparison, process comparison and standard comparison are very low. This is considered to be caused by the fact that the HQS and JCI models deal with the processes in hospitals in more detail and comprehensively, while the HIMSS EMRAM model features standards related to the digitalization perspective.

Some studies that are similar to the subject of the research were carried out. The study conducted by Yousefian et al. in 2013 compared the Excellence Model developed in Iran with the JCI criteria and concluded that JCI made a very comprehensive assessment. In this study, it was concluded that HQS and JCI are more comprehensive than the HIMSS-EMRAM model. In a study conducted by Şahin in 2020, HQS and Health Accreditation Standards (SAS) hospital standards and JCI standards were compared, resulting in the understanding that the standards were similar but structured differently. Upon this study, it was understood that HQS and JCI models had similar standards. Virginio and Dos Reis compared the requirements of JCI and EMRAM in 2019. The comparison demonstrated that the set of SAS-Hospital standards was prepared very extensively for hospitals and are similar to the JCI standards in many aspects, with some sections being even more detailed. Upon this study, it was understood that the HQS and JCI models have similar standards, but the standards of the HIMSS-EMRAM model have a digital perspective. In addition, it was

understood that the HIMSS-EMRAM model can be used as a very useful tool in fulfilling the standards related to digitalization in HQS and JCI models.

Our study is considered to bring benefits to the hospitals that intend to be accredited by JCI, HQS and HIMSS EMRAM models. The similarity of HQS and JCI documents shows that a JCI requirement is also fulfilled while fulfilling an HQS requirement. While the standards related to digitalization in HQS and JCI documents are fulfilled, the standards related to the HIMSS EMRAM model are met. It is thought that the harmony between the documents will be beneficial for a hospital in terms of managing the evaluation processes.

One of the innovative aspects of the study is that HQS, JCI and HIMSS-EMRAM documents were not been analysed comparatively before. When the earlier studies in the literature were examined, no study was found, which dealt with the three models used in the research. In addition, the methods used in other studies in the literature are mostly based on qualitative data. In our study, the data were digitized and quantified. This is considered to bring innovation and value to the study.

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