

# Exploring the Quality of Life for Saudi Patients Utilizing Dental Healthcare Services: A Systematic Review

Riyadh I Althumairy

Division of Endodontics, Department of Restorative Dental Sciences, College of Dentistry, King Saud University, Riyadh, 11545, Saudi Arabia

Correspondence: Riyadh I Althumairy, Tel +966 114677420, Email ralthumairy@ksu.edu.sa

**Abstract:** Over three billion people globally are affected by oral diseases. The Kingdom of Saudi Arabia (KSA) has declared a new vision for 2030, which includes an aim to improve the quality of healthcare in the Kingdom while maintaining the efficacy of spending. The Oral Health Impact Profile (OHIP) is a quality of life instrument that helps evaluate health status. This study aims to evaluate equity in accessing dental services and the integration of different types of dental services in the Kingdom of Saudi Arabia. A systematic review of the MEDLINE, ClinicalTrials.gov, and EBSCOhost Research Databases was conducted on August 1, 2021. To answer the research question, the SPIDER search tool that identified the sample, the phenomenon of interest, design, evaluation, and research type prior to conducting the review was adapted. Multiple steps were followed to identify the results. The first step was scanning and selecting the related titles. The second step involved reviewing the abstracts, and the third step involved scanning the full manuscript for all criteria to determine and validate the eligibility of the articles. Twenty-two articles remained in the final stage of the study. The first study applying the OHIP instrument in the KSA was in 2010, and the latest was in 2021. In terms of cities, nine cities accounted for research within eight administrative regions. Of the 4794 patients recruited within these reviewed articles, the highest number of patients reported was 1141 for fashion braces, while the minimum number of patients was 32 for conventional complete dentures. This study shows that the Arabic OHIP tool was successfully adapted by multiple dental studies in the KSA with various dental services and results were reported. The reviewed studies suggest that equity and integration of dental health services are well established in Saudi Arabia. Moreover, the major role of dental academic researchers has been identified.

**Keywords:** OHIP, dental services, KSA, dental integration, dental equity

## Introduction

It has been estimated that over three billion people globally suffer from oral diseases.<sup>1</sup> Previous studies have shown a correlation between oral diseases and chronic conditions, such as cardiovascular diseases,<sup>2</sup> chronic obstructive pulmonary disease,<sup>3</sup> diabetes, kidney disease,<sup>4</sup> and asthma.<sup>5</sup> Moreover, dental issues are associated with other health conditions beyond chronic conditions, such as pregnancy-related complications<sup>4</sup> and low birth weight babies.<sup>6</sup> Atchison et al suggested that overall health increased when dental care is integrated with medical care.<sup>7</sup>

In the Kingdom of Saudi Arabia (KSA), a national survey estimated that over 1.5 million Saudi adults had a dental routine visit, while over 6.5 million needed a dental service in 2013.<sup>8</sup> Studies have suggested that these figures have grown in recent years, which reflects the increased demand for dental services in the Kingdom.<sup>9–11</sup> Subsequently, the number of dentists per 10,000 population within the Ministry of Health (MoH) has increased from 4.4 in 2016 to 5.6 in 2020.<sup>12</sup> Certainly, the KSA prioritizes healthcare budget allocation more than other Arab countries.<sup>13</sup>

Because of the increased demand and spending in healthcare, the KSA has declared a new vision for 2030 for various sectors, including healthcare. It aims to improve the quality of healthcare in the Kingdom while maintaining the efficacy of spending.<sup>14</sup> Quality of life (QoL) is a phrase that has become popular in healthcare for capturing patients' experiences when dealing with medical conditions.<sup>15</sup> These QoL instruments can be classified as subjective (delivered by patients) or

objective (delivered by patients' observers).<sup>16</sup> Another way to categorize QoL measurements is by their goal, where some measurements are generic and similar for all conditions, while other measurements are disease specific and more sensitive to a disease or a service.<sup>17</sup>

Slade and Spencer established the Oral Health Impact Profile (OHIP) as a subjective and oral-specific QoL instrument.<sup>18</sup> The OHIP consists of seven domains: functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability, and handicap.<sup>18</sup> Originally, these domains were calculated using 49 questions (OHIP-49); thereafter, Gary Slade modified the OHIP to capture the seven domains using 14 questions to address the nonresponse issue because of the length of the survey.<sup>18</sup> The OHIP was successfully adapted, translated, and validated in Arabic.<sup>19</sup>

Some studies have explored the QoL for dental services using the Arabic version of OHIP in the KSA; however, these studies focused on a single center with a limited number of patients. Considering the national attention paid to QoL in healthcare, including oral health services, in the KSA, the main goal of this systematic review was to estimate the benefits of quality dental care in Saudi Arabia. To narrow the scope of this goal, the study aimed to a) evaluate equity in accessing dental services in the Kingdom of Saudi Arabia. b) evaluate the integration of different types of dental services in the Kingdom of Saudi Arabia.

## Materials and Methods

A systematic review of the MEDLINE, ClinicalTrials.gov, and EBSCOhost Research Databases (includes: Dentistry & Oral Sciences Source, MEDLINE Complete, and CINAHL Complete) database was conducted on August 1, 2021. The main research aims were to evaluate equity in accessing dental services and the integration of different types of dental services in the Kingdom of Saudi Arabia; to achieve the aim, the SPIDER search tool described by Cooke et al was used.<sup>20</sup> The SPIDER search is based on identifying the sample, phenomenon of interest, design, evaluation, and research type prior to conducting the actual review. The details of the SPIDER tool are listed in [Table 1](#).

To make sure the search was efficient and complete, index terms and synonyms for each theme were identified, per recommendation by Bramer.<sup>21</sup> These themes are summarized in [Table 2](#). Multiple steps were followed to identify the

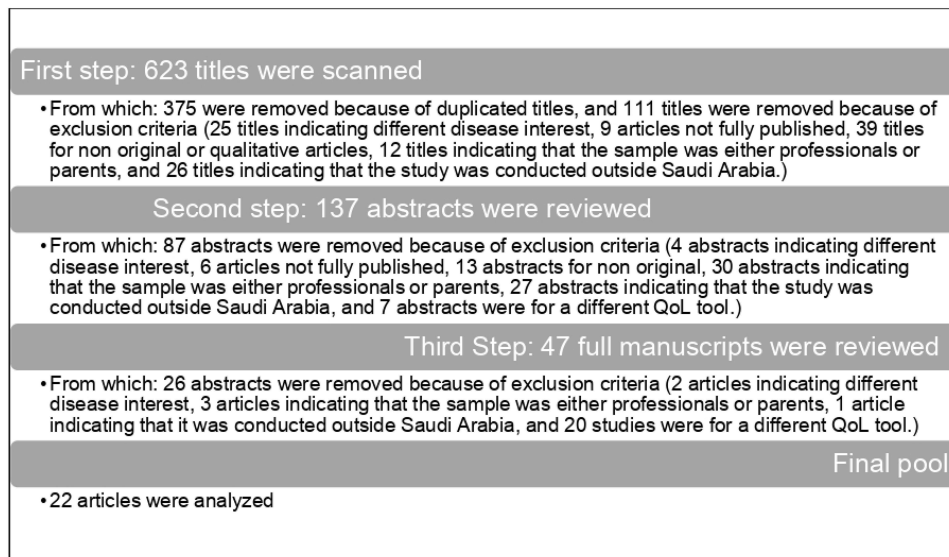
**Table 1** Definition of Various the SPIDER Tool Elements

SPIDER	Description
Sample	Population from the Kingdom of Saudi Arabia
Phenomenon of interest	Dental services
Design	Quantitative data (mainly randomized clinical trials, and cohort & cross-sectional studies)
Evaluation	Quality of life through, Equity in Dental Services, Integration of Dental Services
Research type	Original article; full article

**Table 2** Identification of Index Terms and Synonyms for Each Theme

Terms	Synonyms
Saudi Arabia*	KSA; Riyadh; Jeddah; Dammam; Makkah
Dental services*	Dentistry; Oral health; Endo; Dental implantology. Dental implants and tooth restoration; General dentistry; Maxillofacial surgery; Orthodontics; Pediatric dentistry; Prosthodontics; Cosmetic dentistry; Dental veneers;
Quantitative data@	Survey; interview; primary data
Quality of life*	QoL; OHIP
Original Article@	Full article; full text

**Note:** \*Used in the search box @identified using search filters, if applicable.



**Figure 1** Illustration of the inclusion and exclusion processes during article selection.

results. The first step was scanning and selecting the related titles that might cover the topic, and duplicated titles were deleted. The second step involved reviewing the abstracts for the key information highlighted in Table 1. The third step involved scanning the full manuscript for similar criteria to determine and validate the eligibility of the articles. The adaptation of SPIDER tool yielded the following: a sample population from the Kingdom of Saudi Arabia, a phenomenon of interest related to dental service, a design that is based on quantitative data, an evaluation of oral health based on OHIP questionnaire, and an original research.

At any step, the exclusion criteria were as follows: studies focused on different diseases of interest other than dental or oral care, articles that were not published fully, review articles, study sample that did not include patients (and instead had participants such as health professionals, dental students, or parents of patients), articles outside the KSA, qualitative studies, and articles with different QoL tools. Figure 1 illustrates the inclusion and exclusion processes during article selection.

According to the World Health Organization, the benefits of quality health care in general can be realized through different domains: time, equity, integration, and efficiency.<sup>22</sup> In this review, the focus was on measuring the benefits of dental health care in the KSA by translating equity and integrating dental services from reviewed articles. Equity was captured by estimating the accessibility of oral healthcare in different sites (cities) and times (years) for the local population.<sup>23</sup> Integration of dental services was captured by accounting for the number of people benefiting (patients) and the type of specialty covered (dental services). Accordingly, each article was classified based on the date of publication, city within the KSA, number of samples, and dental services studied.<sup>24</sup>

## Results and Discussion

Twenty-two articles remained in the final stage of the study.<sup>25–46</sup> The first study applying the OHIP instrument in the KSA was in 2010, and it is not surprising that researchers continue to use the instrument till date (2021). In terms of cities, ten cities accounted for research within eight administrative regions. Of the 4794 patients recruited within these reviewed articles, the highest number of patients reported was 1141 for fashion braces, while the minimum number of patients was 32 for conventional complete dentures. Table 3 shows the reviewed articles with their affiliated date of publication, cities, number of patients, and dental services utilized.

## Equity of Dental Services

The accessibility of oral healthcare in different cities throughout the years for people living in the KSA were used as indicators of equity of healthcare. In terms of cities, the capital of Saudi Arabia, Riyadh,<sup>27–30,44,45</sup> accounted for the

**Table 3** Description of the Reviewed Articles

Authors	Date	City	N	Dental Services
Khan SD, Alqannass NM, Alwadei MM, Alnajrani MD, Alshahrani ZM, Al Alhareth AY, Alqahtani KM <sup>25</sup>	2021	Najran	118	All dental service utilized
Alam, M.K. and Alfawzan, A.A., 2021 <sup>26</sup>	2021	Not stated	96	Orthodontic patients with ectopic canine
Alrumyyan, A., Quwayhis, S., Meaigel, S., Almedlej, R., Alolaiq, R., Nafesah, R.B., Almutairi, M. and Alzamil, S., 2020 <sup>27</sup>	2020	Riyadh	631	Fixed dental prostheses
Al Deeb, M., Abduljabbar, T., Vohra, F., Zafar, M.S. and Hussain, M., 2020 <sup>28</sup>	2020	Riyadh	200	Removable dental prosthesis
Anbarserri, N.M., Ismail, K.M., Anbarserri, H., Alanazi, D., AlSaffan, A.D., Baseer, M.A. and Shaheen, R., 2020 <sup>29</sup>	2020	Riyadh	152	Severity of tooth loss
Baidas, L.F., AlJunaydil, N., Demyati, M. and Sheryei, R.A., 2020 <sup>30</sup>	2020	Riyadh	42	Fixed orthodontic appliance
Altouki, N.H., Albrahim, M.A., Hassan, A.H., Natto, Z.S. and Alhajrasi, M. K., 2020 <sup>31</sup>	2020	Jeddah	109	Vertical discrepancies in occlusion
Bukhari, O.M., 2020 <sup>32</sup>	2020	Makkah	85	All dental service utilized
Hidayathulla Shaikh, R.H., Fatima, A., Asawa, K., Kannan, K. and Lankar, A., 2020 <sup>33</sup>	2020	Al Zulfi	600	Expatriate population dental quality of life
Hussein, M.O. and Alruthea, M.S., 2020 <sup>34</sup>	2020	Qassim	43	Patients treated by mandibular mini implant overdentures
Hakami, Z., Chung, H.S., Moafa, S., Nasser, H., Sowadi, H., Saheb, S. and Anderson, N.K., 2020 <sup>35</sup>	2020	Jazan	1141	Fashion braces
Al Nazeh, A.A., Alshahrani, I., Badran, S.A., Almoammar, S., Alshahrani, A., Almomani, B.A. and Al-Omiri, M.K., 2020 <sup>36</sup>	2020	Abha	50	Orthodontic patients treated with Invisalign clear aligners
Alqefari, J., Albelaihi, R., Elmoazen, R. and Bilal, R., 2019 <sup>37</sup>	2019	Qassim	149	Patients undergoing fixed orthodontic therapy
Hassan, A.H., Hobani, N.M., Almokri, S.M., Almokri, N.M., Alotibi, F. G. and Alshouibi, E.N., 2018 <sup>38</sup>	2018	Jeddah	308	Anterior crowding or spacing
Alghamdi, M.A., Farsi, N.J. and Hassan, A.H., 2017 <sup>39</sup>	2017	Jeddah	220	Patients undergoing orthodontic treatment
Ahmad, M.S., Bhayat, A., Zafar, M.S. and Al-Samadani, K.H., 2017 <sup>40</sup>	2017	Al Madinah Al Munawwarrah	166	Hyposalivation
AlZarea, B.K., 2017 <sup>41</sup>	2017	AlJouf	79	Implant-supported single crowns or fixed partial dentures
Alzarea, B.K., 2016 <sup>42</sup>	2016	AlJouf	92	Patients with dental implants
Zwiri, A.M., 2015 <sup>43</sup>	2015	AlJouf	60	Recurrent aphthous ulcers
Alfadda, S.A., Al-Fallaj, H.A., Al-Banyan, H.A. and Al-Kadhi, R.M., 2015 <sup>44</sup>	2015	Riyadh	32	Quality of conventional complete dentures
AlBaker, A.M., 2013 <sup>45</sup>	2011	Riyadh	55	Conventional complete dentures
Hassan, A.H. and Amin, H.E.S., 2010 <sup>46</sup>	2010	Jeddah	366	Orthodontic patients

highest number of publications (6 articles), followed by Jeddah<sup>31,38,39,46</sup> (4 articles), followed by AlJouf<sup>41–43</sup> (3 articles). The presence of Riyadh and Jeddah when estimating the frequency of publications is expected, as they account for the first and second most inhabited cities in the KSA.<sup>47</sup> Both cities have recruited higher number of dentists within the MoH hospitals.<sup>12</sup> A surprising result was not to find any article from a city within the Eastern region, specifically Dammam, as it has the fifth highest population density in the Kingdom.<sup>47</sup> Some studies have explored the QoL for dental services in the Eastern region, but none have used the OHIP tool. This could signal an equity concern, which needs to be explored in the future. The OHIP is derived from Locker's conceptual model of health, which proposed that the impact of oral diseases is ranked by factors (domains) that ultimately impaired the quality of life.<sup>18</sup> One of the OHIP domains is the handicap domain, which, in the majority of reviewed studies reported that oral health did not impair their quality of life with the exception of two studies. The first was Hassan et al (2010) who reported that when seeking orthodontic treatment in Riyadh, females were significantly more affected than males in term of satisfaction with life in general and were unable to function. The other study was Hakami et al (2020), where they found that in Jazan, there was a significant association between the impairment of QoL and age.

In terms of other equity indicators, time is measured by years of publication. There is an increasing trajectory in the use of the OHIP wherein post 2015, about 81% of the articles were published (18 articles),<sup>25–42</sup> and 2020 in particular accounted for most of these publications (10 articles).<sup>27–36</sup> This result aligns with the literature on QoL for various healthcare services in Saudi Arabia, where recent publications focused on exploring quality of care among physicians,<sup>48</sup> pharmacists,<sup>49</sup> and nurses.<sup>50</sup> Healthcare researchers are expected to apply what has been a governmental goal in improving the quality of care after the launch of the Saudi Vision 2030.<sup>14</sup> The results prove that dentistry researchers follow a similar path. Indeed, the MOH in the KSA has launched many initiatives aimed at improving the quality of care.<sup>48</sup>

## Integration of Dental Services

The number of patients within each article and the type of dental service studied were used as parameters for the integration of dental services within the Kingdom. A total of 4794 patients were recruited; the capacity of recruitment was associated with the recruitment site, wherein larger cities, such as Riyadh and Jeddah, yielded a larger number of patients.<sup>27,46</sup> This is true except in Jazan, where over a thousand patients were studied; one explanation for this is that the researcher was studying a popular type of service—fashion braces.<sup>35</sup> Moreover, some studies with lower sample sizes may have had methodological challenges that influenced the number of the sample; Hussein and Alrutha conducted a five-year investigation on QoL for selected samples with implant overdentures,<sup>34</sup> while Alfadda et al explored the QoL of patients with conventional complete dentures, but they needed to determine seven clinical characteristics using three specialized investigators.<sup>44</sup>

In this systematic review, there were different types of dental services covered most frequently: orthodontics (7 articles),<sup>26,30,35–37,39,46</sup> followed by prosthodontics (4 articles),<sup>27,28,44,45</sup> and implants (3 articles).<sup>34,41,42</sup> The diversity of dental services provides an insight into how well the dental profession is integrated in the Saudi system. Most of the studied articles (16) were conducted in primary dental hospitals in an academic setting. Harnagea et al classified the integration of dental health services with primary care into systemic (macro), organizational and professional (meso), and clinical (micro).<sup>51</sup> Tailoring similar approach into all types of dental services within the scope of our study would show a clear integration of oral health in the KSA at the macro and meso levels, where currently there are various public dental programs, oral policies, dental education and training, and inter-professional collaboration. Moreover, the fact that most of these reviewed articles were conducted in an academic setting highlights the importance of dental academics in providing dental services and research. Undeniably, research is considered an integral task for academic careers by dental schools both nationally and internationally.<sup>52</sup>

## Conclusion

This study shows that the Arabic OHIP tool was successfully adapted by multiple dental studies in the KSA with various dental services, and results were reported. Despite the wide range of applications of the studied QoL tool, there is a lack of research in the Eastern region. The reviewed studies suggest that equity and integration of dental health services are well established in Saudi Arabia. There is a need for further research to explore the quality of life by the OHIP for certain regions within the kingdom, like Eastern, Ha'il, Jizan, Al-Bahah, Tabuk, and Northern Borders Regions. Moreover, the

major role of dental academic researchers has been identified. This study is not without limitations, as the article was focused on one type of Questionnaire – OHIP, which limits the generalization of the findings. Other limitations are the fact that this study presented what have been published and focused on defining equity by location, however equity needs boarder definition. Future research can explore equity of dental service in the KSA using other parameters like affordability, quality of oral health services, and gender related access.

## Disclosure

The author reports no conflicts of interest in this work.

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