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Digital Health Information and Orthopedic Surgeon Selection in Saudi Arabia: Clinical Competence Remains the Primary Determinant

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Abstract **Background:** Online health information is frequently consulted by patients before clinical encounters and may shape expectations about healthcare providers. In Saudi Arabia, the use of digital platforms is common but there is limited evidence on their role in selecting orthopedic surgeons. **Objectives:** To examine how patients in Saudi Arabia use online health information when selecting orthopedic surgeons and to explore the selection criteria associated with their decisions. **Methods:** A cross-sectional survey was conducted from May to December 2024 among adults attending private orthopedic clinics across five regions of Saudi Arabia. A total of 416 participants completed the survey, of whom 341 who had consulted an orthopedic surgeon in a private setting were included in the final analysis. The questionnaire assessed digital platform use and the importance of clinical, interpersonal and institutional selection criteria, including medical knowledge, surgical skill, bedside manner and hospital reputation. **Results:** Among participants, 63.6% reported using digital platforms prior to consultation. However, only 42.3% perceived social media popularity as indicative of professional competence. Core clinical attributes were rated highest, with medical knowledge (79.2%) and surgical skill (75.7%) most frequently considered "very important." While online reviews were moderately valued, they ranked lower than clinical factors. Higher importance assigned to clinical attributes was significantly associated with greater patient satisfaction ($p<0.001$). **Conclusion:** Patients in Saudi Arabia commonly use online information when selecting orthopedic surgeons but clinical competence remains the key determinant of choice and satisfaction.

Key Words Health Information Seeking, Orthopedic Surgery, Patient Decision-Making, Saudi Arabia, Social Media

INTRODUCTION

The internet has become a widely used resource for obtaining health-related information, driven by factors such as accessibility, convenience, affordability and the ability to search anonymously [1]. In Saudi Arabia, many individuals search for medical information online before clinical consultations and online platforms are commonly perceived as useful in supporting health awareness among the population [2].

However, persistent questions remain about the consistency and reliability of health content online, with research suggesting substantial variability in quality across digital platforms [3]. In the Saudi context, although digital sources are widely accessed, most people continue to trust physicians as their primary source of health advice, viewing internet-based material as supplementary rather than definitive [4]. International evidence indicates that the broader impact on patient-physician relationships extends beyond information quality alone; it also depends on how health information is communicated, clarified and contextualized within consultations [5].

When it comes to selecting a surgeon specifically, recent findings indicate that a significant proportion of patients actively seek information about surgeons online prior to their initial consultations. Younger individuals are particularly likely to trust online resources and physician rating platforms as accurate and comprehensive [6]. Patient feedback often highlights technical skill and professionalism as key to positive experiences [7]. Reputation and competency are consistently identified as highly valued

attributes when patients select a surgeon and interpersonal skills often play a significant role in their decisions. Furthermore, word-of-mouth and referrals from other physicians remain particularly influential sources of guidance, whereas advertising and online reviews tend to have a more limited impact [6,8].

Objective

This study aimed to examine patient decision-making in the selection of orthopedic surgeons within the Saudi private healthcare setting. Specifically, the study had two primary aims:

- To assess how patients utilize online health information and digital platforms prior to orthopedic consultation
- To evaluate and rank the relative importance of clinical and non-clinical factors influencing surgeon selection, with particular emphasis on comparing core clinical attributes (e.g., medical knowledge and surgical skill) with digital and social media-related indicators

METHODS

This non-interventional, observational study employed a cross-sectional design to examine factors associated with patients' selection of orthopedic surgeons in private healthcare settings across the Kingdom of Saudi Arabia. Data were collected over a seven-month period, from May to December 2024, in outpatient orthopedic clinics located within private hospitals across the five principal regions of the country: Central, Eastern, Western, Northern and Southern.

Study Hypotheses

The study was designed to test three prespecified hypotheses. First, the use of online sources is common among patients in Saudi Arabia when selecting orthopedic surgeons. Second, patients' perceptions of surgeons' social media visibility are associated with their preferences and interpretations of professional competence. Third, demographic characteristics, particularly age and educational level, are associated with differences in how patients assess and prioritize surgeon selection criteria.

Sampling and Participants

A minimum sample size of 329 was calculated using the EPI Info program (95% confidence level, 5% margin of error and 50% expected prevalence). To account for incomplete responses, the target sample size was increased to 340. Participants were recruited through convenience sampling, whereby eligible patients were invited to participate during clinic visits. Inclusion criteria were adults aged 18 years or older attending a private orthopedic clinic and willing to participate. Patients under 18 years of age or those who declined participation were excluded. Sex and ethnicity were not collected, as they were not relevant to the study objectives.

Survey Instrument

The questionnaire was partially adapted from a previously validated instrument developed in the United States [6]. Several modifications were made to ensure contextual relevance to the Saudi healthcare setting and alignment with the study objectives.

A screening item was added to confirm that respondents were attending a private hospital, as patients in public hospitals in Saudi Arabia are typically assigned to available physicians, whereas patients receiving private care generally have autonomy in choosing their orthopedic surgeon. To reflect local demographic norms and enable clearer statistical comparisons, age categories were consolidated into three groups: 18-39, 40-59 and 60 years or older. An additional item was introduced to capture participants' region of residence (Central, Eastern, Western, Northern or Southern).

The original list of 11 surgeon selection criteria was retained, with each item rated on a 4-point Likert scale ranging from "Not Important" to "Very Important." One additional criterion related to hospital reputation was included due to its relevance within the local healthcare context. The questionnaire was further adapted by replacing the dichotomous patient satisfaction item with a five-item satisfaction scale, modifying surgeon evaluation items to focus on commonly used social media platforms rather than formal rating websites and excluding items related to internet use frequency and website credibility due to limited relevance. Finally, a new item assessed participants' perceptions of surgeons' social media popularity and its association with perceived professional attributes.

Pilot Testing

A pilot study was conducted with 32 participants (approximately 10% of the target sample) to evaluate the clarity, linguistic appropriateness and content validity of the adapted questionnaire. The instrument was translated into Arabic and then back-translated into English. No substantive revisions were required and this version was used for data collection. Internal consistency was confirmed using Cronbach's alpha: 0.866 (importance), 0.859 (satisfaction) and 0.832 (overall instrument).

The Arabic version of the questionnaire (Appendix A) was administered to participants, while the English version (Appendix B) is provided for publication purposes only. Both versions are included in the Supplementary Materials.

Data Collection and Analysis

Data were collected electronically using Google Forms. Data were collected in outpatient clinic settings, which may have introduced response bias due to time constraints or environmental distractions. Participants completed the survey independently using personal devices. While research staff were available to facilitate distribution, responses were self-administered. Measures were taken to minimize duplicate entries through controlled distribution; however,

this cannot be completely excluded. The survey was distributed to eligible patients during clinic visits at private orthopedic clinics. Participants completed the questionnaire using their personal devices. Responses were analyzed using IBM SPSS Statistics (Version 26).

Descriptive statistics, including frequencies and percentages, were used to summarize categorical variables. Associations between categorical variables were assessed using the Chi-square test or Fisher's exact test, as appropriate. Pearson's correlation coefficient was applied to examine relationships between continuous variables. A p-value of less than 0.05 was considered statistically significant. Formal approval was obtained from all participating private hospitals prior to data collection.

RESULTS

Participant Demographics

A total of 416 individuals completed the survey, of whom 341 (82.0%) reported having consulted an orthopedic surgeon at a private healthcare facility. Only these 341 responses were included in the final analysis. As shown in Table 1, the majority of participants were aged 18-39 years (56.9%), while 12.3% were aged 60 years or older. Regarding educational attainment, 51.0% held a bachelor's degree and 2.1% held a doctoral degree. Participants were geographically distributed across all five regions of Saudi Arabia, with the highest proportion from the Central Region (29.6%), followed by the Southern Region (26.1%).

Patient Use of Online Information for Surgeon Selection

Among the 341 participants, 217 (63.6%) reported using at least one digital platform to obtain information about orthopedic surgeons prior to their consultation. The most frequently used platforms were Twitter (31.7%), Snapchat (29.0%) and WhatsApp (25.8%).

Of the 241 participants who expressed a clear opinion, 42.3% agreed that a surgeon's social media popularity, such as having a large follower count, was indicative of professional expertise, skill or knowledge. In contrast, 57.7% disagreed.

Participants rated the importance of online patient reviews on a 4-point Likert scale. The mean importance score was 2.96 out of 4.0, with 118 respondents (34.6%) rating online reviews as "very important."

Relative Importance of Provider Selection Criteria in Saudi Arabia

Participants rated 12 predefined criteria related to orthopedic surgeon selection using a 4-point Likert scale. As shown in Table 2, 79.2% of respondents rated medical knowledge as "Very Important" (mean = 3.73). Surgical skill received a mean score of 3.68, with 75.7% rating it as "Very Important." Other criteria, including bedside manner, surgeon availability and hospital reputation, also received high mean importance scores. TV/print/other advertising received the lowest mean score (2.42).

Association Between Demographic Characteristics and Surgeon Selection Criteria

Mean importance scores of surgeon selection criteria were compared across three age groups (18-39, 40-59 and ≥60 years). Statistically significant age-related differences were identified for two criteria: online patient reviews ($\chi^2 = 15.87$, $p = 0.003$) and TV/print/other advertising ($\chi^2 = 9.73$, $p = 0.045$).

Participants aged 18-39 rated online patient reviews as more important (mean = 3.12) compared with those aged 40-59 (mean = 2.80) and those aged ≥60 years (mean = 2.67). Similarly, younger participants assigned greater importance to TV/print/other advertising (mean = 2.49) than participants aged 40-59 (mean = 2.33) and those aged ≥60 years (mean = 2.29). No statistically significant age-related differences were observed for the remaining selection criteria, as shown in Table 3.

Statistically significant differences across educational levels were identified for four selection criteria: institution or country where the surgeon's training was completed ($\chi^2 = 31.46$, $p = 0.008$), online patient reviews ($\chi^2 = 26.85$,

Table 1: Demographic Characteristics of Participants Who Consulted Orthopedic Surgeons in Private Healthcare Settings (n = 341)

Characteristic	Frequency	Percentage
Age Group		
18-39	194	56.9
40-59	105	30.8
60+	42	12.3
Geographic Region		
Central Region	101	29.6
Southern Region	89	26.1
Western Region	55	16.1
Northern Region	51	15
Eastern Region	45	13.2
Educational Level		
Bachelor's Degree	174	51
High School	65	19.1
Diploma	45	13.2
Primary/Middle School	34	10
Master's Degree	16	4.7
Doctoral Degree	7	2.1

Table 2: Importance Ratings of Orthopedic Surgeon Selection Criteria (n = 341)

Rank	Factor	Mean Score	Very Important (%)	Not Important (%)
1	Medical Knowledge	3.73	79.2	1.5
2	Surgical Skill	3.68	75.7	1.5
3	Bedside Manner	3.60	69.5	2.1
4	Availability	3.54	67.4	3.8
5	Hospital Reputation	3.52	67.2	3.8
6	Recommendations from other Physicians	3.18	46.9	9.1
7	Word of Mouth Referrals from Friends/Family	3.12	39.9	6.5
8	Out of Pocket Cost	3.09	40.8	7.6
9	Insurance Network Compatibility	3.08	45.5	10.0
10	Internet Reviews by Patients	2.96	34.6	10.6
11	Institution where Surgeon's Training was Completed	2.77	34.6	19.1
12	TV/Print/Other Advertising	2.42	23.2	25.2

Importance was rated on a 4-point Likert scale ranging from 1 (Not Important) to 4 (Very Important)

Table 3: Mean Importance Scores for Orthopedic Surgeon Selection Factors by Age Group

Factor	18-39 (n = 194)	40-59 (n = 105)	60+ (n = 42)	Maximum Difference*	Chi-square	p-value
Medical Knowledge	3.71	3.74	3.79	0.08	6.28	0.179
Surgical Skill	3.69	3.69	3.62	0.07	5.41	0.247
Bedside Manner	3.57	3.63	3.64	0.07	4.68	0.321
Availability	3.53	3.60	3.40	0.20	7.89	0.096
Hospital Reputation	3.54	3.46	3.60	0.14	6.14	0.189
Recommendations from other Physicians	3.19	3.20	3.07	0.13	5.23	0.264
Word of Mouth Referrals from Friends/Family	3.10	3.11	3.21	0.11	5.97	0.201
Out of Pocket Cost	3.06	3.19	3.02	0.17	7.12	0.130
Insurance Network Compatibility	3.10	3.03	3.12	0.09	6.35	0.174
Internet Reviews by Patients	3.12	2.80	2.67	0.45	15.87	0.003**
Institution where Surgeon's Training was Completed	2.78	2.74	2.76	0.04	4.02	0.403
TV/Print/Other Advertising	2.49	2.33	2.29	0.20	9.73	0.045*

*Maximum Difference: Largest difference in mean scores between any two age groups *p<0.05, **p<0.01

p = 0.020), TV/print/other advertising ($\chi^2 = 29.72$, p = 0.013) and insurance network compatibility ($\chi^2 = 24.71$, p = 0.037).

Participants with doctoral degrees rated the institution or country of the surgeon's training as more important (mean = 3.43) compared with participants with primary or middle school education (mean = 2.56). Higher educational attainment was also associated with greater importance placed on online patient reviews, with doctoral degree holders reporting the highest mean score (mean = 3.29) compared with those with lower educational levels (mean = 2.62).

Regional differences in mean importance scores were observed across the five regions of Saudi Arabia. The Eastern Region demonstrated the highest mean scores for medical knowledge (mean = 3.91) and surgical skill (mean = 3.89), whereas the lowest mean scores for both criteria were observed in the Western Region (mean = 3.55). The Northern Region assigned the highest importance to surgeon availability, while TV/print/other advertising was rated highest in the Central Region (mean = 2.72) and lowest in the Northern Region (mean = 2.00).

Relationship Between Selection Priorities and Patient Satisfaction

A one-way ANOVA test was conducted to examine satisfaction differences across importance ratings for four selection factors: medical knowledge, surgical skill, bedside manner and hospital reputation. As shown in Supplementary Table S6, all four factors were associated with statistically significant differences in satisfaction scores (p<0.001 for each).

DISCUSSION

This study provides a contextualized understanding of how patients in Saudi Arabia approach the selection of orthopedic surgeons within an increasingly digital healthcare landscape. The findings demonstrate that, while online information sources are commonly consulted, patients continue to emphasize established clinical and professional qualities in their decision-making. Digital engagement thus serves to inform expectations but traditional selection criteria remain central. Building on this context, patient engagement with online health resources reflects broader patterns of health information-seeking behavior observed across different healthcare settings. Digital platforms offer convenient, accessible and private avenues for patients to explore health-related concerns, particularly when preparing for clinical encounters. Prior evidence suggests that such engagement may enhance patients' understanding, clarify expectations and support more active involvement in healthcare decisions. Importantly, online information is generally viewed as a complementary tool that supports patient preparedness rather than a replacement for professional medical advice [1].

However, beyond the frequency of online engagement, the nature of content shared by surgeons or healthcare professionals on social media appears to play a critical role in shaping patient perceptions. Prior research suggests that when medical professionals use social platforms to share educational or professionally relevant information, such behavior tends to align with patient expectations and may foster increased trust [9]. Beyond digital engagement, core clinical attributes remain at the forefront of patient decision-

making. These findings reflect a clear emphasis on clinical competence within patient decision-making processes. This pattern aligns with existing literature indicating that patients tend to prioritize substantive professional qualifications over peripheral characteristics when selecting a surgeon. Evidence from a systematic review on surgeon selection suggests that attributes such as specialized training, certifications, accumulated experience and surgical caseload are commonly regarded as key indicators of competence [8]. Additional evidence from the Saudi context supports this interpretation, demonstrating that surgical ability and overall experience are consistently viewed as central considerations in surgeon selection [10].

In addition to these general patterns, age-related differences further shape how information is sought and prioritized. Younger adults, particularly those from Generation Z, are more likely to engage with digital information sources such as social media and online reviews, a pattern that reflects broader trends in digital health literacy within this demographic [11]. These observations suggest that age-related variation in information seeking is both theoretically grounded and consistent with contemporary models of patient behavior. Beyond generational differences, educational attainment represents another important dimension associated with how patients engage with health information and participate in healthcare decision-making. Education is widely recognized as a foundation for health literacy, equipping individuals with the skills needed to access, comprehend and critically assess health information [12]. In this way, education and health literacy together foster the autonomy and engagement necessary for patients to make informed choices regarding their care [12,13]. Beyond personal and demographic attributes, contextual influences related to geographic location warrant consideration. Geographic context serves as a relevant background factor in understanding patterns of healthcare utilization. As such, region of residence operates primarily as an enabling factor for healthcare access, underscoring the need to consider geographic variation when interpreting service use across different areas [14].

Ultimately, the convergence of these individual and contextual factors is reflected in the patient's overall satisfaction with care. Patient satisfaction is shaped by the degree to which actual experiences align with prior expectations during the course of care. When patients are able to make choices that reflect their own priorities, satisfaction becomes a reflection of patient-centered care. Rather than representing a single outcome, satisfaction can be viewed as a cumulative process that develops throughout the healthcare journey. This perspective highlights the importance of understanding satisfaction as an evolving construct, influenced by a series of interactions and decisions rather than as an isolated result [15].

Overall, these findings highlight that digital information plays a supportive role in shaping patient expectations rather than replacing established clinical judgment. For physicians, maintaining high standards of clinical competence, clear communication and professional transparency remains central to patient trust and satisfaction. Healthcare institutions, particularly within the private sector, may benefit from aligning their digital presence with accurate, educational content that reflects clinical expertise rather than emphasizing visibility alone. Importantly, online engagement should not be interpreted as a substitute for medical skill or experience but as a complementary tool that supports informed, patient-centered decision-making.

CONCLUSIONS

This study demonstrates that while online information sources are commonly consulted by patients in Saudi Arabia when selecting orthopedic surgeons, they primarily serve to shape expectations rather than replace established clinical judgment. Patients continue to prioritize core professional attributes, including medical knowledge, surgical skill and quality of care, reinforcing the central role of clinical competence in decision-making and satisfaction. Digital engagement, therefore, functions as a complementary element within a broader patient-centered selection process rather than as a determinant of perceived expertise. These findings offer locally relevant insights into patient behavior within the Saudi private healthcare context and contribute to a more nuanced understanding of the role of digital information in contemporary surgical care.

Patient Consent Statement

Informed consent was obtained from all participants prior to participation. Participation was voluntary and responses were anonymous and confidential.

Limitations

This study has several limitations. The cross-sectional design precludes causal inference and findings reflect associations at a single point in time. The sample was drawn from private orthopedic clinics using convenience sampling; although participants were recruited from all five regions, the distribution was uneven and the cohort is regionally diverse but not nationally representative, limiting generalizability to public-sector settings where physician choice is restricted. Data were self-reported and collected in clinic environments, introducing potential recall and response bias. Important demographic variables such as sex, nationality and income were not collected, restricting deeper analysis of socioeconomic influences. The statistical approach was primarily descriptive and bivariate and the absence of multivariable modeling limits identification of independent predictors; moreover, multiple comparisons may increase the risk of type I error. Finally, while the questionnaire showed good internal consistency and was culturally adapted, further validation in broader populations is warranted.

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