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Systematic Review

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The Influence of Nursing Interventions on Patient Outcomes: A Systematic Review

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Keywords
Nursing interventions · Patient outcomes · Influence · Systematic review

Abstract

Introduction: Nursing interventions encompass a wide range of activities, including physical care, emotional support, patient education, medication administration, and coordination of healthcare services. They play a significant role in patient outcomes. ***Aims:*** This study aimed to identify the most effective nursing interventions for improving patient outcomes. ***Methods:*** A systematic review was conducted to examine the impact of nursing interventions on patient outcomes across various healthcare settings. Six studies were included in the review. A comprehensive search was performed using databases such as the Cochrane Library, Google Scholar, Web of Science Core Collection, PubMed, and Scopus. Only studies published in English between January 2000 and December 2022 were included. A structured process was followed, including study selection, data extraction, aggregation of findings. ***Results:*** Findings from these studies demonstrate the positive outcomes associated with specific nursing interventions in various healthcare settings. Analysis of the selected studies revealed that nursing interventions had a significant impact on improving patient outcomes. Interventions such as patient education, medication management, infection control, pain management, wound care management, and fall prevention were found to be effective across different healthcare settings. ***Conclusions:*** Overall, the findings from this review demonstrate the positive outcomes associated with specific nursing interventions in various healthcare settings. Implementing these interventions can improve patient outcomes, enhance patient safety, and contribute to better overall healthcare quality.

Introduction

Nursing interventions play a significant role in patient outcomes [1]. Nurses are responsible for implementing interventions that are aimed at preventing

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illness, promoting health, and providing care to patients [2]. The implementation of nursing interventions is essential in enhancing patient outcomes and guaranteeing the provision of exceptional patient-focused healthcare. Nursing interventions are defined as actions taken by nurses to promote health, prevent illness, and manage the physical, emotional, and social needs of patients [3]. These interventions can include a range of activities such as patient education, medication management, infection control, pain management, and fall prevention [4]. Pain management interventions, including the use of non-pharmacological approaches and pharmacological approaches, were found to be effective in reducing pain intensity and improving patient satisfaction [5, 6]. Patient education was found to be a highly effective nursing intervention in improving patient outcomes, including improved knowledge and understanding of the condition and improved adherence to treatment plans, and medication management interventions, such as medication reconciliation and medication reviews, were effective in reducing medication errors and adverse drug events [7]. Patient education has been shown to improve patient outcomes such as increased knowledge and understanding of the condition, improved adherence to treatment plans, and improved self-management skills [8].

Medication management interventions, including medication reconciliation, medication reviews, and patient education about medication use and side effects, can reduce medication errors and adverse drug events, improve medication adherence, and minimize the risk of drug interactions [9]. Infection control interventions, such as hand hygiene and isolation precautions, were effective in reducing healthcare-associated infections and improving patient safety, and implementation of infection control measures, including but not limited to hand hygiene, isolation protocols, the use of personal protective equipment, and maintaining cleanliness in the surroundings, can minimize the likelihood of healthcare-associated infections and advance patient safety [10, 11].

Fall prevention interventions, including patient education about fall prevention, use of assistive devices, and environmental modifications, can reduce the risk of falls and fall-related injuries, particularly in older adults who are at increased risk of falls [12]. The effectiveness of these interventions in decreasing falls and associated injuries underscores the critical role played by nurses in enhancing patient outcomes and ensuring the delivery of exceptional patient-focused healthcare [13]. Therefore, this study aims to conduct a more comprehensive evaluation of the impact of nursing interventions on patient outcomes, utilizing the findings of the systematic review.

Materials and Methods

Search Strategy

The search strategy included a combination of keywords related to nursing interventions and patient outcomes; the search was limited to studies conducted in healthcare settings.

Data Sources

The investigators explored the subsequent databases: from January 2000 to December 2022, a comprehensive exploration of electronic databases, including Google Scholar, the Cochrane Library, Web of Science Core Collection, PubMed, and Scopus, The search was limited to articles published in the English language. Through this thorough assessment, we found a total of 6 articles directly relevant to our research question, "What is the influence of nursing interventions on patient outcomes across various healthcare settings and patient populations."

Inclusion and Exclusion Criteria

The inclusion criteria involved research that investigated the impact of nursing interventions on patient outcomes, while studies that specifically focused on particular patient populations or clinical settings were excluded. The review incorporated studies that satisfied the following criteria: (1) evaluated the impact of nursing interventions on patient outcomes, (2) used a randomized controlled trial, quasi-experimental, or observational design, (3) included adult patients, and (4) were conducted in healthcare settings. Studies that focused on specific populations or diseases were excluded.

Design

A systematic review methodology was employed in the study to assess the effect of nursing interventions on patient outcomes. The review adhered to the Preferred Reporting Items for Systematic Reviews using a flow diagram of the study to ensure the transparency and thoroughness of the review process.

Data Extraction

The researchers extracted data from the selected studies that met the inclusion criteria. The extracted information comprised study design, sample size, intervention type, measured outcomes, and outcomes achieved.

Analysis Methods

Following a structured process to analyze the studies included in the review, the results of this study were presented following a narrative analysis, as follows: First, study selection: identify relevant studies by conducting a comprehensive search of databases, using specific search terms and inclusion criteria, and screening the search results based on titles, abstracts, and full-text articles to select studies that meet the predetermined eligibility criteria. Second, extract relevant data from the selected studies. It assessed

Table 1. Summary of the results of the studies included in the study

Nursing intervention	Patient population	Healthcare setting	Key findings
Patient education	Adults with chronic diseases (e.g., diabetes, hypertension)	Hospital, community clinic	Improved patient knowledge and self-management of chronic diseases
Medication management	Adults with various conditions	Hospital, long-term care	Increased medication adherence and reduced medication-related adverse events
Infection control	Adults with various conditions	Hospital, long-term care	Decreased incidence of healthcare-associated infections
Pain management	Adults with acute or chronic pain	Hospital	Improved pain control and patient satisfaction
Fall prevention	Older adults or adults at risk for falls	Hospital, long-term care	Reduction in falls and fall-related injuries observed in interventions such as alarms and exercise programs
Wound care management	Adults with wounds (e.g., laceration, puncture, burn, and avulsion wound)	Hospital, community clinic, long-term care	Wound care management interventions resulted in reduced wound healing time and lower infection rates

the quality and risk of bias of each included study; findings from the included studies were then aggregated to identify patterns and trends.

Results

Table 1 and Figure 1 provides a summary of the nursing interventions examined in the systematic review. Patient education interventions targeting adults with chronic diseases improved their knowledge and self-management in hospital and community clinic settings. Medication management interventions increased adherence and reduced adverse events in hospital and long-term care settings. Infection control interventions decreased healthcare-associated infections among adults in hospitals and long-term care facilities. Pain management interventions in hospitals improve pain control and patient satisfaction. Fall prevention interventions in hospitals and long-term care settings reduced falls and fall-related injuries, utilizing strategies like alarms and exercise programs. Wound care management interventions in hospitals, community clinics, and long-term care settings resulted in faster wound healing and lower infection rates for adults with various wound types. These interventions play a crucial role in improving patient outcomes, ensuring patient safety, and enhancing overall healthcare quality.

Table 2 outlines the study attributes, such as publication year, study design, nursing intervention, patient population, and outcome measures, providing a condensed representation of the systematic review's extent. Table 3 facilitates readers in comprehending the extent of the systematic review and detecting patterns in the interventions and studies encompassed. These studies cover various patient populations and nursing interventions, aiming to assess their impact on specific outcome measures related to diabetes management, heart failure, orthopedic surgery, pain management, fall prevention, and wound care.

Table 3 provides a summary of recommendations for nursing practice based on the reviewed interventions. These recommendations underscore the importance of evidence-based nursing practices in patient education, medication management, infection control, pain management, fall prevention, and wound care. By implementing these recommendations, nurses can contribute to improving patient outcomes, enhancing patient safety, and delivering high-quality care.

Discussion

The review highlights the importance of evidence-based nursing practice and the need for ongoing research to identify best practices for nursing interventions. These studies were executed in diverse clinical environments, comprising hospitals, long-term care facilities, and community settings. The nursing interventions that were examined in the studies included

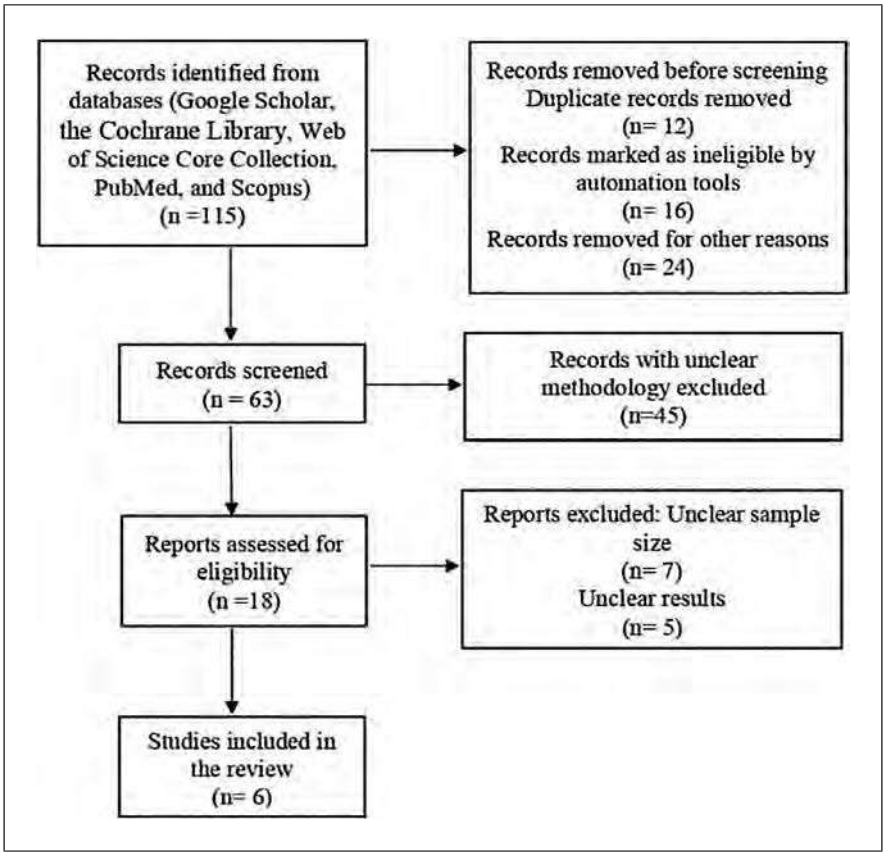

Fig. 1. Flow diagram of the study. The flowchart outlines the sequential procedure for the inclusion and exclusion of studies in this systematic review. In this study, a comprehensive search was conducted across multiple databases, including Google Scholar, the Cochrane Library, Web of Science Core Collection, PubMed, and Scopus. A total of 115 records were initially identified. After removing duplicate records (n = 12) and using automation tools to identify ineligible records (n = 16), 24 additional records were excluded for various reasons. Subsequently, the remaining 63 records were thoroughly screened. Among them, 45 records were excluded due to having unclear methodology. A further assessment was carried out on the remaining 18 reports for eligibility. Out of these, 7 reports were excluded due to unclear sample sizes, while 5 reports had ambiguous results. Ultimately, the review included a total of 6 studies that met the inclusion criteria.

patient education, medication management, infection control, pain management, fall prevention, and wound care management. The studies reflected that nursing interventions had a significant impact on improving patient outcomes across a range of healthcare settings. The efficacy of nursing interventions is due to the fact that nurses are in direct contact with patients and are able to provide individualized care, nurses are also able to educate patients and provide them with the necessary skills to manage their condition and adhere to treatment plans; additionally, nurses are able to identify potential risks and implement interventions to prevent adverse events.

Patient education interventions were found to be effective in improving patient knowledge and self-management of chronic diseases, such as diabetes and hypertension; regarding medication management interventions, they improved medication adherence and reduced medication-related adverse events. This result is consistent with studies that found that patient education interventions can improve patient knowledge and self-management of chronic diseases [20, 21]. It has been revealed that patient education is a highly effective nursing intervention in improving patient outcomes; patients' education led to a significant improvement in glycemic control among patients with diabetes. The study reported that patient education improved patient knowledge and understanding of their condition, resulting in improved adherence to treatment plans and better self-management of their condition [22]. In another study by Riegel et al. [23], reported that patient education improved medication adherence among patients with heart failure.

Medication management is another nursing intervention that was found to have a positive impact on patient outcomes. Several studies reported that medication management interventions, such as medication reconciliation and medication reviews, resulted in a reduction in medication errors and adverse drug events. A systematic review by Baughman et al. [24] reported that medication reconciliation interventions led to a significant reduction in medication discrepancies and adverse drug events, and similarly, a study by Blixen et al. [25] reported that medication reviews led to a significant reduction in hospital readmissions among elderly patients.

Table 2. Summary of study characteristics

Study	Study design	Patient population	Nursing intervention	Outcome measures
Chen et al. [14] (2021)	Randomized controlled trial	Adults with type 2 diabetes	Empowerment-based intervention	HbA1c levels, psychosocial self-efficacy, diabetes knowledge
Marques et al. [15] (2022)	Systematic review and meta-analysis	Patients with heart failure	Nursing educational intervention with home visits and telephone contact	Hospital readmission, mortality of patients with heart failure
Bai et al. [16] (2021)	Randomized controlled trial	Elderly patients undergoing orthopedic surgery	Operating room nursing intervention	Grade A incision healing rate, length of hospital stays, and patient satisfaction rate
Germossa et al. [17] (2022)	Quasi-experimental	Patients admitted to the four inpatient departments	Nurse-led pain management program	The proportion of patients perceiving staff response within 30 min, overall patient satisfaction with pain management
Ojo and Thiamwong [18] (2022)	Systematic review	Older adults	Nurse-led fall prevention programs	Reduction in fall rates, reduction in fall incidents, changes in patients' behavior
Tegegne et al. [19] (2022)	Hospital-based cross-sectional study design	Nurses working in government hospitals of South Wollo Zone, Ethiopia	Assessment of knowledge and practice of wound care	Knowledge and practice of wound care among nurses

Table 3. Summary of recommendations for nursing practice

Nursing intervention	Recommendations
Patient education	Include patient education as a standard component of nursing care for patients with chronic diseases
Medication management	Implement medication reconciliation and monitoring programs to prevent medication errors and adverse events
Infection control	Implement infection control measures based on evidence, such as practicing hand hygiene and adopting isolation protocols
Pain management	Adopt a comprehensive pain management strategy that encompasses both pharmacological and non-pharmacological interventions
Fall prevention	Implement fall prevention programs that include a combination of environmental modifications, exercise programs, and staff education and training
Wound care management	Enhance access to training opportunities, strengthen mentorship and peer support programs, incorporate wound care competencies into nursing curricula, and implement quality improvement initiatives

Infection control interventions, such as hand hygiene and isolation precautions, showed effectiveness in improving patient outcomes. This result is consistent with several of the studies that referred to the implementing infection control measures led to a decline in healthcare-associated infections and

enhanced patient safety [26, 27]. A survey conducted in US hospitals observed a significant decrease in the incidence of healthcare-associated infections among patients in intensive care units following hand hygiene interventions [28]. Likewise, a study by Huis et al. [29] found that implementing isolation protocols resulted in a significant reduction in the transmission of multidrug-resistant organisms among hospitalized patients.

Nursing interventions aimed at pain management were also examined in this systematic review. Several studies reported that pain management interventions, such as the use of non-pharmacological interventions and patient-controlled analgesia, resulted in a reduction in pain intensity and improved patient satisfaction. This finding is similar to the report of a study conducted by Chou et al. [30], which reported that the use of patient-controlled analgesia led to a significant reduction in pain intensity among postoperative patients. There is a study conducted by Wu et al. [31] that reported that non-pharmacological interventions, such as music therapy, led to a significant reduction in pain intensity among patients with cancer.

Regarding fall prevention, nursing interventions aimed at fall prevention were also found to have a positive impact on patient outcomes. Several studies reported that fall prevention interventions, such as the use of bed alarms and exercise programs, resulted in a reduction in falls. This result is supported by the results of a study in which it was stated that the use of bed alarms led to a significant reduction in falls among hospitalized older adults [32].

The study has explored the effectiveness of wound care management interventions and has reported promising outcomes; one key finding is the significant reduction in wound healing time, by employing evidence-based wound care techniques, such as appropriate cleansing, debridement, dressing selection, and wound monitoring, healthcare providers can facilitate faster healing of wounds. This result is supported by Sibbald et al. [33], whose results revealed that prolonged healing time can lead to increased pain, discomfort, and risk of complications.

Conclusion

Patient education interventions have a positive impact on patient outcomes, including increased knowledge, improved self-management, and enhanced quality of life. Medication management interventions play a crucial role in improving patient outcomes. Implementation of medication reconciliation and monitoring programs can help prevent medication errors, enhance medication adherence, and reduce adverse drug reactions. Infection control practices significantly contribute to improved patient outcomes. Adherence to evidence-based infection control measures, such as proper hand hygiene and isolation precautions, reduces the incidence of healthcare-associated infections. Effective pain management interventions, encompassing both pharmacological and non-pharmacological approaches, contribute to better outcomes for patients experiencing acute or chronic pain. Implementing a multimodal pain management strategy can lead to better pain control and increased patient satisfaction. Fall prevention programs are essential in reducing the incidence of falls and fall-related injuries, particularly among older adults and individuals at risk.

Statement of Ethics

An ethics statement is not applicable because this study is based exclusively on published literature.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

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The authors declare that no funds have been received for this study.

Author Contributions

Ahmed Abdalla Jarelnape and Elwaleed Idris Sagiron designed and implemented the study, and also contributed to searches in databases and reviewed their abstracts. Zeinab Taha Alia and Abdalla Mohamed Osman proofread the manuscript, completed the data collection and data entry, and also contributed to the analysis. Eltayeb Abdelazeem and Hamza Balola reviewed the abstracts, interpretation of findings, and also contributed to drafting and revising the manuscript. Aida Ahmed Fadlala and Bander Albagawi contributed to drafting, reviewed the abstracts, and revising the manuscript. All authors approved the final manuscript.

Data Availability Statement

All data generated or analyzed during this study are included in this article. Further inquiries can be directed to the corresponding author.

References

1 Berman A, Snyder SJ, Frandsen G. Kozier and Erb's fundamentals of nursing: concepts, process, and practice. Pearson; 2020.
2 Johansson YA, Bergh I, Ericsson I, Sarenmalm EK. Delirium in older hospitalized patients-signs and actions: a retrospective patient record review. BMC Geriatr. 2018; 18(1):43.
3 American Nurses Association. Nursing interventions classification (NIC) [Internet]. 2021. Retrieved June 25, 2023, Available from: https://www.nursingworld.org/practice-policy/nursing-excellence/.
4 Recio-Saucedo A, Dall'Ora C, Maruotti A, Ball J, Briggs J, Meredith P, et al. What impact does nursing care left undone have on patient outcomes? Review of the literature. J Clin Nurs. 2018;27(11–12):2248–59.
5 Smith MY, DuHamel KN, Egert J, Winkel G. Impact of a brief intervention on patient communication and barriers to pain management: results from a randomized controlled trial. Patient Educ Couns. 2010;81(1): 79–86.
6 Gélinas C, Puntillo KA, Levin P, Azoulay E. The Behavior Pain Assessment Tool for critically ill adults: a validation study in 28 countries. Pain. 2017;158(5):811–21.
7 O'Brien MA, Rogers S, Jamtvedt G, Oxman AD, Odgaard-Jensen J, Kristoffersen DT, et al. Educational outreach visits: effects on professional practice and health care outcomes. Cochrane Database Syst Rev. 2007; 2007(4):CD000409.
8 Paterick TE, Patel N, Tajik AJ, Chandrasekaran K. Improving health outcomes through patient education and partnerships with patients. Proc (Bayl Univ Med Cent). 2017;30(1):112–3.
9 Ravi P, Pfaff K, Ralph J, Cruz E, Bellaire M, Fontanin G. Nurse-pharmacist collaborations for promoting medication safety among community-dwelling adults: a scoping review. Int J Nurs Stud Adv. 2022; 4:100079.
10 Haque M, McKimm J, Sartelli M, Dhingra S, Labricciosa FM, Islam S, et al. Strategies to prevent healthcare-associated infections: a narrative overview. Risk Manag Healthc Policy. 2020;13:1765–80.
11 World Health Organization. Infection prevention and control [Internet]. 2019. [cited 2023 Jun 26]. Available from: https://www.who.int/infection-prevention/en/.
12 National Institute on Aging. Global health and aging [Internet]. 2017. [cited 2023 Jun 26]. Available from: https://www.nia.nih.gov/about/aging-strategic-directions-research.
13 Montejano-Lozoya R, Miguel-Montoya I, Gea-Caballero V, Mármol-López MI, Ruíz-Hontangas A, Ortí-Lucas R. Impact of nurses' intervention in the prevention of falls in hospitalized patients. Int J Environ Res Public Health. 2020;17(17):6048.
14 Chen Y, Tian Y, Sun X, Wang B, Huang X. Effectiveness of empowerment-based intervention on HbA1c and self-efficacy among cases with type 2 diabetes mellitus: a meta-analysis of randomized controlled trials. Medicine. 2021;100(38):e27353.
15 Marques CRd G, de Menezes AF, Ferrari YAC, Oliveira AS, Tavares ACM, Barreto AS, et al. Educational nursing intervention in reducing hospital readmission and the mortality of patients with heart failure: a systematic review and meta-analysis. J Cardiovasc Dev Dis. 2022;9(12):420.
16 Bai Y, Su Y, Zheng Z. The clinical effect of nursing intervention in the operating room on the prevention of orthopedic wound infections. Am J Transl Res. 2021;13(4):3703–9.
17 Germossa GN, Sjetne IS, Småstuen MC, Hellesø R. Patient satisfaction with a nurse-led pain management program: a quasi-experimental study in Ethiopia. SAGE Open Nurs. 2022;8:23779608221141237.
18 Ojo EO, Thiamwong L. Effects of nurse-led fall prevention programs for older adults: a systematic review. Pac Rim Int J Nurs Res Thail. 2022;26(3):417–31.
19 Tegegne B, Yimam F, Mengesha Yalew Z, Wuhib M, Mekonnen L, Asmamaw Yitayew Y, et al. Knowledge and practice of wound care and associated factors among nurses working in south wollo zone government hospitals, Ethiopia. Chron Wound Care Manag Res. 2022;9:1–11.
20 Ernawati U, Wihastuti TA, Utami YW. Effectiveness of diabetes self-management education (DSME) in type 2 diabetes mellitus (T2DM) patients: systematic literature review. J Public Health Res. 2021;10(2):2240.
21 Erlen JA, Sereika SM, Sun R, Tamres LK, Tang F, Lingler JH. Outcomes of a problem-solving medication management intervention for informal caregivers. West J Nurs Res. 2019;41(11):1642–57.
22 Qi X, Xu J, Chen G, Liu H, Liu J, Wang J, et al. Self-management behavior and fasting plasma glucose control in patients with type 2 diabetes mellitus over 60 years old: multiple effects of social support on quality of life. Health Qual Life Outcomes. 2021;19(1):254.
23 Riegel B, Moser DK, Buck HG, Dickson VV, Dunbar SB, Lee CS, et al. Self-care for the prevention and management of cardiovascular disease and stroke: a scientific statement for healthcare professionals from the American heart association. J Am Heart Assoc. 2017;6(9):e006997.
24 Baughman AW, Triantafylidis LK, O'Neil N, Norstrom J, Okpara K, Ruopp MD, et al. Improving medication reconciliation with comprehensive evaluation at a veterans affairs skilled nursing facility. Jt Comm J Qual Patient Saf. 2021;47(10):646–53.
25 Blixen CE, Kanuch S, Perzynski AT, Thomas C, Dawson NV, Sajatovic M. Barriers to self-management of serious mental illness and diabetes. Am J Health Behav. 2016;40(2): 194–204.
26 Pittet D, Allegranzi B, Sax H, Bertinato L, Concia E, Cookson B, et al. Considerations for a WHO European strategy on healthcare-associated infection, surveillance, and control. Lancet Infect Dis. 2005;5(4): 242–50.
27 Musu M, Lai A, Mereu NM, Galletta M, Campagna M, Tidore M, et al. Assessing hand hygiene compliance among healthcare workers in six Intensive Care Units. J Prev Med Hyg. 2017;58(3):E231–7.
28 Krein SL, Kowalski CP, Hofer TP, Saint S. Preventing hospital-acquired infections: a national survey of practices reported by U.S. hospitals in 2005 and 2009. J Gen Intern Med. 2012;27(7):773–9.
29 Huis A, Schoonhoven L, Grol R, Donders R, Hulscher M, van Achterberg T. Impact of a team and leaders-directed strategy to improve nurses' adherence to hand hygiene guidelines: a cluster randomised trial. Int J Nurs Stud. 2013;50(4):464–74.
30 Chou R, Deyo R, Friedly J, Skelly A, Hashimoto R, Weimer M, et al. Nonpharmacologic therapies for low back pain: a systematic review for an American college of physicians clinical practice guideline. Ann Intern Med. 2017;166(7):493–505.
31 Wu C, Zheng Y, Duan Y, Lai X, Cui S, Xu N, et al. Nonpharmacological interventions for cancer-related fatigue: a systematic review and bayesian network meta-analysis. Worldviews Evid Based Nurs. 2019;16(2): 102–10.
32 Haines TP, Hill AM, Hill KD, McPhail S, Oliver D, Brauer S, et al. Patient education to prevent falls among older hospital inpatients: a randomized controlled trial. Arch Intern Med. 2011;171(6):516–24.
33 Sibbald RG, Elliott JA, Persaud-Jaimangal R, Goodman L, Armstrong DG, Harley C, et al. Wound bed preparation 2021. Adv Skin Wound Care. 2021;34(4):183–95.

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Research Article

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Is YouTube a Reliable Source of Information on Antimicrobial Resistance in the Arab World?

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Keywords
Antimicrobial resistance · YouTube · Arabic · Public health · Public education

Abstract
Introduction: Antimicrobial resistance (AMR) is a global challenge that the public should be aware of. YouTube is a major educational source on the internet from which the public could learn about AMR. We aimed to evaluate the quality and reliability of AMR videos on YouTube catered to Arabic speakers. ***Methods:*** This was a cross-sectional study, where the Arabic term of AMR was used to search for AMR videos on YouTube published in Arabic. Videos that were non-Arabic, targeted children, and did not target the public, and TV reports/interviews were excluded. Views and interactions with the videos were evaluated. The quality and reliability were assessed using global quality scale (GQS) and DISCERN tool, respectively. ***Results:*** Of 366 videos in search results, 96 met the eligibility criteria. Most videos came from Egypt (n = 27; 28.9%), followed by Saudi Arabia (n = 22; 22.9%). Although videos from official sources have stayed longer on YouTube (1,348 vs. 844 days; p = 0.025), videos from unofficial sources had a significantly higher score of viewers' interaction based on views and likes counts (2 vs. 5; $p < 0.0001$). Nevertheless, no significant difference was observed between the two video groups in GQS score (3 vs. 3; p = 0.307) and DISCERN score (3 vs. 3; p = 0.412). ***Conclusion:*** Arabic AMR videos on YouTube from official and unofficial sources had an overall good quality and reliability. Healthcare providers can refer their patients to videos that meet such criteria regardless of their source. Additionally, authorities and public health organizations can use these videos in awareness campaigns on antibiotics and AMR.

Introduction

Antimicrobial resistance (AMR) is a major challenge worldwide, in which microorganisms, particularly bacteria and fungi, evolve over time and cease to respond to antimicrobials, making infections more difficult to treat and raising the risk of morbidity and mortality [1]. In the Arab World, the current status of AMR shows high resistance rates to β-lactams, macrolides, fluoroquinolones, and antituberculosis medications when compared to other regions in the world [2]. Antibiotic misuse is one of the key contributors to the rise in AMR. This includes self-medication due to lack of prescription obligation, incorrect dosage, missed doses, and reuse of antibiotics

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from past prescriptions [3, 4]. Studies from some Arabic countries showed high rates of inappropriate use of antibiotics as demonstrated by the high rates of antibiotics self-medication, which ranged from 44 to 77.5% [5–9]. The Gulf Cooperation Council countries, which includes Saudi Arabia, the United Arab Emirates, Kuwait, Qatar, Oman, and Bahrain, have a high rate of Gram-negative bacterial resistance, such as extended-spectrum beta-lactamases, carbapenem-resistant Enterobacterales, *Pseudomonas aeruginosa*, and *Acinetobacter baumannii* [10–12].

The internet is a powerful education tool and is a source that affects a layperson's knowledge about nearly any topic, including AMR. YouTube is a video-sharing website that may aid in bridging the education gap. Its fame has expanded tremendously in recent years because of its relatively accessible, user-friendly, and consumer-run nature. It currently has a global audience of approximately 2 billion people and is increasingly being used to address health-related issues. In a 2022 report about social media usage worldwide, several Arabic countries were among the top world countries in the number of users on some popular social media platforms, including YouTube [13]. Therefore, YouTube has a great potential to be an awareness tool about antibiotic misuse [14].

Knowledge of Arabs on AMR and appropriate handling of antibiotics was assessed in several studies from different Arabic countries, where a large proportion of the participants had insufficient knowledge, which was demonstrated by their agreements with statements such as antibiotics can be used for viral infections like cold and flu, that they can be stopped once the patient feels better, and that they can be shared or kept for future use [6, 7, 15, 16]. Moreover, some participants in these studies reported using social media and/or the internet as their main source of information [6, 7, 15, 16]. To further evaluate the content, quality, and reliability of Arabic YouTube videos addressing AMR from which the Arabs could learn about this crucial topic, this study was conducted. Results from this study should inform healthcare providers and policymakers about the quality of information presented to the public in the Arab World, which may help guide future antimicrobial awareness campaigns.

Methods

Study Design and Search Strategy

In this cross-sectional study, the keyword "Antimicrobial Resistance" in Arabic (مقاومة المضادات الحيوية) was searched between July 2 and October 2, 2022, where all published videos from inception until this search period were evaluated. The videos were sorted according to the number of views in a descending order. Videos in languages other than Arabic, TV reports, interviews, irrelevant topics, videos targeting children, videos not targeting the public, and videos that lack information on AMR were excluded. This study was exempted from ethical review by the Research Ethics Committee of the Faculty of Pharmacy, King Abdulaziz University as the study did not involve human data.

Video Parameters

Collected data on videos included the source (official or unofficial), type of image (real or animation), the profession of the speaker if he/she appears on the video (healthcare worker or other), days since upload (from the date of upload to the day of visit), country of video creator/publisher, video length, total views, views per day (total views divided by the number of days since the video was uploaded), number of likes, number of dislikes, number of comments, video power index (VPI), and the viewers' interaction. VPI was calculated as follows:

$$\left(\frac{\text{number of likes} \times 100}{[\text{number of likes} + \text{number of dislikes}]}\right) \times \frac{(\text{views per day})}{100}$$

where the views per day were calculated by dividing the number of views by the number of days since the video was uploaded. Viewers' interaction was calculated using the following equation:

$$\left[\frac{(\text{number of likes} - \text{number of dislikes})}{\text{number of views}}\right] \times 100$$

Assessment of Content Quality and Reliability

Global quality scale (GQS) and DISCERN tool were used to assess the videos' quality and reliability, respectively. The GQS is a five-point scale that assesses the overall quality of the content and the usefulness of the information, where A score of 1 point indicates a poor quality and a score of 5 points indicates an excellent quality [17]. Table 1 lists the GQS criteria. The reliability of the videos was evaluated using the modified DISCERN tool, which is a five-question instrument used for judging the quality of written consumer health information on treatment choices. Each "Yes" is recorded as 1 point, and each "No" is recorded as 0 (Table 1) [18].

Statistical Analysis

Videos were categorized based on the source as either official or unofficial. Shapiro-Wilk test of normality was conducted for all the continuous data, which showed lack of normal distribution. Therefore, continuous data were presented as median (interquartile range) and compared using Mann-Whitney U test. On the other hand, categorical data were presented as numbers (percentages) and compared using χ^2 test. A p value of <0.05 indicated a significant difference. SPSS version 24.0 (IBM Corp., Armonk, NY, USA) was used for statistical analysis.

Results

Of 355 videos shown in search results and screened for eligibility, 96 met the study criteria and were evaluated. Figure 1 displays the reasons for exclusion of 246 videos,

Table 1. GQS and DISCERN tool scoring criteria

GQS	1. Poor quality, very unlikely to be of any use to patients 2. Poor quality but some information present, of very limited use to patients 3. Suboptimal flow, some information covered but important topics missing, somewhat useful to patients 4. Good quality and flow, most important topics covered, useful to patients 5. Excellent quality and flow, highly useful to patients
DISCERN	1. Are the explanations given in the video clear and understandable? 2. Are useful reference sources given? (publication cited, from valid studies) 3. Is the information in the video balanced and neutral? 4. Are additional sources of information given from which the viewer can benefit? 5. Does the video evaluate areas that are controversial or uncertain?

where most videos (n = 108) were excluded due to more than one reason. The characteristics of the included videos are listed in Table 1. Overall, most videos came from Arabic countries and were presented by a healthcare worker. Among the Arab countries, Egypt contributed the most with 27 (28.1%) videos, 25 (37.3%) of which were produced by unofficial sources. Saudi Arabia comes the second with a total of 22 (22.9%) videos. Six of the included videos (6.3%) were produced by international organizations, such as the World Health Organization (WHO) and Consumers International. Figure 2 illustrates the distribution of countries from which the videos were produced and their counts.

While the oldest video was published in 2014, most videos were published in year 2021 (n = 21) as shown in Figure 3, where official sources have produced videos on AMR long before unofficial producers published their videos as could be seen from the median time since video upload (1,348 vs. 844 days; p = 0.025). Despite that videos from unofficial sources were significantly longer with a median of 4.75 min compared with 2.36 min for videos from official authorities (p <0.0001), total views and the average views per day were not different between the two video categories. Moreover, videos from unofficial sources outscored the official source videos in the median number of likes and comments (25 vs. 6 and 5 vs. 0; p = 0.021 and <0.0001, respectively); hence, they had better viewers' interaction score of 5 versus 2 for the official videos (p <0.0001) with no difference in VPI score. In terms of the quality and reliability of information presented in the videos, GQS and DISCERN scores were comparable between the two groups with a median of 3 points for both video groups and for both scoring scales, which indicate balanced and neutral content in terms of reliability, as well as suboptimal flow with some information was covered and some were missing in terms of quality (Table 2).

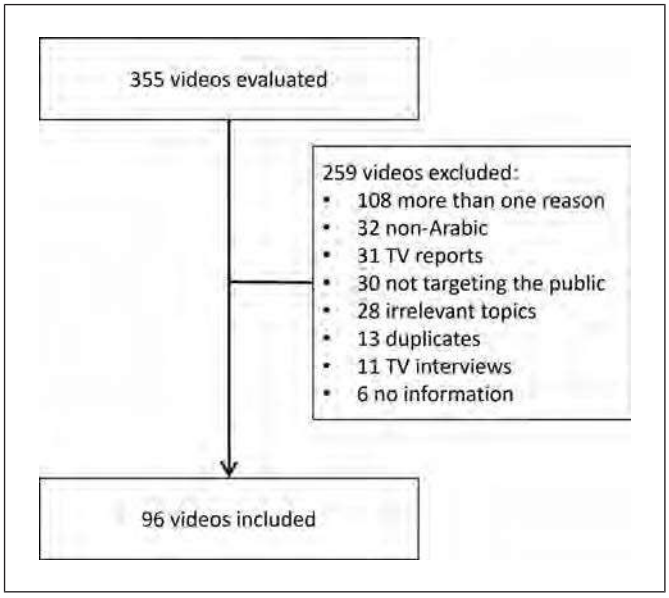

Fig. 1. Determination of videos' eligibility.

Discussion

AMR is a worldwide predicament that requires collaborative efforts to tackle it, and public education and awareness is one way to help mitigate it [19]. In this study, we assessed the quality of educational Arabic AMR videos on YouTube that contributes to the knowledge of the public in the Arab World about this issue, where 96 videos were evaluated. Overall, the videos were of good scientific quality and reliability whether they were published by official or unofficial producers on YouTube as the quality and reliability scores were comparable despite that most unofficial video creators did not disclose the sources of their information. However, those that disclosed their references mostly relied on official sources,

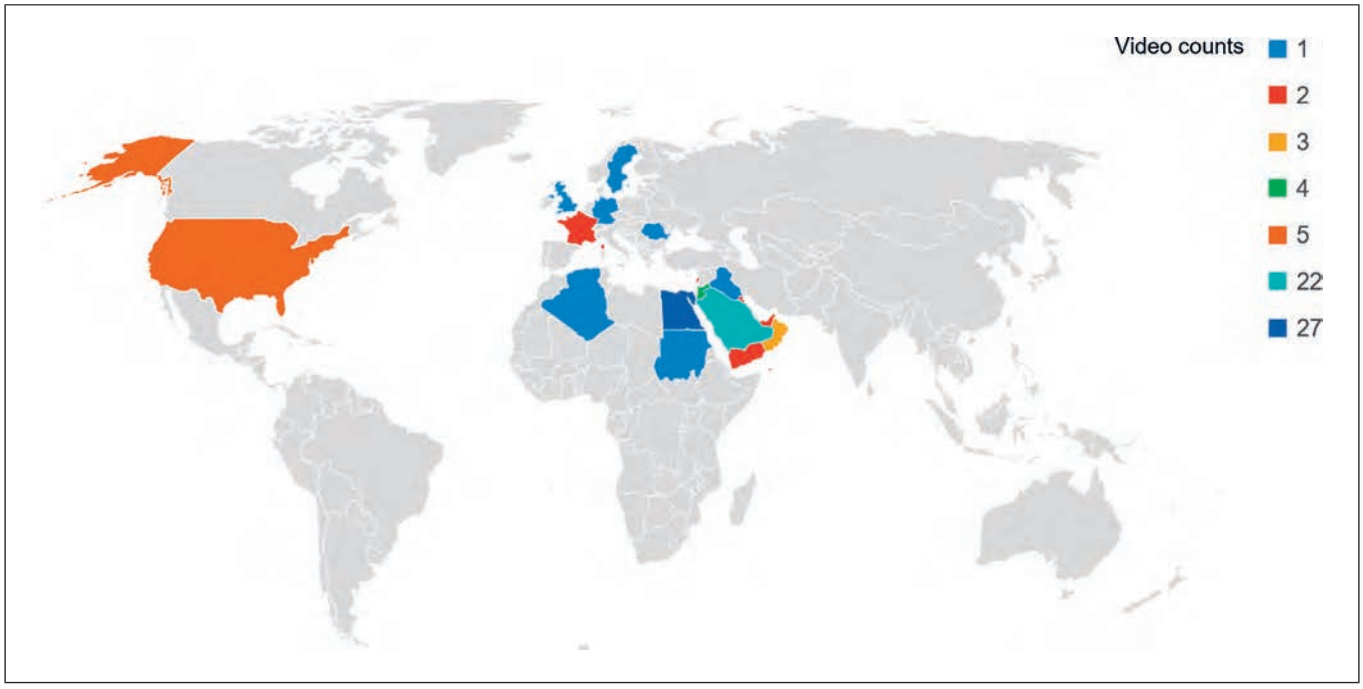

Fig. 2. Distribution of source country of the included videos. Note: There were 7 videos that were published by international organizations and 3 videos of unknown origin (not shown on the map).

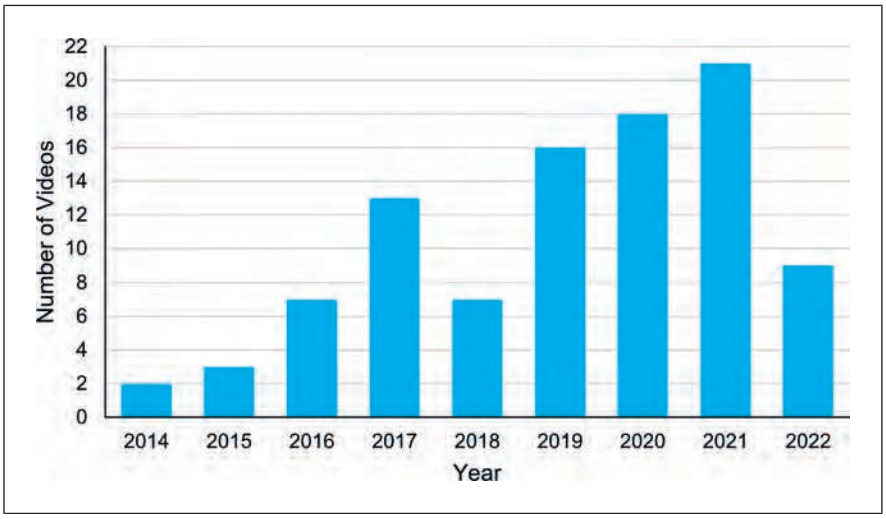

Fig. 3. Counts of videos published per year.

such as the WHO website and local ministries of health. Although videos uploaded by official sources were older and shorter than unofficial videos, the latter were more popular as they received higher level of interactions in terms of views, likes, and comments. This may be due to the blogger's interaction as most of these videos (n = 40; 59.7%) were in real image, which may motivate viewers to interact with them, as well as the fact that official sources may not typically interact with the viewers in the comments section; hence, viewers may abstain from commenting.

Among the source countries of the included videos, Egypt topped the list with 28.1% (n = 27) of the videos, followed by Saudi Arabia in the second place with

Table 2. Characteristics of the included videos

Characteristic	Total (n = 96)	Official source (n = 29)	Unofficial source (n = 67)	p value
Country[a]				0.003
Egypt	27 (28.1)	2 (6.9)	25 (37.3)	
Saudi Arabia	22 (22.9)	5 (17.2)	17 (25.4)	
International organization	6 (6.3)	5 (17.2)	1 (1.5)	
USA	5 (5.2)	2 (6.9)	3 (4.5)	
Jordan	4 (4.2)	3 (10.3)	1 (1.5)	
Morrocco	4 (4.2)	0 (0.0)	4 (6.0)	
Oman	4 (4.2)	3 (10.3)	1 (1.5)	
Palestine	4 (4.2)	1 (3.4)	3 (4.5)	
France	2 (2.1)	1 (3.4)	1 (1.5)	
Kuwait	2 (2.1)	2 (6.9)	0 (0.0)	
Lebanon	2 (2.1)	2 (6.9)	0 (0.0)	
United Arab Emirates	2 (2.1)	1 (3.4)	1 (1.5)	
Yemen	2 (2.1)	1 (3.4)	1 (1.5)	
Romania	1 (1.0)	0 (0.0)	1 (1.5)	
United Kingdom	1 (1.0)	0 (0.0)	1 (1.5)	
Sweden	1 (1.0)	0 (0.0)	1 (1.5)	
Iraq	1 (1.0)	0 (0.0)	1 (1.5)	
Germany	1 (1.0)	0 (0.0)	1 (1.5)	
Sudan	1 (1.0)	1 (3.4)	0 (0.0)	
Algeria	1 (1.0)	0 (0.0)	1 (1.5)	
Unknown	3 (3.1)	0 (0.0)	3 (4.5)	
Arab country	75 (87.2)	20 (87.0)	55 (87.3)	0.966
Speaker was a HCW[b]	60 (72.3)	20 (87.0)	40 (66.7)	0.065
Time since upload, days[c]	921 [432–1,698.25]	1,348 [643.5–2,026]	844 [390–1,604]	0.025
Video length, s	219.5 [140.5–420]	142 [67–291]	285 [174–475]	0.001
Video length, min	3.64 [2.34–7.37]	2.36 [1.12–4.85]	4.75 [2.98–8.53]	<0.0001
Type of image				0.050
Real	51 (53.1)	11 (37.9)	40 (59.7)	
Animation	45 (46.9)	18 (62.1)	27 (40.3)	
Total views	517 [72–2,755]	538 [26.5–3,200]	496 [86–2,728]	0.495
Views per day	0.56 [0.13–2.6]	0.27 [0.08–2.38]	0.62 [0.15–2.61]	0.150
Number of likes	16.5 [4–106]	6 [1–71.5]	25 [5–116]	0.021
Number of dislikes	0 [0–2]	0 [0–2]	0 [0–2]	0.821
Number of comments	3 [0–13.75]	0 [0–3.5]	5 [0–23]	<0.0001
VPI	1 [0–3]	0 [0–2.5]	1 [0–3]	0.136
Viewers' interaction	4.5 [2–8]	2 [1–3.5]	5 [3–9]	<0.0001
GQS score	3 [3–4]	3 [2–4]	3 [3–4]	0.307
DISCERN score	3 [2–3]	3 [2–3]	3 [2–3]	0.412

Data are presented as median [IQR] or n (%). HCW, healthcare worker; GQS, global quality scale; VPI, video power index; IQR, interquartile range. [a]Videos from non-Arab countries were either of Arabic immigrants or were non-Arabic videos dubbed or translated to Arabic. [b]This is only for the videos where the speaker appears on the screen (total n = 83). [c]Calculated from the day of video visit.

22.9% (n = 22) of the videos. This could be potentially because Egypt is the country with the highest population in the Arab World, where 71.9% of Egyptians (approximately 76.3 million people) use the internet compared with Saudi Arabia which has about 35 million internet users (97.9% of the country's population) based on a recent global report published in 2022 [13, 20]. While it was expected that the majority of the videos would come from Arabic countries, six videos (6.3%) came from international organizations, such as the WHO, but were published in Arabic. The videos that were labeled as coming from non-Arab countries were originally published in non-Arabic language but were translated or dubbed to Arabic.

Previous studies from the Arab World have shown that the public often use social media (or the internet) as one of their sources of information about AMR and appropriate use of antibiotics [15]. In a recent study from Saudi Arabia, 28% of the participants (n = 111 of 397) reported such behavior, whereas about 9% (n = 17 of 193) of the participants in another recent study from Iraq reported it [7, 16]. The larger percentage in the former study could be potentially justified by the fact that many of the included videos in this study were produced from Saudi Arabia (n = 22; 22.9%).

Studies that surveyed the Arabic public within the last decade showed a trend toward poor understanding of AMR and appropriate antibiotics use according to a systematic review of nine studies by Almohammed et al. [15]. However, it was noted that most of these studies were conducted between 2012 and 2016 before most of Arabic educational videos on AMR were published (n = 12 vs. n = 84 published in 2017 and onward). Conversely, two new studies from Saudi Arabia demonstrated a shift in the level of knowledge about AMR and antibiotics use. One study by Alqarni et al. [21] found younger age (31–40 years) having undergraduate or postgraduate education and being employed were significantly associated with better awareness and knowledge of AMR. The other study by Alduahimi et al. [16] found similar results with factors such as the female gender and a health science background.

This is the first study to evaluate the Arabic content in YouTube pertaining to educating the public on AMR and risks associated with misuse of antimicrobials. However, some limitations cannot be overlooked. The values on which viewers' interaction score is based (number of views, likes, dislikes and number of comments) are continuously changing; hence, the numbers presented reflect only the values reported on the video visit day. Additionally, these results reported in this study may not represent all the population in the Arab countries as some users may search for the same content but in languages other than Arabic, such as French which is the second language in some Arabic North African countries (i.e., Tunisia, Algeria, and Morocco) [22].

Conclusion

Findings from this study indicate that Arabic AMR videos on YouTube from unofficial sources had a comparable good quality and reliability with videos from official sources. Therefore, healthcare providers in Arab countries can be assured of the credibility of these videos and the knowledge delivered to their patients and the public about AMR; hence, they can refer their patients to them. Moreover, authorities and public health organizations can make use of such videos in awareness campaigns related to antibiotics and AMR.

Statement of Ethics

An ethics statement was not required for this study type; no human or animal subjects or materials were used.

Conflict of Interest Statement

The authors declare no conflict of interest.

Funding Sources

This study received no funding from any source.

Author Contributions

A.K.T. designed the study, performed statistical analysis and interpretation, and reviewed and edited the manuscript. R.Y.B., S.S.A., A.E.A., and M.H.Q. collected the data. A.K.T., R.Y.B., S.S.A., A.E.A., and M.H.Q. drafted the manuscript. All authors approved the final manuscript.

Data Availability Statement

The dataset is available on Open Science Framework at https://osf.io/3y5b8/?view_only=c5f7b69b8f4d4f32a2f72be93c52b0d7. Further inquiries can be directed to the corresponding author.

References

1 Thabit AK, Crandon JL, Nicolau DP. Antimicrobial resistance: impact on clinical and economic outcomes and the need for new antimicrobials. Expert Opin Pharmacother. 2015;16(2):159–77.
2 Zowawi HM. Antimicrobial resistance in Saudi Arabia. An urgent call for an immediate action. Saudi Med J. 2016;37(9):935–40.
3 Rather IA, Kim BC, Bajpai VK, Park YH. Self-medication and antibiotic resistance: crisis, current challenges, and prevention. Saudi J Biol Sci. 2017;24(4):808–12.
4 Wall S. Prevention of antibiotic resistance: an epidemiological scoping review to identify research categories and knowledge gaps. Glob Health Action. 2019;12(1):1756191.
5 Alghadeer S, Aljuaydi K, Babelghaith S, Alhammad A, Alarifi MN. Self-medication with antibiotics in Saudi Arabia. Saudi Pharm J. 2018;26(5):719–24.
6 Muflih SM, Al-Azzam S, Karasneh RA, Bleidt BA, Conway BR, Bond SE, et al. Public knowledge of antibiotics, self-medication, and household disposal practices in Jordan. Expert Rev Anti Infect Ther. 2023;21(4):477–87.
7 Al-Taie A, Hussein AN, Albasry Z. A cross-sectional study of patients' practices, knowledge and attitudes of antibiotics among Iraqi population. J Infect Dev Ctries. 2021;15(12):1845–53.
8 Eltom EH, Alanazi AL, Alenezi JF, Alruwaili GM, Alanazi AM, Hamayun R. Self-medication with antibiotics and awareness of antibiotic resistance among population in Arar city, Saudi Arabia. J Infect Dev Ctries. 2022;16(11):1762–7.
9 Abdelaziz AI, Tawfik AG, Rabie KA, Omran M, Hussein M, Abou-Ali A, et al. Quality of community pharmacy practice in antibiotic self-medication encounters: a simulated patient study in upper Egypt. Antibiotics. 2019;8(2):35.
10 Thabit AK, Alabbasi AY, Alnezary FS, Almasoudi IA. An overview of antimicrobial resistance in Saudi Arabia (2013–2023) and the need for national surveillance. Microorganisms. 2023;11(8):2086.
11 Bizri AR, El-Fattah AA, Bazaraa HM, Al Ramahi JW, Matar M, Ali RAN, et al. Antimicrobial resistance landscape and COVID-19 impact in Egypt, Iraq, Jordan, and Lebanon: a survey-based study and expert opinion. PLoS One. 2023;18(7):e0288550.
12 Zowawi HM, Sartor AL, Sidjabat HE, Balkhy HH, Walsh TR, Al Johani SM, et al. Molecular epidemiology of carbapenem-resistant Acinetobacter baumannii isolates in the Gulf Cooperation Council States: dominance of OXA-23-type producers. J Clin Microbiol. 2015;53(3):896–903.
13 Reportal D. Digital 2022 global overview report. 2022. https://datareportal.com/reports/digital-2022-global-overview-report (accessed 28 Nov, 2022).
14 Zowawi HM, Abedalthagafi M, Mar FA, Almalki T, Kutbi AH, Harris-Brown T, et al. The potential role of social media platforms in community awareness of antibiotic use in the gulf cooperation Council states: luxury or necessity? J Med Internet Res. 2015;17(10):e233.
15 Almohammed RA, Bird EL. Public knowledge and behaviours relating to antibiotic use in Gulf Cooperation Council countries: a systematic review. J Infect Public Health. 2019;12(2):159–66.
16 Alduhaimi GS, Alabdulkareem ME, Alhussin GI, Alhumaid LA, Basudan SK, Masud N, et al. Awareness of antimicrobial resistance: surveillance among visitors of a tertiary care center, riyadh, Saudi Arabia. Saudi J Health Syst Res. 2022;2(3):128–35.
17 Bernard A, Langille M, Hughes S, Rose C, Leddin D, Veldhuyzen van Zanten S. A systematic review of patient inflammatory bowel disease information resources on the World Wide Web. Am J Gastroenterol. 2007;102(9):2070–7.
18 Charnock D, Shepperd S, Needham G, Gann R. DISCERN: an instrument for judging the quality of written consumer health information on treatment choices. J Epidemiol Community Health. 1999;53(2):105–11.
19 Michael CA, Dominey-Howes D, Labbate M. The antimicrobial resistance crisis: causes, consequences, and management. Front Public Health. 2014;2:145.
20 United Nations Population Funds. World population dashboard. 2022. https://www.unfpa.org/data/world-population-dashboard (accessed 29 Nov 2022).
21 Alqarni SA, Abdulbari M. Knowledge and attitude towards antibiotic use within consumers in Alkharj, Saudi Arabia. Saudi Pharm J. 2019;27(1):106–11.
22 Aitsiselmi F, Marley D. The role and status of the French language in North Africa. 2008.

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Innovation and Thought Leadership by Women in Healthcare during the COVID-19 Pandemic

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Keywords
Women · Healthcare · Administration · Innovation · Thought leadership · COVID-19

Abstract

Introduction: The purpose of this study was to explore the innovation and thought leadership of women in healthcare during the COVID-19 pandemic. ***Methods:*** We used a phenomenological qualitative design. Participants were women health leaders (WHLs) from multiple hospital administration levels. Their thought leadership profile and innovation were assessed. ***Results:*** All WHLs indicated awareness of strengths and weaknesses, actively prioritised tasks, showed openness to feedback, and effectively assessed sources of conflict. Most were willing to listen to others, accept advice, and open to change. They were confident of their credibility and comprehensibility of their messages, felt capable of solving problems and handling conflict, utilised a negotiating style, and showed situation-appropriate emotion. They were confident in managing teamwork, allocated resources efficiently, and supported employee work preferences. ***Conclusion:*** This study provides evidence of WHLs' capabilities in leading healthcare organisations during crisis and the shift to virtual care in Saudi Arabia. Establishing women's leadership programs that focus on placing women in healthcare executive positions is necessary to utilise their untapped potential. Facilitating research on women's leadership capacity, administrative skill, and impact on providing the highest quality healthcare would be valuable. Evaluating infrastructure and preparedness of healthcare organisations to expand virtual care and the potential for innovation to sustain performance during crises are crucial. Supportive hospital culture provides confidence to WHLs to manage and achieve organisational goals with relative fluidity.

Introduction

With the COVID-19 pandemic outbreak, rapid changes were necessary in healthcare [1–3]. Leaders needed to mobilise resources quickly, urge people to adjust to established behaviours, and modify familiar routines. The pandemic required uptake of virtual care mechanisms [1, 4]. Telemedicine and digital technology have demonstrated improvement in health outcomes and the potential to overcome barriers to care, improve access for remote patients, help patients effectively self-manage chronic disease, and revolutionise interactions between patients and providers, streamlining care [5]. Several countries found that the pandemic circumstances were motivators to embrace digital technology to mitigate the situation and provide care to patients [1, 5, 6]. To cope with the pandemic, workload increased for healthcare professionals, primarily for women [7–12].

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Theory

Thought leadership encourages organisations to achieve competitive advantage by developing innovative working methods, encouraging collaboration within the workforce, sharing knowledge, engaging organisational values, understanding strengths and weaknesses, and working intuitively to adjust the institutional culture using active learning. It understands the individual while considering the organisational context.

Thought leadership is defined as "identifying, evaluating, and managing key topics and resources to achieve wise value-added results" [13, 14]. Thought leaders are revolutionaries challenging the status quo; their purpose is not only to accomplish operational goals but also to encourage innovative ideas, championing them from the outset until their achievement [13, 14].

In healthcare, thought leadership can shift organisational culture, develop new ways of working by innately feeling for opportunities, considering the best ideas and promoting them, acknowledging diversity of expertise and skill of the workforce and their organisational wisdom as key stakeholders, and handle challenges fluidly [14]. Thought leaders must embrace technology to influence stakeholders and engage their thinking potential, creativity, and innovation [14].

Women possess traits to embrace thought leadership principles, such as deep listening, emotional intelligence, effective communication, providing support, empathy, and maintaining work ethics [7, 15–22]. In healthcare, women health leaders (WHLs) bring compassion, sincerity, and empathy which have proven vital during the pandemic [2, 21, 23–25].

Women in Healthcare Leadership

Globally, women comprise approximately 70% of the health system workforce. However, only 25% hold senior leadership positions [7–9, 12, 26, 27]. Women demonstrated efficient management of the COVID-19 pandemic, leading global health policies and translating them into positive emergency response actions [12, 27]. In Germany, Chancellor Angela Merkel emphasised the importance of early testing [2, 27, 28]. President Tsai Ing-wen of Taiwan introduced 124 measures to prevent COVID-19 spread without resorting to lockdowns [2, 27, 28]. Prime Minister Jacinda Ardern implemented early lockdown and mandated self-isolation on people entering New Zealand [2, 27, 28]. In Norway, Prime Minister Erna Solberg used television to explain the pandemic to children and answer questions [2, 27, 28]. Iceland's Prime Minister Katrín Jakobsdóttir offered free COVID-19 testing to citizens and became an example of proper control of COVID-19 [2, 27, 28].

These examples prove that women are essential for a sustainable health system during the pandemic [2, 10–28, 29]. These countries had fewer confirmed COVID-19 deaths and rapidly flattened COVID-19 curves [10–12, 27].

Women's leadership is key to strengthening the health system; therefore, investing in and empowering qualified, trained, and experienced WHLs is necessary [7–9, 12, 29, 30]. Women's unique leadership style is less individualistic, more interactive, and effective in building trust and achieving results [2, 7, 8, 15, 17, 22, 26, 31, 32]. Warmth, positive relationships at work, and compassion, which women innately demonstrate, have a significant impact on employee loyalty and are valued more highly than financial rewards [2, 16, 17, 22, 33].

Women in leadership endorse governance through groupthink, novel viewpoints, higher quality management, more effective risk management, and robust deliberation [7, 8, 10, 15–17, 22, 29, 30]. In 2019, Zenger and Folkman found that 84% of women were more effective in leadership competencies than men. Women excel in taking the initiative, acting with resilience, practicing self-development, driving for results, and showing high integrity and honesty [2, 15–17, 22, 34].

However, historically, there has been a discrimination against women's access to leadership due to cultural and societal stereotypes and perceptions about traditionally male domains that emphasise masculine behaviours such as emotional restraint or rigid work processes, which create a challenging environment for women and affect their career progress [2, 7–12, 15–17, 22, 26, 35–39]. The proportion of women in the Saudi healthcare workforce is approximately 20% and increasing, yet women are underrepresented in leadership and executive roles [15–17, 23, 26, 37, 38, 40, 41]. The proportion of women working in executive or administrative positions in healthcare is unclear. At King Faisal Specialist Hospital and Research Centre (KFSHRC), at the time of this study, only six women held executive and deputy executive positions.

The G20 recommends women to participate in decision-making. Additionally, it suggests shifting towards digital technology to achieve global developmental targets [42]. The Kingdom of Saudi Arabia has announced and begun to implement significant strategic initiatives as part of the ambitious Vision 2030, such as the National Transformation Program, the Healthcare Transformation Program, and the Human Capability Development Program among several others [43–46]. These initiatives support a shift towards thought leadership, naturally moving the social dialogue towards a diverse work environment, and increased engagement of

women to lead and design innovative technological solutions and contribute significantly to managing healthcare, especially in emergencies such as the COVID-19 pandemic [2, 5, 10–12, 41, 42].

During the pandemic, the rapid shift to virtual care required awareness of different levels by all stakeholders, recognition of specific performance patterns, need for champions, and active strategies to facilitate change [1, 40, 47–49]. Recent research has found that although women were mostly responsible for care, men dominated as leaders [2, 7, 8, 12]. Increasing WHLs is an opportunity to build resilience and responsiveness, especially during crises when organisational flexibility and responsiveness are critical to manage and sustain in the unforeseeable future [2, 10–12, 29]. Thought leadership by women may be an important asset to deftly handle the challenges of the pandemic and innovate to facilitate the shift to virtual care modalities.

Aim and Objectives

We explored thought leadership and its application during the crisis and highlighted qualities and leadership traits of WHLs to emphasise the potential for women to lead the transition to virtual care during the COVID-19 pandemic and beyond. We interviewed WHLs on their role in facilitating technological and practical changes in healthcare organisations to adapt to the pandemic situation and provided recommendations to lead change in healthcare services during crises.

Design

Study Setting

The KFSHRC is a tertiary healthcare organisation in Riyadh that offers specialised medical care and is a leading research centre in the Kingdom of Saudi Arabia. It highly specialises in oncology, organ transplantation, cardiovascular diseases, neurosciences, and genetic diseases. The KFSHRC has consistently achieved high ratings from national and international accrediting institutions such as the Joint Commission International (JCI), Magnet Recognition Program, American Nurses Credentialing Center (ANCC).

Sample

The study sample was identified through the KFSHRC human resources department. Snowball sampling was used to recruit female leaders and executives in the organisation, recommending other colleagues within the organization to connect with and interview until saturation was achieved, having identified, and contacted all the females in managerial and executive positions within the hospital. We attempted to recruit participants from the highest level of executives to middle management. The initial estimate was that 15–20 interviews would be conducted during November–December 2020.

Inclusion Criteria

All female healthcare executives or administrators in leadership positions at the KFSHRC were eligible for inclusion in the study, including ward supervisors and nurse managers, regardless of their nationality, length of experience, and leadership role or position. We interviewed executives and their subordinates, which was beneficial as it reflected the reliability and validity of their self-reporting.

Methodology and Method

We used a phenomenological approach for a hospital-based qualitative research design with a standardised open-ended interview, adhering to the COREQ criteria and American Psychological Association guidance for replicability [50–52]. The interview duration was 10–20 min. Participants were invited by e-mail and could select a convenient time and medium for the interview (in person, by phone, or using a virtual meeting platform). The interview purpose was explained to them, information sheet and consent forms were provided, and the confidentiality terms were fully addressed. The interviews were recorded to facilitate data coding and analysis.

Instrument

The interview schedule was developed using Kerns [13] thought leadership profile and contained sections on participant demographics (age, work experience, administrative level, job role and responsibilities, and staff supervised). We utilized Kerns [13] measure with a Likert scale (always to never) for each of the thought leadership components: self and situational awareness, high-impact communication, decisive problem-solving, linking resources behaviour, openness to change, managing behavioural work style preferences, persuasiveness, managing conflict and negotiation, appreciating wisdom, and focussing on desirable outcomes. Questions were added to assess innovation by WHLs in their role during the pandemic response to COVID-19 circumstances, changes and adjustments made, and their awareness of their strengths and weaknesses. The interview schedule was piloted with several healthcare professionals to ensure coherence, flow, and suitability.

Table 1. WHL demographics

Variable	Frequency	%
Age		
28–36	6	38
37–45	3	19
46–54	4	25
55–63	3	19
Nationality		
Saudi	11	69
Non-Saudi	5	31
Administrative level		
Low	6	38
Middle	8	50
High	2	13
Work experience, years		
4–11	8	50
12–19	2	13
20–27	2	13
28–35	4	25
Total	16	

Data Analysis

Qualitative analysis, coding, organizing, sorting, and identification of leadership themes were performed manually, using colour coding techniques and cross-checking. Based on a sample of interviews, data were iteratively coded into themes and sub-themes. Data were compared across interviews and analysed through a framework to evolve beyond the thematic analysis and allow appreciation of unique cases, draw inferences, and ensure that the analysis was aligned with the research objectives using audio transcriptions of interview recordings. The analysis framework consisting of five phases was adopted from Heath et al. [53]: (1) familiarisation – interviews were familiarised by listening and reading the transcripts, notes were taken to recognise exceptional information; (2) identification – initial coding and identification of potential theme titles; themes were selected based on thought leadership traits (Kerns [13]); (3) indexing – going through the remaining interview transcripts and manually coding data; (4) charting – identifying sub-themes, commonality, and outliers based on the developed framework; and (5) mapping and interpretation – data are compared and analysed [49].

Results

Demographic Information

Sixteen WHLs participated in the study. Their age ranged from 28 to 36 years (n = 6, 38%), 46 to 54 years (25%), and 37 to 45 and 55 to 63 years (n = 3, 19%). Most were Saudi (n = 11, 69%); 50% (n = 8) were mid-level administrators, while 38% (n = 6) and 13% (n = 2) were low- and high-level administrators, respectively. Regarding work experience, 50% (n = 8), 25% (n = 4), and 13% (n = 2) had 4–11, 28–35, and 12–19 and 20–27 years of work experience, respectively (Table 1).

Thought Leadership Profile

Self-Awareness and Situational Awareness

WHLs were aware of their strengths and weaknesses. Additionally, strengths were assessed from the interviews. Many responses reflected concerns that showing emotion is a weakness and attempts to control it. Situational awareness was assessed through seeking opportunities, targeting essential topics, and prioritisation. All WHLs were actively prioritizing, and 88% (n = 14) were focused on essential topics. Only 44% (n = 7) were actively seeking opportunities (Table 2).

High-Impact Communication

Communication and the ability to link skills were assessed. All participants showed openness to feedback. Among them, 94% (n = 15) could speak clearly, 81% (n = 13) ensured that their message was understood, and 75% (n = 12) felt they could link skills with individuals, 63% (n = 10) WHLs had an open-door policy (Table 2).

Decisive Problem-Solving

Participants were encouraged to share situations and evaluate the decisiveness of their problem-solving skills. Among them, 94% (n = 15) thought they solved problems in agreed-upon timeframes, were able to weigh time versus quality of information and achieved desired results; 69% (n = 11) and 31% (n = 5) rated themselves as good and excellent problem solvers, respectively. Among them, 75% (n = 12) felt capable of leading team decision-making (Table 2).

Linking Resources Behaviour

Linking resources behaviour had five elements: managing teamwork, ensuring alignment, managing key interfaces, and allocating resources efficiently and effectively. In a healthcare organisation, internal interfaces are between hospital employees, and external stakeholders are patients and the external supply chain. Among WHLs, 100% (n = 16) were internally managing key interfaces, 88% (n = 14) were managing teamwork and ensuring alignment, 69% (n = 11) were allocating resources efficiently and effectively, and 44% (n = 7) were managing external stakeholder interfaces (Table 2).

Table 2. Thought leadership in participants

Thought leadership component	Frequency	%
Situational awareness		
Seeking opportunities	7	44
Targeting essential topics	14	88
Prioritize what to be done	16	100
High-impact communication skills		
Speak clearly	15	94
Message is understood	13	81
Open to feedback	16	100
Linking skills with appropriate people	12	75
Open-door policy	10	63
Decisive problem-solving behaviour		
Good problem-solving skills	11	69
Excellent problem-solving skills	5	31
Problem-solving achieved within timeframes	15	94
Weighing time with quality of information	15	94
Desired outcome has been achieved	15	94
Referred to team decision-making	12	75
Linking resources behaviours		
Managing teamwork	14	88
Ensuring alignments	14	88
Allocating resources	11	69
Managing external stakeholder interfaces	7	44
Internally managing key interfaces	16	100
Support employee preferences		
Unconditionally support employees preferences	13	81
Conditionally support employees preferences	3	19
Persuasiveness assessment		
Leadership credibility	14	88
Offer a reasonable approach	9	56
Show emotion appropriately	14	88
Faced gender issues	3	19
Faced personality issues	2	13
Approach is set by the team	7	44
Ability to "sell" an idea	4	25
Assessing conflict management		
Proactively handling potential conflicts	5	31
Describing observable behaviour	7	44
Assessing the source of conflict	16	100
Delivering negotiating style	15	94
Determine what was learnt	2	13
Satisfaction with current team		
Satisfied with her team	7	44
Satisfied with her leader	8	50
Mentioned negative attitude	3	19

Openness to Change

Leaders were asked about their openness to change. Among them, 81% (n = 13) and 19% (n = 3) rated themselves as "always" and "often" open to change, respectively. Our assessment showed 56% (n = 9), 38% (n = 6), and 6% (n = 1) to have moderate-, high-, and low-level of openness, respectively (Table 2).

Understanding and Managing Behavioural Work Style Preferences

All WHLs confirmed gaining awareness and learning through staff hospital meetings. They showed a high understanding of the importance of not forcing an employee to work in a task they are not suited for. In healthcare organisations, work preferences could be in data analytics,

leadership, teaching, handling patient cases, etc. All WHLs supported their employees to work where they might excel. Among them, 81% (n = 13) unconditionally supported their employee's work preferences, 13% (n = 3) supported with some criteria. For example, one WHL mentioned the challenge in assigning the responsibility of a complicated case or leadership position to junior staff as patient safety was a priority. Another explained that due to staff shortages, employees could request to switch departments only if they had a medical condition limiting them from performing tasks (Table 2).

Persuasiveness

Among the participants, 88% (n = 14) were confident in their credibility among stakeholders and confirmed their ability to show situation-appropriate emotion; this was corroborated from interviews with their subordinates. Nine WHLs (56%) were able to offer a reasonable approach. Four categories were identified: gender discrimination, personality issues, team approach, and the ability to "sell" an idea. Among the WHLs, 44% (n = 7) preferred to let their team set the approach, 25% (n = 4) were able to "sell" their ideas, 19% (n = 3) felt they would be approached differently if they were men, and 13% (n = 2) faced resistance from others due to personality issues (Table 2).

Managing and Negotiating Conflict

All WHLs were able to identify the source of conflict, 94% (n = 15) could deliver negotiating style, 44% (n = 7) could describe observable behaviour, 31% (n = 5) proactively handled potential conflicts, and 13% (n = 2) could define what was learned (Table 2).

Appreciating Wisdom

Among the WHLs, 63% had an open-door policy, 75% supported team decision-making, and 44% preferred their team set the approach. From the median of these indicators, we inferred that 60.5% were actively listening and offering advice, despite most not having the privilege to select their team members initially. We found that 50% (n = 8) and 44% (n = 7) were satisfied with their leaders and current team, respectively. Three WHLs (17%) indicated that they valued employee's positive attitude over experience and knowledge (Table 2).

Focussing on Desirable Outcomes

WHLs' administrative level, innovation during the pandemic and achievements were assessed from the interviews. Those in lower-administrative levels scored between 40 and 75% and those in mid- and high-administrative levels scored between 80 and 95% (Table 2).

Thought Leadership

WHLs' reflections on their leadership traits were evaluated against the thought leadership profile. Behavioural skills with one component were coded as (1) for yes or present and (0) if not mentioned or not present. For skills with more than one component, each component was coded similarly. The overall percentage skill existence was calculated by adding all components, dividing by their count, and finally, multiplying by 100 (Table 3).

Innovation

WHLs were either innovators or supported innovations during the pandemic. Several actions were initiated by them to minimise numbers of patients and visitors at the hospital. Patients were not allowed to visit the hospital and were offered access through telephone. Only critical patients were accepted in the inpatients wards, and medical teams were divided into teams A and B to lessen exposure and prevent transmission. Outpatient services shifted to virtual clinics for follow-up and medication dispensing. Patients were educated on the use of virtual platforms, utilising platforms that offered interactive therapy via video, audio, screen sharing, and a waiting room. The speech therapy department developed policies and procedures to ease patient flow and teach patients how to use a virtual setup. WHLs agreed that organising processes in this way was successful and most patients were satisfied with virtual care settings (Table 4).

Family medicine shifted to provide virtual prescriptions; depending on medication type, patients were able to obtain them from any pharmacy or via courier services. Prescriptions in paediatric haematology-oncology were different: medications were given through hospital outpatient pharmacy, but during the peak of COVID-19, restrictions on outpatient pharmacies did not allow to hand over medication. The issue was escalated, and a scheme was initiated to deliver medications directly to patients maintaining the recommended medication temperatures and distancing requirements.

As the hospital continued to perform procedures during lockdown, the blood bank faced severe shortages of blood and platelets. The department pivoted to send internal donor invitations and directed employees to use governmental application WATEEN (blood donation app) that enabled home visits to collect donations.

The risk management department had three members and struggled to complete at least five risk assessments weekly. The acting clinical disaster specialist designed a risk assessment crash course for employees from the clinics that were closed. Subsequently, 10 individuals were able to complete the hospital risk assessments.

Table 3. WHL thought leadership profile

Components	A1, %	A2, %	A3, %	A4, %	A5, %	A6, %	A7, %	A8, %	A9, %	A10, %	A11, %	A12, %	A13, %	A14, %	A15, %	A16, %
Self-awareness and situational awareness	67	67	67	100	67	33	100	100	67	67	67	100	100	67	67	100
High-impact communication	100	100	75	100	100	50	100	100	100	100	50	100	100	100	100	100
Decisive problem-solving	100	100	100	100	100	100	100	100	100	100	25	100	100	100	100	100
Linking resources	60	80	60	100	80	80	80	80	60	80	80	100	80	80	60	80
Understanding and managing behavioural work style preferences	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Openness to change	100	75	25	100	100	100	75	75	75	100	75	100	75	75	50	75
Persuasiveness	67	100	100	100	100	33	67	100	100	67	33	67	67	67	67	100
Managing and negotiating conflict	67	67	50	83	50	50	50	67	83	67	50	67	50	83	67	50
Appreciating wisdom	100	67	0	33	33	100	100	67	0	67	100	67	0	100	100	50
Focussing on desirable outcomes	70	85	80	75	70	40	80	80	80	55	80	80	80	70	80	95
Total score	83	84	66	89	80	69	85	87	77	80	66	88	75	84	79	85

Table 4. Innovation during COVID-19

Participants	Responses (quotes)
A3	"The hospital during COVID-19 had rapid changes. As an administrator, I supported the changes and the staff. I really just put a positive sort of spin on what was going on and try to support and hear their complaints."
A9	"We were covering the machines with plastic, and we were also trying to cover our transfuses with probe covers to prevent the virus transmission."
A11	"We had to do a team nursing, we had to do team A team B, so that we can lessen the exposure of the nurses in case that there was an exposure not the whole team will go down."
A14	"Of course, we applied all the regulations that the hospital and the Ministry of Health instructed us to do, we applied it immediately and also in order not to affect patient flow we converted our service to a virtual service immediately."
A15	"I did secretary work. I did whatever was needed to do because I wanted to keep people at home as much as I could."
A16	"We worked with them on that and facilitated with outreach to make sure that we are not just cancelling our patients even now after COVID, and we do backlog, for most of the areas we do not have a backlog because we serve them virtually, which is amazing."

A paediatric haematology-oncology working group met daily to follow-up patients, anticipate scenarios, and handle them proactively. The cardiology laboratories developed a staff guideline for standard and semi-invasive procedures to protect staff and patients from COVID-19 transmission, using international guidelines, evidence-based practices on recommended personal protective equipment, room cleaning and disinfection, patient handling, and equipment cleaning after use.

The ICU collaborated with the residency department in assigning residents to support COVID-19 wards and arranging virtual teaching plans for medical students.

A safety culture program for hospital employees was developed. Non-essential workers and administrators shifted to telework, maintaining productivity, and organised weekly reporting of accomplished tasks. The productivity project initiative aimed to measure employees' productivity level by defining productive and non-productive time, calculated as a percentage, establishing a work standard in each department (Table 4).

Motivators

WHLs showed loyalty to the organisation, asserting that they did not see themselves working elsewhere. Their motivators were patients and their safety (25%, $n = 4$), career development (19%, $n = 3$), leaving a legacy even after moving on (13%, $n = 2$), and love for work and loyalty to the hospital (13%, $n = 2$). Five WHLs had unique motivations: supporting family, having a great team, previous negative experience with a manager inspiring to become a better leader for others, success of trainees, and new challenges or projects.

Organisational Role

Virtual KFSHRC before the Pandemic

WHLs confirmed that the hospital management had established virtual care prior to the COVID-19 pandemic, mostly used by the outpatient clinics to follow-up with patients in remote locations. The availability of the infrastructure enabled a quick shift to comply with mandated health restrictions during the crisis.

Hospital Meetings

The KFSHRC mandates leadership meetings with teams, to facilitate awareness of employee personal development plans, preferences, and strengths, and communication and idea sharing between team members. Huddle meetings (30 min in the morning) were held to exchange information or new memos. Staff meetings were held thrice a year for follow-up on set objectives and continued alignment with hospital goals. Council meetings were opportunities to highlight issues such as infrastructure or human resources to align all stakeholders.

Supply Chain

Mismanagement of supply chains distracts leadership focus from innovation and consideration of employee needs. The WHLs confirmed that they did not face equipment or personal protective equipment resource issues during the crisis as procurement and supply chain procedures were robustly managed by the hospital administration.

Organisational Culture

WHLs emphasised the organisations' highly supportive culture and their confidence to approach other departments with ideas. The strong relationships among the WHLs were also a valuable component of the culture within the organization. A7 was part of a pandemic WhatsApp group that included all leaders to share and support each other. A8 confirmed her phone number was accessible to everyone as per hospital policy, which was convenient for her. WHLs felt that their leaders were supportive and willing to help solve conflicts. WHLs acknowledged that as they were supported by their leaders, they in turn supported their employees. The organization is recognized for its strong organizational culture, diversity, and a sense of belonging; regardless of their nationality, the WHLs were enabled to innovate and achieve their goals in the health system and facilitate these successes.

Discussion

Our study explored thought leadership in practice during the pandemic, highlighting traits in WHLs that facilitated innovative technological changes, adaptation to work processes, and helped sustain the healthcare organisation.

Innovation

The pandemic forced organisations to work differently and allow working from home due to "lockdown" measures [2, 3, 5, 19]. Healthcare organisations which did not invest in telehealth or technological means for healthcare delivery earlier, quickly shifted to provide outpatient medical care [1, 5, 6]. These rapid adjustments required efficient leadership balanced with emotional intelligence [4, 19]. Interestingly, women leaders have stronger information technology skills compared to their male peers due to their motivation to learn independently and excel [2, 15, 19, 33]. Our findings echo that of others who found WHLs were innovators or supportive of hospital innovations during the pandemic, successfully shifting towards virtual mechanisms, including outpatient services, staff meetings, telework for non-front liners, prescriptions, inpatient visits, and student training, and developed virtual care policies and guidelines for ease of use [2, 4, 10, 12, 19].

Thought Leadership

Self-Awareness and Situational Awareness

The participants indicated a high level of self and situational awareness [13]. Our findings complement those of previously published research as all WHLs

showcased ability to analyse situations, showing flexibility and ability to prioritise efficiently [15, 18]. They demonstrated humility and appreciation of values and personalities of themselves and others and were highly capable of making timely and appropriate decisions while considering the impact of these decisions on others [15, 20, 26]. WHLs exhibited strong work ethics and spoke against unacceptable behaviour or practices using internal reporting channels which were essential qualities in enhancing the work environment and ensuring best patient care [31].

High-Impact Communication

Among the WHLs, 75% had high-impact communication skills, remaining visible and reachable during the crisis using virtual mechanisms and establishing new metrics to measure progress, which was essential [4, 15, 19, 20]. Their frequent communication was integral for crisis management, and positively impacted organisational performance, employee morale, and motivation levels [2, 48]. The participants manifested competencies such as active listening to influence team members, navigate change management, and ensure positive stakeholder engagement [25]. They were influential, highly able to communicate, building rapport and effective working relationships, and supporting employee morale during the crisis [15, 26, 30, 32, 49].

Decisive Problem-Solving

WHLs actively solved problems by gathering information, making decisions and delivering within expected timeframes [26, 34], and these behaviours were exhibited by both who were experienced and newly assigned: two WHLs newly assigned to the COVID-19 swabbing area showed efficient problem-solving skills. In recent literature, female managers frequently demonstrated deeper understanding of staff challenges within and outside the office, making them influential leaders and decision makers [25, 36, 37]. WHLs bring a unique approach to problem-solving, developing solutions, and addressing difficulties using their innate capabilities [15].

Linking Resources

WHLs have significant skills in linking resources, involving multidisciplinary stakeholders to solve issues [15, 26]. The WHO issued guidance to support COVID-19 health system response, which affirms the necessity for strong management to ensure smooth operations, efficient health workforce, and resource utilisation [10, 47]. WHLs encourage a positive environment through mutual respect and team spirit [31]. The participants efficiently re-assigned staff to cover shortages in patient wards and emphasised strong communication to ensure issues were resolved quickly during the pandemic.

Understanding and Managing Behavioural Work Style Preferences

WHLs were supportive of employees' work preferences, mentoring and giving others the chance to shine, encouraging them to achieve maximum potential [25, 26]. They encouraged others to pursue their strengths in roles they excel in, registering in trainings and actively mentoring. In other studies, women's competencies and potential was discussed as inspirational role models, enhancing good human relations, investing in their teams, and encouraging skill development [15, 18, 21, 34]. The participants could establish trust and empowerment with employees, facilitating an environment with strong social bonds and support for growth [24].

Openness to Change

Among the participants, 56% showed moderate flexibility and tolerance to change compared with 38% with high levels of tolerance, constantly listening, analysing, implementing employees' suggestions, and evaluating potential outcomes. Kerns theory (2019) asserts that having at least moderate level of openness to change is essential to thought leadership; this is appropriate in healthcare [13]. Most of the participants encouraged brainstorming sessions to allow the team to share problem-solving [15, 24].

Persuasiveness

Leaders must be persuasive and inspire a shared vision [36, 48, 49]. In our study, 88% of WHLs had credibility among stakeholders. Those newly engaged in their managerial positions indicated that they were able to gain their colleagues' trust and were supported by their superiors. Other studies have considered showing emotions a negative leadership trait; our findings indicate that 88% of WHLs were able to express emotion in a situation-appropriate manner [15, 31, 49]. It is important for women leaders to be able to accept and express emotion appropriately and exhibit strength during crisis to support others and mirror employees as needed. Among the WHLs, 56% showed highly effective strategic thinking capabilities and were able to offer a reasonable approach to manage obstacles, similar to the findings of recently published literatures [15, 16, 24, 26].

Managing and Negotiating Conflict

All WHLs were able to negotiate and manage conflicts, including resolving disagreements. Individualised meetings were held and then all parties were asked to attend. Some WHLs preferred a neutral third party to intervene

in challenging conflicts. Others sought to proactively establish an employee orientation module on how to prevent and resolve work conflicts. This reflects the findings of other work which mentioned that women leaders built positive relationships and actively selected an appropriate approach to manage conflict [15, 16, 24].

Appreciating Wisdom

WHLs leveraged skills and expertise in listening to others and appreciating inputs in problem-solving. Most of them (75%) confirmed that decisions were made in teams, while 44% preferred their team set the approach or strategy to reach a goal, thereby fully engaging them and ensuring compliance [25]. WHLs valued others' opinions and organisational members' expertise to facilitate decision-making through consensus building [6, 15, 26]. They understood that leading in crises requires wisdom and patience. Our WHLs were effective decision makers, engaged employees in discussions about managing crises and prepared implementation plans [49].

Focussing on Desirable Outcomes

Effective leadership articulates common goals instead of focussing on the vision of a single person and encourages achievement of desired outcomes [49]. WHLs in our study engaged all stakeholders and shared these directions successfully.

Thought Leadership

Thought leadership profile components such as self-awareness, high-impact communication, involving others in decision-making, being goal-oriented, innovation, understanding technology, the ability to improve, and opportunity seeking are effective in crisis management [14, 19, 48]. In our study, WHLs' scored between 66 and 89% in thought leadership. This demonstrates that they had the required traits to manage healthcare organisations through the COVID-19 crisis effectively [11, 12, 39].

Motivators

WHLs were guided by a personal compass, focussing on ideas and experiences that motivated them. Their compassion, giving, and self-motivated personality enabled them to lead. They were passionate about their work, motivated by supporting their families, their teams, the desire to be a good manager, or ensuring patient safety [7, 15, 17, 25].

Organisational Role

The hospital's technological infrastructure and virtual modalities were present before the COVID-19 pandemic [4]. This eased WHLs ability to shift to fully virtual modes for daily work activities. The majority of WHLs affirmed support by their superiors, peers, and employees and by those in other departments, exhibiting a strong positive hospital culture that enabled them to succeed in their roles and increase their potential to expand vertically into executive positions [24]. This positively indicates the mindset shift that should be encouraged further [1, 12, 16, 17, 37, 38, 40].

Strengths and Limitations

This study was unique in exploring women's leadership potential in healthcare during the COVID-19 crisis in Saudi Arabia. The leadership initiatives by women can be modelled in other healthcare organisations. The hospital administration supported this study, and the WHLs were willing to showcase their abilities and skills in leadership to improve the quality of healthcare services in their organisation. The study sample size provided an in-depth understanding of the WHLs' experiences in hospital management during the COVID-19 crisis, and the interview method facilitated the exploration of their potential for thought leadership.

A limitation of this study was the challenge to secure participants and conduct the lengthy interviews due to the overwhelming workload during the pandemic. Some participants were cautious in expressing vulnerability or ideas outside the box due to concerns about visibility and potential identification in the organisation as they are considerably few and how that might affect the positions they have worked hard to achieve. Additionally, it was difficult to identify definitive statistics on women leaders who held leadership positions in the health sector in Saudi Arabia as this data is not readily available or accessible through governmental websites or national statistics portals.

Policy and Practice Implications

It is recommended that organisations consider offering experience, knowledge, and support to women by their peers in building their potential to be innovative healthcare leaders considering the ongoing digital transformation. In this study, WHLs exhibited thought leadership profiles that granted them the opportunity to innovate and manage through crises and they excelled and thrived in their roles [14]. It is recommended to establish a women's healthcare leadership program, increase prioritisation on hiring women in executive positions in the Saudi health sector, and utilisation of their untapped potential [16, 17, 22, 26, 37, 38, 40]. Women's thought leadership capabilities will enhance the efforts towards a more sustainable and robust health system for the Kingdom of Saudi Arabia in line with the strategy for Vision 2030, the recommendations of the World Health Organization and the G20 [10–12, 42, 43].

It is also recommended to evaluate the preparedness and infrastructure of healthcare organisations to expand virtual care services and enhance women's innovation potential to drive organisational performance. Furthermore, it is recommended that further research be conducted on women's leadership capacity and administrative skills, and their impact on highest quality healthcare for patients.

Conclusion

The study provided evidence on WHLs' capabilities to lead a healthcare organisation through crisis and beyond. Technological innovation is an increasingly viable means to sustain healthcare systems. This shift requires leadership criteria that considers stakeholders and involves them in decision-making and setting approaches towards directed goals. Women are thought leaders who combine competencies and other innate traits and intrinsic motivation of self and others, considering work preferences and pursuit of innovations to achieve organisational goals. Women's leadership potential in healthcare should be recognised and utilised in building the capacity of the healthcare workforce and achievement of ambitious healthcare reforms.

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Statement of Ethics

This research study was conducted in accordance with ethical guidelines of the World Medical Association Declaration of Helsinki and has been approved by the Research Advisory Council of the King Faisal Specialist Hospital and Research Centre (KFSHRC) Ethics Review Committee and the National Committee of Bioethics (NCBE) of the King Abdulaziz City for Science and Technology (KACST) No: 10023639. Participants were provided complete study information and asked to sign a consent form to participate in the interview recording and publication of study findings. Participants received principal investigator contact details (AG) and were given the opportunity to withdraw from the study at any time.

Conflict of Interest Statement

The authors declare no conflict of interest in the conduct or publication of this research study. The authors declare they have no competing interests in this research work.

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Author Contributions

A.G. and H.Z. conceived the concept, designed the research project, and prepared all necessary documentation. A.G. was responsible for the execution and acquisition of data, analysis, interpretation, and initial manuscript drafts. H.Z. supported the execution, analysis, interpretation of data, writing, critical review, and substantial revisions of the manuscript.

Data Availability Statement

The study was designed to protect and secure personal identifying details of participants, ensuring they were always kept strictly confidential. Data were coded and anonymized, known only to the principal investigator (A.G.) and kept securely on a dedicated computer, not shared or transmitted elsewhere. All recordings and transcripts will be destroyed once the research project is complete as per standard research ethics regulations. Data supporting research results can be obtained by contacting the principal investigator (A.G.), exclusive of personal identifying information of participants.

References

1 Denadai R. COVID-19 pandemic as a driver for spreading virtual care globally: the future starts now. Clinics. 2020;75:e1967.
2 Eichenauer CJ, Ryan AM, Alanis JM. Leadership during crisis: an examination of supervisory leadership behavior and gender during COVID-19. J Leader Organ Stud. 2021 Apr 28:154805182110107.
3 Yezli S, Khan A. COVID-19 social distancing in the Kingdom of Saudi Arabia: bold measures in the face of political, economic, social and religious challenges. Trav Med Infect Dis. 2020 Apr;37:101692.
4 Bartsch S, Weber E, Büttgen M, Huber A. Leadership matters in crisis-induced digital transformation: how to lead service employees effectively during the COVID-19 pandemic. J Serv Manag. 2020;32(1):71–85.
5 Hassounah M, Raheel H, Alhefzi M. Digital response during the COVID-19 pandemic in Saudi Arabia. J Med Internet Res. 2020 Apr 15;22(9):e19338.
6 Webster P. Virtual health care in the era of COVID-19. Lancet. 2020 Apr;395(10231):1180–1.

7 Mousa M, Boyle J, Skouteris H, Mullins AK, Currie G, Riach K, et al. Advancing women in healthcare leadership: a systematic review and meta-synthesis of multi-sector evidence on organisational interventions. EClinicalMedicine. 2021 Sep 1;39:101084.
8 Mousa M, Skouteris H, Boyle JA, Currie G, Riach K, Teede HJ. Factors that influence the implementation of organisational interventions for advancing women in healthcare leadership: a meta-ethnographic study. eClinicalMedicine. 2022 Sep;51(101514):101514.
9 World Health Organization. Delivered by women, led by men: a gender and equity analysis of the global health and social workforce. World Health Organization; 2019. Available from: https://apps.who.int/iris/handle/10665/311322.
10 World Health Organization. Regional Office for Europe. Strengthening the health system response to COVID-19: technical guidance #1: maintaining the delivery of essential health care services while mobilizing the health workforce for the COVID-19 response, 18 April 2020. World Health Organization; 2020. [cited 2022 Apr 6]. Available from: https://apps.who.int/iris/handle/10665/332559.
11 World Health Organization. Inspiring change: women's leadership in health care is vital during the COVID-19 pandemic and beyond. 2021. Available from: https://www.euro.who.int/en/health-topics/health-determinants/gender/news/news/2021/3/inspiring-change-womens-leadership-in-health-care-is-vital-during-the-covid-19-pandemic-and-beyond.
12 Women in Global Health. The state of women and leadership in global health; 2023 Mar. Available from: https://womeningh.org/wp-content/uploads/2023/03/The-State-of-Women-and-Leadership-in-Global-Health.pdf.
13 Kerns C. Leading thought leadership: a practice-oriented framework. Int Leadersh J. 2019 Feb;11(1):3–41.
14 Koçak D. New leadership dynamics in the information age: lateral leadership and thought leadership. Kocaeli Üniversitesi Sosyal Bilimler Dergisi. 2019 Dec 31. Vol. 38. Available from: https://dergipark.org.tr/tr/download/article-file/927303.
15 Alotaibi F, Cutting R, Morgan J. A critical analysis of the literature in women's leadership in Saudi Arabia. Int J Business Adm Manag Res. 2017 Mar 29;3(1):29.
16 Gazzaz L. Renaissance of Saudi women leaders' achievement. Bura.brunel.ac.uk. 2017. Available from: https://bura.brunel.ac.uk/handle/2438/14736.
17 Kattan M. Factors of successful women leadership in Saudi Arabia. Universidad Rey Juan Carlos; 2015. Available from: https://burjcdigital.urjc.es/bitstream/handle/10115/13600/PhD%20Dissertation%20Manal.pdf?sequence=1&isAllowed=y.
18 Kunalić B, Mujkić A, Jusić J, Pajević M, Rovčanin D. Impact of emotional intelligence on leader effectiveness. Ekonomski Vjesnik : Rev Contemp Entrepreneurship, Business, Econ Issues. 2016 Dec 13 ;29(2):297–310. Available from: https://hrcak.srce.hr/170465.
19 Mustajab D, Bauw A, Irawan A, Rasyïd A, Aldrïn Akbar M, Amïn Hamïd M. Covid-19 pandemic: what are the challenges and opportunities for e-leadership? Fiscaoeconomia. 2020 May;4(2):483–97. Available from: https://dergipark.org.tr/en/pub/fsecon/issue/54684/721814.
20 Salas-Lopez D, Deitrick LM, Mahady ET, Gertner EJ, Sabino JN. Women leaders-challenges, successes, and other insights from the top. J Ldrship Stud. 2011 Jun;5(2):34–42.
21 Smirles KES, Basile KA, Aughenbaugh A, Nasser S, Logue S, Arteaga L. Japanese women's perceptions of gender roles and leadership and the effects of a women & leadership course: a qualitative analysis. Women's Studies International Forum. 2020 May;80:102359. Available from: https://www.sciencedirect.com/science/article/abs/pii/S0277539519303644?via%3Dihub.
22 Thompson MC. Saudi women leaders: challenges and opportunities. J Arabian Stud. 2015 Jan 2;5(1):15–36.
23 Aldekheyyel R, Almulhem J, Binkheder S, Muaygil R, Aldekheyyel S. OUP accepted manuscript. J Am Med Inf Assoc. 2020;28(2).
24 Amla F, Buitendach JH. Psychological strengths: an interpretative phenomenological analysis of Muslim women leaders. SA J Hum Resour Manag. 2019 Nov 26;17(0):14.
25 Javadi D, Vega J, Etienne C, Wandira S, Doyle Y, Nishtar S. Women who led: successes and challenges of five health leaders. Health Syst Reform. 2016 Jul 2;2(3):229–40.
26 Alwazzan L, Rees CE. Women in medical education: views and experiences from the Kingdom of Saudi Arabia. Med Educ. 2016 Jul 11;50(8):852–65.
27 Jones R. Women are on the frontlines in the fight against COVID-19. National Geographic Society; 2020. Available from: https://www.nationalgeographic.com/history/article/women-on-frontlines-fight-against-covid-19.
28 Wittenberg-Cox A. What do countries with the best coronavirus responses have in common? Women leaders. Forbes; 2020. [cited 2022 Apr 6]. Available from: https://www.forbes.com/sites/avivahwittenbergcox/2020/04/13/what-do-countries-with-the-best-coronavirus-reponses-have-in-common-women-leaders/?sh=1fcb09f43dec.
29 Dhatt R, Theobald S, Buzuzi S, Ros B, Vong S, Muraya K, et al. The role of women's leadership and gender equity in leadership and health system strengthening. Glob Health Epidemiol Genom. 2017;2:e8.
30 van Daalen KR, Bajnoczki C, Chowdhury M, Dada S, Khorsand P, Socha A, et al. Symptoms of a broken system: the gender gaps in COVID-19 decision-making. BMJ Glob Health. 2020 Oct;5(10):e003549.
31 Chandler JB, Taylor SM. What women bring to the Table.of leadership. J Leader Stud. 1994 Oct;1(4):104–22.
32 Post C, Latu IM, Belkin LY. A female leadership trust advantage in times of crisis: under what conditions? Psychol Women Q. 2019 Feb 27;43(2):215–31.
33 Seppälä E. Why compassion is a better managerial tactic than toughness. Harvard Business Review; 2015. Available from: https://hbr.org/2015/05/why-compassion-is-a-better-managerial-tactic-than-toughness.
34 Zenger J, Folkman J. Research: women score higher than men in most leadership skills. Harvard Business Review; 2019. Available from: https://hbr.org/2019/06/research-women-score-higher-than-men-in-most-leadership-skills.
35 Hodges J. Cracking the walls of leadership: women in Saudi Arabia. Gend Manag Int J. 2017 Mar 6;32(1):34–46.
36 Akram F, Murugiah L, Shahzad A. Cultural aspects and leadership effectiveness of women leaders: a theoretical prospective of Saudi Arabia. Pak J Humanit Soc Sci. 2017 Jun 30;5(1):25–35.
37 Al-Asfour A, Tlaiss HA, Khan SA, Rajasekar J. Saudi women's work challenges and barriers to career advancement. Career Dev Int. 2017 May 8;22(2):184–99.
38 Alobaid A, Gosling C, Mckenna L, Williams B. Gendered organizational theory and glass ceiling: application to female Saudi paramedics in the workplace. Saudi J Health Sci. 2020;9(3):177.
39 World Bank Group IFC. Women's Leadership in Health. International Finance Corporation; 2022. Available from: https://www.ifc.org/wps/wcm/connect/industry_ext_content/ifc_external_corporate_site/health/publications/womens+leadership+in+health.
40 Al-Ahmadi H. Challenges facing women leaders in Saudi Arabia. Hum Resour Dev Int. 2011 Apr;14(2):149–66.
41 Parveen M. Women empowerment: new paradigm shift of Saudi women into labor workforce. Society and Business Review; 2021 Jul. Available from: https://www.emerald.com/insight/content/doi/10.1108/SBR-10-2020-0123/full/html?skipTracking=true.
42 Lopez C, Contreras O. Gender equality discussion within the G20. Mil. Milken Institute; 2020.
43 Saudi Vision 2030. Saudi vision 2030. 2021. Available from: https://www.vision2030.gov.sa/.
44 Digital Government Authority. National transformation program. Empowering women in digital transformation; 2023. [cited 2023 Jul 20]. Available from: https://dga.gov.sa/en/women-empowering.
45 Vision 2030. Health sector transformation program; 2022. Available from: https://www.vision2030.gov.sa/v2030/vrps/hstp/.
46 Vision 2030. Human capability development program; 2021. Available from: https://www.vision2030.gov.sa/v2030/vrps/hcdp/.

47 Figueroa CA, Harrison R, Chauhan A, Meyer L. Priorities and challenges for health leadership and workforce management globally: a rapid review. BMC Health Serv Res. 2019 Apr 24(1): 19. Available from: https://bmchealthservres.biomedcentral.com/articles/10.1186/s12913-019-4080-7.
48 Milway KS, Saxton A. The challenge of organizational learning (SSIR) stanford social innovation review; 2011. Available from: https://ssir.org/articles/entry/the_challenge_of_organizational_learning.
49 Stefan T, Nazarov AD. Challenges and competencies of leadership in covid-19 pandemic. Atlantis Press; 2020. p. 518–24. Available from: https://www.atlantis-press.com/proceedings/rtcov-20/125945714.
50 American Psychological Association. Replicability in psychological science; 2015. Available from: https://www.apa.org/science/about/psa/2015/01/replicability.
51 Tanwir F, Moideen S, Habib R. Interviews in healthcare: a phenomenological approach a qualitative research methodology. J Public Health Int. 2021 Jul 8; 4(2):10–5.
52 Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. Int J Qual Health Care. 2007 Sep 16;19(6):349–57.
53 Heath G, Cameron E, Cummins C, Greenfield S, Pattison H, Kelly D, et al. Paediatric "care closer to home": stake-holder views and barriers to implementation. Health Place. 2012 Sep;18(5):1068–73.

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Awareness of Health Professional Regulations, Associated Factors, and Malpractice Consequences among Dentists

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Keywords
Malpractice · Dentists · Health professional regulations · Knowledge · Saudi Arabia

Abstract

Introduction: The rising number of complaints against dentists in Saudi Arabia was the main motivator to conduct this study, which aimed to assess the level of knowledge regarding health professional regulations among dentists, identify the associated factors, and explore the consequences of malpractice experience. ***Methods:*** This was a cross-sectional study conducted between February and July 2022 among dentists working at public or private dental clinics in Saudi Arabia and who had medical malpractice insurance coverage. To conduct the research, a predestined questionnaire comprised three sections: section 1 included 13 questions aimed to assess the knowledge related to the health professional regulations in Saudi Arabia; section 2 evaluated the most significant changes in providing dental care as a result of complaint experience; and section 3 assessed the impact of the complaint on dentists' professional practice and physical and psychological conditions. ***Results:*** The study included 148 dentists who responded to the questionnaire. The dentists' median score of their knowledge concerning legal health regulations in Saudi Arabia was 7 (range: 6–9) out of 13. The median score was higher among dentists who had been sued compared with those who had never been sued (8 [IQR: 7–9.75] vs. 7 [IQR: 5.25–9], respectively), although no significant difference was detected ($p > 0.05$). A significantly higher median score ($p = 0.029$) was recorded among male dentists (median = 7 [IQR: 6–10]) compared to female dentists (median = 7 [IQR: 5–8]). ***Conclusion:*** The overall level of knowledge of dental care legal regulations among the included dentists was good to some extent. Several dentists with a history of malpractice changed their behavior toward patients. This change in behavior was more common among dentists who had been previously sued.

Introduction

Medical law is described as a branch of law that cares about the practices and duties of the healthcare providers toward different kinds of patients without racism [1–3]. This kind of law is covering the main topics of professional regulations related to healthcare providers, such as setting roles and responsibilities, establishing professional liability insurance, investigating medical malpractice, and defining blood money compensations [4].

Medical malpractice is one of the essential issues facing the healthcare providers nowadays as the malpractice litigations have become very common due to the easy

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Table 1. Characteristics of dentists included in study (N = 148)

Variable	N (%), mean ± SD
Gender	
Male	91 (61.5)
Female	57 (38.5)
Age, years	36.8±6.6
Years of experience in dental healthcare	11.1±7.4
Nationality	
Saudi citizens	116 (78.4)
Saudi residents	32 (21.6)
Working site	
Public dental clinics	106 (71.6)
Private dental clinics	42 (28.4)

access to the internet and social media [5]. There are several definitions of medical malpractice; however, it is defined by the World Health Organization (WHO) as "any preventable event that may cause or lead to inappropriate medication use or patient harm." Having good knowledge about the medical law will help the healthcare providers prevent medical malpractices and treat their patients more effectively [6]. In general, medical malpractice is either related to medical procedures or medications. Based on previous studies, medical malpractice was a risk factor for pneumothorax incidence among patients during hospital stays in the intensive care unit (ICU). Besides, several adverse events due to medication errors were also caused by medical malpractice [7]. Medical malpractices do not only cause patient suffering but also result in physical, psychological, and behavioral disorders in healthcare providers due to the lawsuits filed against them [8, 9].

Because dentists contribute to both medical procedure and providing medications, they have an intense responsibility to follow medical laws' instructions when dealing with their patients at the dental clinics [10, 11]. A recent study showed that dental specialty ranked as the second highest number of claims compared to other specialties, and the dentists were found guilty of more than half of malpractice claims and the majority of causes related to procedure errors, documentation, and lack of treatment plan [7, 12]. Other studies have shown that dentists have insufficient knowledge of the rules and regulations related to the dental profession and reported on the serious consequences of these medical malpractices for the patient [6, 9, 13, 14].

The health professional practices in Saudi Arabia, including dentistry practices, are governed by an official medical law organization, which called the Law of Practicing Healthcare Professions (LPHP). This law is based on the Islamic regulations and issued by the Saudi Royal Decree [15, 16]. One of the methods used to decrease medical errors and malpractices is that the Saudi Ministry of Health simplified the reporting of possible medical malpractice by responding around-the-clock to patients' claims through telephone calls, emails, and comments in social media [17, 18].

According to a Saudi study published in 2022, there has been an increase in the number of claims against dentists since 2017 [19]. The rising number of complaints against dentists in Saudi Arabia was the main motivator to conduct this study, which aimed to assess the level of knowledge regarding health professional regulations among dentists, identify the associated factors, and explore the consequences of malpractice experience.

Methodology

Study Design, Setting, and Participants

This was a cross-sectional study conducted between February and July 2022 among dentists, working at public or private dental clinics in Saudi Arabia, who had medical malpractice insurance coverage with [anonymized], which is one of the major insurance companies that provide medical malpractice insurance for physicians in Saudi Arabia.

Sampling

The sample size was calculated using Openepi [20]. The sample size calculation was based on the number of dentists who had medical malpractice insurance coverage with [anonymized] Company (N = 20,418), a confidence level of 95% (z = 1.96), confidence limits of 5.5%, and the prevalence of malpractice among dentists (p = 13%). Accordingly, the minimum sample for the study was 148. Study participants were selected using a simple random sample from a list of dentists who had malpractice insurance coverage with [anonymized] for the period 2021–2022 (N = 20,418).

Data Collection

Based on an agreement between the researchers and [anonymized] insurance company, a pre-designed questionnaire was sent in the form of a mobile text message to the selected study participants. The researchers received the dentists' responses without any personal details.

The Questionnaire

The questionnaire started with a concise sociodemographic part, which consists of questions about dentists' age, gender, years of experience, nationality, and type of working site (governmental or private clinic). Following this part, dentists' knowledge regarding health professional regulations was assessed using 13 multiple-choice questions (MCQs), which mainly focus on particular definitions, blood money compensations, and procedures' ethics. Dentists choosing the best

Table 2. The questions regarding legal health regulations of dental care in Saudi Arabia and dentists' answers

Question number	Question aspect	Answer	*N* (%)
Q1	The system that aims to organize the work for health practitioner	Health professions practice system[a]	111 (75)
		Private health institution system	1 (0.7)
		Health system	12 (8.1)
		Don't know	24 (16.2)
Q2	You will be liable to accountability according to the system of practicing health professions and paying financial compensation to the patient in one of the following cases	The occurrence of damage resulting from a medical error and requires compensation[a]	99 (66.9)
		Submitting false data to obtain a professional license	18 (12.1)
		Impersonating one of the titles that are usually given to health professionals	10 (6.7)
		Don't know	21 (14.2)
Q3	What is the meaning of "Ersh (Arabic: الإرش)" in Islamic law	It is a compensation for a deficiency caused by a felony that not estimated mentioned in Islamic law[a]	25 (16.9)
		It is a compensation for a deficiency caused by a felony that is estimated and clearly mentioned in Islamic law[a]	26 (17.6)
		It is a compensation for a deficiency caused by an involuntary manslaughter that estimated by legal medical authorities	64 (43.2)
		Don't know	33 (22.3)
Q4	What is the difference between "Ersh" and bloodwit	"Ersh" compensation is not estimated in Islamic law, while bloodwit is clearly estimated[a]	45 (30.4)
		Bloodwit compensation is not estimated in Islamic law, "Ersh" is clearly estimated	26 (17.6)
		The process of "Ersh" compensation is different than the compensation related to bloodwit	8 (5.4)
		Don't know	69 (46.6)
Q5	How much money should be paid for the patient if all his/her teeth were extracted accidentally?	480,000 SR for males and 240,000 for females[a]	23 (15.5)
		640,000 SR for males and 320,000 for females	12 (8.1)
		300,000 SR either for males or females	10 (6.7)
		Don't know	103 (96.6)
Q6	How much money should be paid for the patient if one tooth was extracted accidentally?	15,000 SR either for males or females[a]	47 (31.8)
		20,000 SR either for males or females	11 (7.4)
		30,000 SR either for males or females	2 (1.3)
		Don't know	88 (59.4)
Q7	The punishment of not obtaining a professional license	Being in jail for no more than 6 months or paying no more than 100,000 SR, or both[a]	61 (41.2)
		Paying no more than 50,000 SR	8 (5.4)
		Paying no more than 20,000 SR	3 (2)
		Don't know	76 (51.3)
Q8	Is there an issue in this case: explaining the therapeutic procedures in orthodontic treatment to the patient without obtaining a written consent	Yes, the dentist is subject to legal accountability[a]	108 (72.9)
		Yes, the dentist is subject to legal accountability unless obtaining a verbal consent instead	7 (4.7)
		No, there is no issue in this case	6 (4)
		Don't know	27 (18.2)
Q9	The legal process that must be followed when filming or publishing any treatment procedure	Availability of an approval of the facility and should not contradict public morals	1 (0.7)
		Availability of a written consent	26 (17.5)
		All of the above[a]	102 (68.9)
		Don't know	19

Table 2 (continued)

Question number	Question aspect	Answer	*N* (%)
Q10	One of the following described as remiss at medical work	Occurrence of a medical error as a result of negligence or failure to provide healthcare[a]	108 (72.9)
		Medical complications occurred despite the availability of a written consent	2 (1.3)
		In case of no causal relationship between the medical error and the actual harm existed	4 (2.7)
		Don't know	34 (22.9)
Q11	The dentist described as guilty in this case and punishment is possible even if no harm occurred to the patient	Conducting experiments not approved by an official institutional review board (IRB)[a]	97 (65.5)
		Forget one of therapeutics principles	18 (12.1)
		Medical complications occurred despite the availability of a written consent	5 (3.4)
		Don't know	28 (18.9)
Q12	Which of these cases don't require a written consent	Emergency case[a]	128 (86.5)
		Blood transfusion	2
		Local or general anesthesia	3
		Don't know	15
Q13	According to the health professions practice system, the health practitioner has the right to not treat the following case	In the absence of a threat to the patient's life and provide justified reasons[a]	96 (64.9)
		In the absence of a threat to the patient's life and provide reasons related to religion and ethnicity	2 (1.3)
		The dentist has no right to refuse treating any case	20 (13.5)
		Don't know	30 (20.2)

Definition of "Ersh" in Islamic law: it is a compensation that is not well-estimated. Definition of "bloodwit" in Islamic law: it is a compensation that is clearly mentioned in Islamic law. SR, Saudi Riyals. [a]Correct answer.

answer in each MCQ will score 1 point, with a maximum score of 13 points (score range: 0–13 points). Dentists with low scores (0–4 points) indicate "poor knowledge" of legal health regulations, while scores of 5–8 and 9–13 points indicate "good to some extent" and "good" knowledge, respectively. The final section was evaluating the most significant changes in dentists' physical and psychological health, professional practice, and their behavior toward patients as a result of experiencing a complaint. The latter section utilized three binary yes/no questions and was only filled out by dentists who experienced complaints from patients, either sued or not sued in court.

To test the validity and reliability of the questionnaire, a pilot study was conducted among 30 samples. The value of Cronbach's alpha was 0.723, and the average inter-item correlation coefficient was 0.166. These values indicate an acceptable and reliable questionnaire.

Data Analysis

The data did not follow a normal distribution; therefore, Mann-Whitney U and χ^2 tests were performed using SPSS software version 25 to analyze the results. The results were considered significant when the p value was <0.05. Besides, we performed logistic regression and determined the odds ratio, which is referred to as the exponential value of B (Exp(B)), and 95% confidence interval (CI) regarding significant factors related to lower knowledge of legal health regulations.

Ethical Consideration

The Central Institutional Review Board (IRB) at the Saudi Ministry of Health reviewed and approved this study (IRB Log Number: 22–10 M). Participants' informed consent was obtained. By giving each participant a code number, confidentiality and anonymity were guaranteed. Every technique was used in compliance with the rules and regulations that were applicable.

Results

The study included 148 dentists who responded to the questionnaire. The majority of those dentists were male, Saudi citizens, and working in governmental organizations. Their mean age was 36.8, while their mean years of experience in the dental healthcare field was 11.1 (Table 1). The dentists' median score of their knowledge of legal health regulations in Saudi Arabia was 7 (range: 6–9)

Table 3. The relationship between dentists' knowledge of legal health regulations in Saudi Arabia and their characteristics

Dentists' characteristics	Total (N = 148)	Median [IQR] score (out of 13)	Mean ± SD	p value[a]	Good knowledge (score range 9–13) (N = 48)		Good to some extent (score range 5–8) (N = 75)		Poor knowledge (score range 0–4) (N = 25)	
					N	%	N	%	N	%
Male	91	7 (6–10)	7.53±2.70	**0.029***	34	37.4	45	49.5	12	13.1
Female	57	7 0 (5–8)	6.40±2.76		14	24.6	30	52.6	13	22.8
χ^2, df, p value[b]	–	–		–	2.62, 1, 0.105		0.14, 1, 0.706		2.31, 1, 0.128	
Age <36 years old	68	7 (6–9)	7.22±2.89	0.555	24	35.3	32	47.1	12	17.6
Age ≥36 years old	80	7 (5–9)	6.99±2.68		24	30	43	53.7	13	16.3
χ^2, df, p value[b]	–	–		–	0.47, 1, 0.492		0.66, 1, 0.417		0.05, 1, 0.821	
<9 years of experience	72	7 (6–9)	7.28±2.78	0.435	25	34.7	35	48.6	12	16.7
≥9 years of experience	76	7 (5–9)	6.92±2.76		23	30.3	40	52.6	13	17.1
χ^2, df, p value[b]	–	–		–	0.34, 1, 0.562		0.24, 1, 0.624		0.005, 1, 0.943	
Saudi citizen	116	7 (6–9)	7.14±2.71	0.631	35	30.2	64	55.2	17	14.6
Saudi resident (non-Saudi)	32	6.5 (4.75–10)	6.94±3.00		13	40.6	11	34.4	8	25
χ^2, df, p value[b]	–	–		–	1.25, 1, 0.263		**4.34, 1, 0.037***		1.91, 1, 0.166	
Working at public clinics	106	7 (6–9)	7.25±2.63	0.368	32	30.2	59	55.7	15	14.1
Working at private clinics	42	7 (5–9)	6.71±3.09		16	38.1	16	38.1	10	32.8
χ^2, df, p value[b]	–	–		–	0.86, 1, 0.354		3.71, 1, 0.053		1.99, 1, 0.157	

SD, standard deviation. χ^2, χ^2 test. df, degree of freedom. [a]Mann-Whitney U test performed. [b]χ^2 test performed. *p value <0.05.

out of 13. The median score was higher among dentists who were sued compared with those who were never sued (8 [IQR 7–9.75] vs. 7 [IQR 5.25–9], respectively); however, no significant difference was recorded ($p > 0.05$).

Table 2 displays the 13 questions related to dental care legal health regulations in Saudi Arabia and corresponding dentists' responses. Over 50% of the dentists were not able to provide correct answers for 5 questions (Q3, Q4, Q5, Q6, and Q7). For the other 8 questions, the percentage of correct answers ranged from 64.9% to 75%.

Higher median score was showed among male dentists (median = 7 [range 6–10]) compared to female dentists (median = 7 [range: 5–8]), and the difference between median scores was significant ($p = 0.029$). Moreover, poor knowledge of dental care legal health regulations in Saudi Arabia was more frequent among non-Saudi dentists, as 25% of them scored 0–4, while 14.6% of Saudi dentists had this score range. Nevertheless, good to some extent knowledge of dental care was statistically common among Saudi dentists, as 55.2% of them scored 5–8 compared to 34.4% of non-Saudi dentists having this score range ($p = 0.037$). In contrast, other dentists' characteristics (i.e., age, years of experience, and working organization) seem to have no significant impact on the knowledge of health regulations (Table 3). When poor knowledge of dental care legal health regulations was used as a dependent variable for the logistic regression analysis, the Exp(B) for non-Saudi dentists was 3.113 (1.052–9.213, $p = 0.040$), while that for female dentists was 1.903 (0.741–4.889, $p = 0.181$) (Table 4).

Table 5 shows a comparison between dentists with ($N = 14$) and without ($N = 134$) history of medical errors in relation to their knowledge of dental care legal and health regulations. It was found that there was no significant difference between them regarding the median scores (7 [5.25–9] vs. 8 [7–9.75], $p > 0.05$). Moreover, there was no significant difference in the frequency of correct responses regarding their knowledge of legal health regulations. However, dentists with a history of medical errors had correct responses to Q5 and Q6 compared to those with no history of medical errors (frequencies of correct answers for Q5 were 35.7% vs. 13.4%, respectively, $p = 0.028$, and for Q6 were 57.1% vs. 29.1%, respectively, $p = 0.032$). No significant differences were found with regards to the change of behavior toward patients, physical and psychological health, and professional practice among dentists with a history of medical errors who were sued ($N = 10$) and those not sued ($N = 4$) in Table 6.

Table 4. Logistic regression regarding lower knowledge of legal health regulations in Saudi Arabia in the presence of specific dentists' characteristics

Dentist characteristic	Exp(B)	95% CI for Exp(B), *p* value
Female	1.903	0.741–4.889, 0.181
Non-Saudi	3.113	1.052–9.213, **0.040***

Dependent variable: poor knowledge of legal health regulations. **p* value <0.05.

Discussion

The current study showed that the overall level of knowledge of dental care legal health regulations among dentists in Saudi Arabia was good to some extent and revealed that non-Saudi migrant dentists have significantly lower knowledge than Saudi citizen dentists. The study also found that at least 50% of included dentists confessed they had changed in regard to their physical and psychological health and behavior toward patients. This behavioral change was more common among dentists who had been previously sued.

In other studies, Budimir et al. [21] showed that Croatian dentists have limited knowledge of dental regulations, and the awareness of patients' rights is imperfect. Similarly, Tahani et al. [12] reported that over 74% of dentists in Isfahan city, the Islamic Republic of Iran, have poor knowledge of dental regulations. In contrast, Kesavan et al. [22] showed that dentists working in an Indian southeastern state have average knowledge of dental regulations and patients' ethics, while Muralidharan et al. [23] reported poor knowledge of dental morals and jurisprudence among dentists located in another Indian northwestern state.

The issue found in the current study regarding lower knowledge of dental regulations among non-Saudi migrant dentists was also found among Canadian immigrant workers, who had less knowledge about acquiring their skills [24]. Likewise, Yuen Xin Er et al. [25] found that migrant workers in Singapore lack awareness of some country-specific laws and regulations.

Although the current study revealed that years of experience were not a significant factor affecting the knowledge of dental regulations, newer generations of dentists with experience less than 9 years have somewhat better knowledge compared to dentists who have been working for 9 years or more. Likewise, Budimir et al. [21] showed that years of experience did not affect the overall dental ethics among dentists; however, a single ethical issue was significantly more common among dentists with fewer years of practice. These findings differ from that of Tahani et al. [12] who found that dentists with more years of experience (≥9 years) have a significantly higher knowledge score.

Initial analysis of the data for this study revealed a significantly lower median knowledge score among female dentists. However, logistic regression performed on the same data showed no significant difference in median knowledge scores between both genders. Similarly, there was no statistical difference between male and female dentists regarding the means of knowledge scores in Tahani et al. [12] study, though a higher mean score was seen among the female group.

This study found that dentists working in public clinics have a relatively higher score on knowledge of dental regulations when compared to private clinics. Yet, there was no significant difference between the two groups. There are no or limited studies that have assessed the working place with regard to knowledge of dental regulations; thus, no comparisons can be made with these results.

In Tahani et al. [12] study, it was reported that knowledge of dental regulations was not significantly different among dentists with or without a history of legal complaints. Similarly, the current study did not find a significant difference in the overall median knowledge scores among the two groups. Nonetheless, the research found that dentists who experienced one or more medical errors showed significantly better knowledge regarding the questions related to the amount of money that should be paid for the patient if one tooth or all his/her teeth were extracted accidentally.

Regarding the behavioral, physical, and psychological health consequences of malpractice experience among included dentists, Tahani et al. [12] reported similar results, as most of the dentists confirmed they changed or would change their behavior toward patients after malpractice claims. Despite strengths found in this study, several limitations are noticed, including the cross-sectional study design with the subjective assessment of knowledge about dental care legal regulations among dentists. Besides, the current distribution between compared groups was not equal and did not have an ideal distribution, which was mainly caused by the low response rate.

Table 5. Comparison between dentists with and without history of medical error regarding their knowledge of legal health regulations of dental care

Question number	Question aspect	Dentists with correct answer		*p* value
		no history of medical error (*N* = 134)	history with medical error (*N* = 14)	
Q1	The system that aims to organize the work for health practitioner	99 (73.8)	12 (85.7)	0.330
Q2	You will be liable to accountability according to the system of practicing health professions and paying financial compensation to the patient in one of the following cases	87 (64.9)	12 (85.7)	0.115
Q3	What is the meaning of "Ersh (Arabic: الإرش)" in Islamic law	24 (17.9)	1 (7.1)	0.306
Q4	What is the difference between "Ersh" and bloodwit	42 (31.3)	3 (21.4)	0.442
Q5	How much money should be paid for the patient if all his/her teeth were extracted accidentally?	18 (13.4)	5 (35.7)	**0.028***
Q6	How much money should be paid for the patient if one tooth was extracted accidentally?	39 (29.1)	8 (57.1)	**0.032***
Q7	The punishment of not obtaining a professional license	54 (40.3)	7 (50)	0.482
Q8	Is there an issue in this case: explaining the therapeutic procedures in orthodontic treatment to the patient without obtaining a written consent	97 (72.4)	11 (78.5)	0.620
Q9	The legal process that must be followed when filming or publishing any treatment procedure	93 (69.4)	9 (64.3)	0.693
Q10	One of the following described as remiss at medical work	97 (72.4)	11 (78.5)	0.620
Q11	The dentist described as guilty in this case and punishment is possible even if no harm occurred to the patient	89 (66.4)	8 (57.1)	0.487
Q12	Which of these cases don't require a written consent	117 (87.3)	11 (78.5)	0.362
Q13	According to the health professions practice system, the health practitioner has the right to not treat the following case	88 (65.6)	8 (57.1)	0.524
All questions		*p* value = 0.332		

Table 6. The change of behavior toward patients, physical and psychological health, and professional practice among dentists who had history of a medical error (*N* = 14)

Variable	Dentist not sued (*N* = 4) (%)	Dentist sued (*N* = 10) (%)	Total dentists with history of medical error (*N* = 14) (%)	χ^2	df	*p* value
Change in behavior toward patients				1.4	1	
No	3 (75)	4 (40)	7 (50)			0.236
Yes	1 (25)	6 (60)	7 (50)			
Change in physical and psychological health				3.7	1	
No	3 (75)	2 (20)	5 (35.7)			0.052
Yes	1 (25)	8 (80)	9 (64.3)			
Change in professional practice				3.7	1	
No	3 (75)	2 (20)	5 (35.7)			0.052
Yes	1 (25)	8 (80)	9 (64.3)			

χ^2, χ^2 test. df, degree of freedom.

Conclusions

The overall level of knowledge of dental care legal regulations among the included dentists was good to some extent. Among dentists with a history of malpractice, half of them reported to have changed their behavior towards patients and that the experience has affected their physical and psychological health and professional practice. This change in behavior was more common among dentists who had been previously sued.

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Statement of Ethics

The Central Institutional Review Board (IRB) at the Saudi Ministry of Health reviewed and approved this study (IRB Log Number: 22–10 M). The confidentiality and anonymity of the participants' data were preserved. Written informed consent to participate was not directly obtained but inferred by completion of the questionnaire.

Conflict of Interest Statement

The authors have no relevant affiliations or financial involvement with any organization or entity with a financial interest in or financial conflict with the subject matter or materials discussed in the manuscript. This includes employment, consultancies, honoraria, stock ownership or options, expert testimony, grants or patents received or pending, or royalties.

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Author Contributions

Amjad Aldahmashi and Abdullah Alkattan contributed in conceptualization, writing – original draft preparation, and resources. Fahad Al-aydaa contributed in writing – review and editing. All authors have read and agreed to the published version of the manuscript.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request. The data are not publicly available due to containing information that could compromise the privacy of research participants.

References

1 Nys H. Medical law in Belgium. Med L Belgium. 2022:1–256.
2 Furrow BR. Quality control in health care: developments in the law of medical malpractice. J L Med Ethics. 1993;21(2):173–92.
3 Feagin J, Bennefield Z. Systemic racism and US health care. Soc Sci Med. 2014;103:7–14.
4 Ramugade MM, Sagale AA. A review of medicolegal considerations of endodontic practice for general dental practitioners. J Int Soc Prev Community Dent. 2018;8(4):283–8.
5 Blau I, Levin L. Medical malpractice: an introduction for the dental practitioner. Quintessence Int. 2017;48(10):835–40.
6 Almannie R, Almuhaideb M, Alyami F, Alkhayyal A, Binsaleh S. The status of medical malpractice litigations in Saudi Arabia: analysis of the annual report. Saudi J Anaesth. 2021;15(2):97–100.
7 Aldahmashi AS, Alqurashi MA, Al-Hanawi MK. Causes and outcomes of dental malpractice litigation in the riyadh region of the kingdom of Saudi Arabia. Saudi J Health Syst Res. 2021;1(3):108–14.
8 Garrouste-Orgeas M, Philippart F, Bruel C, Max A, Lau N, Misset B. Overview of medical errors and adverse events. Ann Intensive Care. 2012;2(1):2–9.
9 Patel D, Patel N, Parikh B, Mistry E. Are dental practitioners aware about the medicolegal issues? Natl J Integrated Res Med. 2019;10(3).
10 Nainan O. Anaesthesia policy in dentistry-a step towards enhancing patient safety in dental practice. World. 2023;4(2):058–64.
11 Smereka J, Aluchna M, Aluchna A, Szarpak Ł. Preparedness and attitudes towards medical emergencies in the dental office among Polish dentists. Int Dent J. 2019;69(4):321–8.
12 Tahani B, Tashakor A, Mousavi SA. Professional legislation knowledge of dentists and psychological effects of negligence. J Forensic Leg Med. 2021;81:102199.
13 Gupta M, Shrivastava K, Mishra SK, Ahuja R, Mishra P, Kumari S. Importance and awareness of medico legal issues in dental practice Alarm call. Ann Trop Med Publ Health. 2018;11(4):103–7.
14 Vargas-Blasco C, Gómez-Durán EL, Martin-Fumadó C, Arimany-Manso J. Medical malpractice liability and its consequences: a survey among AEU urologists. Actas Urol Esp. 2020;44(4):251–7.
15 Alghamdi KA. Evolving standards of information disclosure: reform of Saudi Arabian medical law in the light of the developments of English law. Doctoral dissertation, University of Glasgow; 2015.
16 Ministry of Health. Law of practicing healthcare professionals. 2017. Available from: https://www.moh.gov.sa/en/Ministry/Rules/Documents/Law-of-Practicing-Healthcare-Professions.pdf [Accessed date 25 August 2023].
17 Alsaleh MM. The use of a mobile-based telehealth service during the COVID-19 pandemic: provider experience and satisfaction. Doctoral dissertation, University of Pittsburgh; 2021.
18 Ministry of Health. 937 services. 2017. Available from: https://www.moh.gov.sa/en/937/Pages/default.aspx [Accessed date 25 August 2023].
19 Alsaeed S, Aljarallah S, Alarjani A, Alghunaim G, Alanizy A. Dental malpractice lawsuit cases in Saudi Arabia: a national study. Saudi Dent J. 2022;34(8):763–71.

20 Sample O. Size for a proportion or descriptive study. Available from: https://www.openepi.com/SampleSize/SSProper.htm [Accessed date 25 August 2023].
21 Budimir V, Cerjan-Letica G, Budimir J, Macan D. Knowledge, attitudes, and awareness of Croatian dentists concerning patients' confidentiality and privacy. J Dent Educ. 2013;77(3):370–6.
22 Kesavan R, Mary AV, Priyanka M, Reashmi B. Knowledge of dental ethics and jurisprudence among dental practitioners in Chennai, India: a cross-sectional questionnaire study. J Orofac Sci. 2016; 8(2):128.
23 Muralidharan S, Pendyala G, Gandhage D, Sachan S. Knowledge of dental ethics and jurisprudence among dental practitioners in pune: a questionnaire survey. Cureus. 2022; 14(11):e31503.
24 Zietsma, D. Immigrants working in regulated occupations. Population, 2010;1(1,207.2), 208–7.
25 Yuen Xin Er S, Paul AM. The workplace-entitlements knowledge of Filipino and Indonesian domestic workers in Singapore. J Immigr Refug Stud. 2020;18(1):113–31.

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Calorie Labeling Impact on Consumers Who Understand Their Calorie Needs: A Cross-Sectional Study

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Keywords
Food ordering · Eating behavior · Obesity · Calories labeling policy · Knowledge of calorie

Abstract

Introduction: Saudi Arabia has an obesity prevalence of 38.96%, ranking 15th globally. The increasing prevalence of obesity has motivated Saudi Arabian health policymakers to develop national strategies to prevent or reduce the anticipated increase in cases. Therefore, the Food and Drug Authority has recently enacted compulsory calorie labeling on the menus of all food industry providers who provide food and drinks to consumers outside their homes. This study aimed to determine whether calorie labeling on fast-food restaurant menus helps consumers make informed decisions about their food consumption. ***Methods:*** This cross-sectional study conducted in Saudi Arabia between April and October 2022 employed a self-reported online survey to investigate the influence of caloric labeling on residents' food-ordering decisions and to determine the effects of the independent variables on calorie requirement knowledge. Participants included Arabic- and English-speaking adults residing in different regions of Saudi Arabia. Data collection utilized a river sampling technique, employing social media platforms for survey distribution. The inclusion criteria encompassed adult Saudi residents exposed to calorie labels, while those who did not encounter such labels were excluded. ***Results:*** This study aimed to examine the factors influencing individuals' food choices and their knowledge of daily calorie requirements. A social media advertisement was used to recruit 935 participants, with 760 included in the final analysis. Descriptive statistics revealed that the mean age of participants was 37.5 years, with 61.1% being female. Moreover, 59.3% reported having a college degree, and the mean monthly income was SAR 7,725. Logistic regression analysis demonstrated that knowing the daily calorie requirements significantly influenced food choices, with individuals who knew their calorie needs being four times more likely to use calorie labels when selecting food. However, other independent variables were found to be statistically insignificant. Additionally, age and citizenship status were significantly associated with knowledge of calorie requirements, with the 18–29 age group and Saudi Arabian citizens showing higher knowledge levels. ***Discussion:*** The findings of this study may catalyze further research aimed at measuring and understanding other variables that may impact consumer choices, such as pictures and font sizes, and understanding consumer knowledge and awareness of daily calorie requirements.

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Introduction

Obesity and weight gain are major public health concerns affecting millions of people worldwide and contributing to various ailments [1]. Since 1975, the global obesity prevalence has tripled; there were more than 650 million individuals with obesity in 2016 [2]. The trend of obesity and excessive weight gain has also impacted Saudi Arabia. Obesity in Saudi adults increased from 22% to 36% between 1993 and 2005 [3–5]. According to a recent study, the prevalence of obesity and overweight is 38.96% and 29.30%, respectively, in Saudi Arabia [6].

Increased intake of calories and energy-dense foods and physical inactivity are the primary causes of obesity and excessive weight gain [4]. The Saudi Arabian population has experienced a notable increase in eating out, primarily influenced by changing lifestyles and increased convenience, leading to a shift in food consumption patterns toward consuming meals away from home [7–9]. According to AlFaris et al. [7], fast-food consumption is common among adolescents and young adults, with 95.4% of adolescents and 79.1% of young adults consuming fast-food at least once a week. The consumption of food away from home is associated with increased caloric intake and a decline in nutritional quality [10], which is associated with an increased body mass index [11].

The increasing prevalence of obesity in Saudi Arabia has prompted health policymakers to develop national strategies to mitigate the expected increase in cases. The Ministry of Health, Ministry of Municipal and Rural Affairs, and Saudi Food and Drug Authority have made efforts to impose and amend policies to promote consumer health and safety. These efforts include levying a tax on energy and soft drink businesses, restricting specific foods and drinks from being served in school cafeterias, limiting partially hydrogenated oils, and implementing several interventions like the "Walk 30" intervention. In 2019, the Saudi Food and Drug Authority mandated caloric labeling on the menus of all food providers [12].

Various studies worldwide have assessed the effect of calorie labeling policies on consumer decisions across a range of settings, including restaurants, cafeterias, and cafes; the findings of these studies range from supporting to opposing the effectiveness of the policy [13–15]. Furthermore, many studies focused on college-aged students, adolescents, low-income neighborhoods/communities, and racial and ethnic minorities. Because studies focus on a specific group, meal, and time of day, various elements, such as the level of hunger or accessibility, may impact the findings, and the generalizability of their results is limited.

Saudi Arabia, known as the heart of the Arab and Islamic world, is currently undergoing massive reforms that have been implemented at different levels, including the health sector, and many countries are observing the success of these reforms in hopes of replication. However, few research studies have been conducted to verify the usefulness of calorie labeling on menus in reducing caloric consumption among Saudi residents. These investigations have also been limited to certain regions [16–18] or specific groups [19]. Therefore, the present study aimed to provide a better understanding of the influence of restaurant menu caloric labeling on residents' food consumption in Saudi Arabia through a self-reported online survey.

Materials and Methods

Study Design

This cross-sectional study was conducted in Saudi Arabia between April 2022 and October 2022. A self-reported online survey was conducted to understand the influence of restaurant and coffee shop menu caloric labeling on residents' food-ordering decisions in Saudi Arabia.

Study Site and Population

This study targeted residents from different regions of Saudi Arabia. The non-citizen population in Saudi Arabia comes from different cultures and backgrounds with different languages; therefore, data collection was limited to participants who speak Arabic, English, or both.

River sampling was performed to obtain a comprehensive sample of residents from different regions of Saudi Arabia. This method relied on collecting data from the population available for participation in the study through social media. The questionnaire was distributed online through social media (WhatsApp, Twitter, Facebook, Snapchat, Instagram, LinkedIn, and email).

Inclusion Criteria

Adult Saudi residents in different regions of Saudi Arabia who saw calorie labels on restaurant and coffee shop menus were included in this study.

Exclusion Criteria

Participants who did not see the calorie labels were excluded from this study.

Instruments

This study's aim was addressed using a self-reporting questionnaire (see Appendix) that included questions adapted from the National Health and Nutrition Examination Survey section/portion on menu label usage behaviors from the Eating and Activity in Adolescents and Young Adults Survey [20] and from a study that investigated the public's understanding of daily caloric recommendations and their perceptions of calorie posting in chain

restaurants [13]. Questions such as "What is your height in centimeters?", "What is your weight in kilogram?", "Do you know your calorie needs per day?", and "How did you use the calorie information in a restaurant when deciding what to order?" were used to measure and understand the usage of calorie labels among participants.

We translated the questions into Arabic to obtain a version that can be applied to citizens and non-citizens who speak Arabic. The survey was conducted using Qualtrics software for online participation and data collection. The survey was tested after modification and translation using a small pilot study to ensure the questions were understood and to assess the time it took to complete. This pilot survey was completed by 20 participants and took approximately 10 min to complete. Only one question required modification, whereas the remaining questions were straightforward.

At the end of April 2022, the survey link was distributed through social media available to the primary researcher (WhatsApp, Twitter, Facebook, Snapchat, Instagram, LinkedIn, and email). Advertisements were made on Twitter, Facebook, and Instagram to increase the number of participants.

Human Subjects and Ethical Considerations

A consent form was created following the requirements of the Institutional Review Board, and approval of the Institutional Review Board was obtained through the Jeddah Research Health Affairs for science and technology before the data were collected. Written informed consent was obtained from all participants. The survey contained no identifiable information and was only labeled with a serial number. The online survey was conducted securely without collecting respondents' IP addresses.

Variables

Demographics

Data on participants' general demographics were collected, including educational level, annual income, citizenship status, employment status, region of residence, and body mass index.

Knowledge of Calorie Needs

In the present study, the investigation of participants' knowledge of calories was a key focus. This knowledge was examined, measured, and analyzed based on the hypothesis that individuals with limited or no knowledge of calories would exhibit a decreased likelihood of perceiving, comprehending, and utilizing calorie labels, consequently having no impact on their food choices. To assess participants' knowledge of calorie needs per day, a self-report measure was employed. Specifically, participants were asked the question, "Do you know your calorie needs per day?". This inquiry served as a means to gauge their level of familiarity and understanding regarding the recommended daily caloric intake tailored to their individual physiological requirements. The answer to this question was collected using a dichotomous response format, where participants were presented with the options of "yes" and "no."

Calorie Label Usage

The aim of assessing the variable of calorie label usage was to determine participants' ability to utilize calorie label information when selecting food items. A direct question was asked: "Did you use the calorie information in deciding which foods to buy?". This inquiry aimed to ascertain whether participants relied on calorie information as a factor when making food choices. Participants provided dichotomous responses to the question with options of "yes" and "no."

Data Management and Analysis

The data were downloaded from Qualtrics as an Excel spreadsheet, and incomplete surveys were excluded. Data were analyzed using the IBM SPSS Statistics software 26 (IBM Corp., Armonk, NY, USA). Descriptive statistical analyses were performed after all variables were coded.

Logistic regression analyses were performed to examine the effectiveness of calorie labeling in restaurants and coffee shop menus in reducing high-calorie food consumption among Saudi residents. Statistical significance was set at $p < 0.05$.

Results

Data analysis was conducted after identifying and eliminating outliers. The assumptions for logistic regression were evaluated, and no issues were detected. Furthermore, multicollinearity among the independent variables was assessed using variance inflation factors. Notably, no variance inflation factor values exceeding 10 were observed, indicating the absence of multicollinearity problems.

A social media advertisement was made between April and October 2022 to recruit participants. The survey link was distributed using social media outlets, and participants were encouraged to begin the survey through Qualtrics. After applying the selection criteria, 760 of the 935 respondents were included in the analysis.

Sample Demographics: Descriptive

Table 1 summarizes the descriptive statistics and participant characteristics. The final sample included 760 participants; their mean age was 37.5 years (standard [SD] ± 9.8), and 61.1% were female. Overall, 59.3% of the participants reported having a college degree. In addition, 14.8%, 22.4%, and 3.6% reported having a graduate degree, high school, or equivalent education, and less than a high school education, respectively. The mean monthly income of the study participants was SAR 7,725 (SD ± 10,142) per year. We divided the participants into two categories according to income: SAR 4,000 (51.6%) and ≤SAR 4,000 (49.4%). Notably, most participants (58.0%) reported being Saudi citizens. The proportion of employed individuals was 74.1%. In addition, 7.4% of the participants were students, 2.4% were retired, and 16.2% were unemployed. The participants were divided into four groups according to body mass index: underweight (3.7%), healthy weight (34.5%),

Table 1. Sociodemographic characteristics of study participants

Variable	Count	%
Sex		
Male	296	38.9
Female	464	61.1
Age		
18–29	158	20.8
30–39	310	40.8
40–49	188	24.7
50 and above	104	13.7
Citizenship status		
Non-Saudi	319	42.0
Saudi	441	58.0
Education status		
Less than high school	27	3.6
High school degree or equivalent	170	22.4
Undergraduate degree	450	59.3
Graduate degree	112	14.8
Employment status		
Unemployed	123	16.2
Employed	563	74.1
Student	56	7.4
Retired	18	2.4
Income level		
SAR 4,000 and less	392	51.6
Above 4,000	368	48.4
BMI group		
Underweight	28	3.7
Healthy weight	262	34.5
Overweight	269	35.4
Obesity	201	26.4
Knowledge of calorie needs		
No	362	47.6
Yes	398	52.4
Calorie label Usage		
No	322	42.4
Yes	438	57.6

Total number of participants included in the study (n = 760).

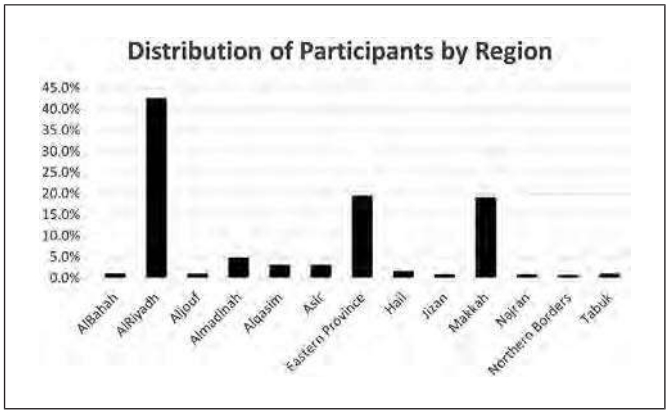

Fig. 1. The distribution of data samples across various regions in Saudi Arabia is illustrated.

overweight (35.4%), and obese (26.4%). The percentage of respondents aware of their daily calorie requirements was 52.4%. According to the survey, 57.6% of the respondents relied on calorie information when making food choices. Figure 1 shows that approximately 82% of the sample came from three regions: the Riyadh region (42.6%), the Eastern Province (19.5%), and the Makkah region (19.1%).

Regression Result

Table 2 shows the results of the final multivariate logistic regression model used to ascertain the effects of the independent variables on the participants' choice of food. The logistic regression analysis presented the results as adjusted odds ratios with 95% confidence intervals, and statistical significance was set at a p value of 0.05. According to the model, 14.7% of the variance in reliance on calorie information occurred when the model could explain choosing foods, and 66.4% of the cases were classified correctly. The Hosmer-Lemeshow goodness-of-fit test indicated a non-significant p value of 0.38, indicating a good fit to the data.

In the final multivariate logistic regression analysis, the relationship between knowing the number of calories needed daily and choosing food was statistically significant ($p < 0.05$). However, other independent variables were statistically insignificant.

Results showed that people who knew how many calories they needed were approximately four times (adjusted odds ratios: 3.84, 95% confidence intervals: 2.77–5.32) more likely to use calorie labels when choosing food than those who did not know how many calories they needed. The remaining variables (Table 2) were insignificant.

Based on these results, we proposed another multivariate logistic regression analysis to determine the effects of the independent variables on calorie requirement knowledge, as shown in Table 3. The second model explained 15.5% (Nagelkerke R2) of the variance in correctly classifying 65.6% of the cases. The Hosmer-Lemeshow goodness-of-fit test indicated a non-significant p value of 0.25, suggesting that the model fits the data well.

The association of age and citizenship status with knowledge of daily calorie requirements was statistically significant ($p < 0.05$). However, other independent variables were statistically insignificant. The age group of 18–29 years was almost twice as likely to know their calorie requirements as the age groups of 30–39 and

Table 2. Multivariate logistic regression model used to ascertain the effects of the independent variables on the participants' choice of food

Variable	*p* values	AOR	95% CI for EXP(B)	
			lower	upper
Sex				
Male				
Female	0.391	1.156	0.830	1.612
Age				
18–29				
30–39	0.156	1.387	0.883	2.177
40–49	0.757	1.083	0.652	1.799
50 and above	0.641	0.863	0.466	1.601
Citizenship status				
Non-Saudis				
Saudis	0.362	0.827	0.551	1.243
Education status				
Less than high school				
High school degree or equivalent	0.252	1.681	0.691	4.088
Undergraduate degree	0.171	1.829	0.770	4.344
Graduate degree	0.173	1.943	0.748	5.048
Employment status				
Unemployed				
Employed	0.658	0.897	0.554	1.452
Student	0.836	1.081	0.516	2.267
Retired	0.608	1.356	0.424	4.343
Income level				
SAR 4,000 and less				
Above SAR 4,000	0.983	1.004	0.674	1.496
BMI group				
Underweight				
Healthy weight	0.234	0.586	0.243	1.414
Overweight	0.423	0.696	0.286	1.690
Obesity	0.446	0.706	0.289	1.727
Knowledge of calorie needs				
No				
Yes	<0.001	3.836	2.767	5.319
Constant	0.385	0.562		

Total number of participants included in the study (n = 760). *Statistically significant at $p < 0.05$.

40–49 years. In addition, those aged 18–29 years were approximately five times more likely to know their calorie requirements than those aged ≥50 years. Saudi Arabian citizens know their daily calorie requirements almost twice as much as non-citizens.

Discussion

The present study assessed the influence of calorie labels on food menus on residents' food-ordering decisions in Saudi Arabia and the factors that could contribute to this decision. Therefore, the results of the present study offer insights into the effectiveness of Saudi Arabia's new calorie labeling policy, which was introduced on January 1, 2019. In addition, the present study can help inform healthcare policymakers about the barriers and factors that hinder people from choosing foods that are not calorie dense.

The average age of participants was 37.5 years, >60% were female, and approximately 60% had a college degree. Saudi participants accounted for 58% of the sample, and 74% were employed. Approximately 62% of the participants presented with either overweight or obesity, which matched the current prevalence of obesity in the country.

Table 3. Multivariate logistic regression analysis to determine the effects of the independent variables on knowledge of calorie needs

Variable	*p* values	AOR	95% CI for EXP(B)	
			lower	upper
Sex				
Male				
Female	0.784	0.955	0.686	1.329
Age				
18–29				
30–39	0.014	0.570	0.364	0.891
40–49	0.021	0.553	0.334	0.916
50 and above	<0.001	0.244	0.130	0.459
Citizenship status				
Non-Saudis				
Saudis	0.021	1.582	1.072	2.335
Education status				
Less than high school				
High school degree or equivalent	0.038	0.400	0.169	0.949
Undergrad degree	0.073	0.464	0.200	1.073
Graduate Degree	0.417	1.484	0.572	3.851
Employment status				
Unemployed				
Employed	0.718	0.917	0.575	1.463
Student	0.974	1.012	0.490	2.093
Retired	0.298	1.807	0.593	5.505
Income level				
SAR 4,000 and less				
Above SAR 4,000	0.129	1.351	0.916	1.992
BMI group				
Underweight				
Healthy weight	0.711	0.851	0.363	1.998
Overweight	0.619	1.243	0.526	2.939
Obesity	0.872	1.074	0.450	2.562
Constant	0.152	2.478		

Our survey results showed that 52.4% of the respondents knew their daily calorie requirements. According to the survey, 57.6% of the respondents made food decisions based on calorie information, which is consistent with the result of a study by Alassaf et al. in Saudi Arabia, showing that 50% of the participants knew their average daily caloric intake and changed their order according to the calorie count display [17].

The present study found that people aware of their calorie needs were approximately four times more likely to use calorie labels while making food choices than those unaware. Although knowledge seemed to play a role in consumer's food choices and decisions, it is important to note that other factors, such as pricing, packaging and labels, salience, and internal factors, could also affect this relationship [21].

Participants aged 18–29 were almost twice as likely to know their calorie requirements as those aged 30–39 and 40–49 years. The younger-aged population also had a substantially higher chance of knowing their calorie requirements than those aged >50 years. This result could be explained by the fact that the younger generation is more educated and more exposed to social media, where most health education campaigns are conducted. Consequently, they may utilize web and mobile applications to calculate their caloric requirements.

Notably, Saudi Arabian citizens knew their daily calorie requirements almost twice as much as non-citizens; this may be due to some menus and calorie information being available in only one language and educational campaigns mainly targeting Saudi citizens rather than all Saudi residents.

Strengths

This study had some strengths. First is the large sample size and the inclusion of participants from various demographic backgrounds. Second, this study contributes to understanding how calorie labeling affects consumer behavior when ordering food.

Limitations

The study had some limitations. First is the sampling method, as river sampling through social media platforms was used. Therefore, it is difficult to generalize these results. In addition, the study introduces some bias because the sociodemographic data might not reflect the proportional structure of the entire population as people who do not use social media will not have the chance to access the survey. However, the sampling method provided valuable insights into the role of the calorie labeling policy in food choice when ordering from restaurants or coffee shops.

Third, while the knowledge theory of consumer behavior suggests that individuals make informed decisions based on their knowledge, it is important to recognize that other factors, such as personal preferences, social influences, and marketing strategies, can also significantly impact consumer choices. Therefore, the influence of calorie knowledge on actual behavior may be more complex than initially anticipated.

Fourth, although calorie labels aim to provide consumers with valuable information about the nutritional content of food products, they may have certain limitations. For instance, individuals may interpret calorie information differently based on their personal understanding or dietary goals. Additionally, some studies have suggested that individuals may underestimate or overestimate the calorie content of certain foods, leading to potential inaccuracies in their decision-making process.

Lastly, this study involved a self-reported survey; therefore, the reported parameters may not reflect the actual parameters as participants may overestimate or underestimate their weight and height, affecting their body mass index calculation. In addition, recall bias may be introduced because the survey questions ask participants to recall information from the past 3 months. This bias will be greater in participants who order food less frequently. Therefore, further studies are required to survey the participants immediately after ordering from restaurants or food applications.

Conclusion

This study evaluated the efficacy of the labeling policy in achieving its goals and provided an understanding of its effectiveness. This understanding will help policymakers decide what changes can be made to improve current policies. One of the most important takeaways from this research was the significance of being aware of calories and how they can affect one's eating choices. As a result, this study sheds light on how to enhance the efficiency of future programs by integrating educational initiatives with labeling-based approaches.

The present study might trigger further research to comprehensively measure and understand other variables that may impact consumer choices, such as pictures and font size, and to learn more about consumer knowledge and awareness of daily calorie needs. In the present study, 50% of the participants lacked knowledge of their daily caloric needs. Labeling foods with their calorie content is important, but we also need more comprehensive rules that take into account a more nuanced understanding of obesity. Policymakers have the option to augment calorie labels by including additional information, such as the recommended daily caloric intake. Establishing a direct association between the energy content of food and physical activity for consumers may potentially mitigate obesity. This approach empowers consumers to effectively situate their food choices within a broader context. All papers must contain the following statements after the main body of the text and before the reference list.

Statement of Ethics

This study protocol was reviewed and approved by the Jeddah Research Health Affairs for science and technology, approval number A01597. Informed consent to participate was not directly obtained but inferred by completion of the questionnaire.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

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Author Contributions

Mutlaq Albugmi, Nouf Alsaheil, and Zahra Alahmed made substantial contributions to the development of the idea and study design, collected the data, performed the analysis and interpretation, and worked equally in drafting and revising the manuscript for final approval.

Data Availability Statement

The data that support the findings of this study are not publicly available due to their containing information that could compromise the privacy of research participants but are available from the corresponding author M.A. albugmi.m@gmail.com upon reasonable request.

References

1 Williams EP, Mesidor M, Winters K, Dubbert PM, Wyatt SB. Overweight and obesity: prevalence, consequences, and causes of a growing public health problem. Curr Obes Rep. 2015;4(3):363–70.
2 WHO Obesity. https://www.who.int/news-room/facts-in-pictures/detail/6-facts-on-obesity (accessed March 20, 2023).
3 Al-Nozha M, Al-Mazrou Y, Al-Maatouq M, Arafah M. Obesity in KSA. Saudi Med J. 2005. Available from: www.smj.org.sa (accessed March 20, 2023).
4 M Alqarni SS. A review of prevalence of obesity in Saudi Arabia. J Obes Eat Disord. 2016.
5 Al-Quwaidhi AJ, Pearce MS, Critchley JA, Sobngwi E, O'flaherty M. Trends and future projections of the prevalence of adult obesity in Saudi Arabia, 1992-2022. East Mediterr Health J. 2014;20(10):589–95.
6 Alghnam S, Alessy SA, Bosaad M, Alzahrani S, Al Alwan II, Alqarni A, et al. The association between obesity and chronic conditions: results from a large electronic health records system in Saudi Arabia. Int J Environ Res Public Health. 2021;18(23):12361.
7 AlFaris NA, Al-Tamimi JZ, Al-Jobair MO, Al-Shwaiyat NM. Trends of fast food consumption among adolescent and young adult Saudi girls living in Riyadh. Food Nutr Res. 2015;59:26488.
8 Benajiba N. Fast food intake among Saudi population: alarming fact. 2016.
9 Naeem Z. Increasing trend of Junk food use in Saudi Arabia and health implications. Int J Health Sci (Qassim). 2012;6(1). Available from:
10 Seguin RA, Aggarwal A, Vermeylen F, Drewnowski A. Consumption frequency of foods away from home linked bibihigher body mass index and lower fruit and vegetable intake among adults: a cross-sectional study. J Environ Public Health. 2016;2016:3074241.
11 Langellier BA, Glik D, Ortega AN, Prelip ML. Trends in racial/ethnic disparities in overweight self-perception among US adults, 1988-1994 and 1999-2008. Public Health Nutr. 2015;18(12):2115–25.
12 'الغذاء والدواء' تلزم المطاعم والمقاهي بعرض السعرات الحرارية | الهيئة العامة للغذاء والدواء. https://www.sfda.gov.sa/ar/news/1828 (accessed Aug 03, 2023).
13 Bleich SN, Economos CD, Spiker ML, Vercammen KA, VanEpps EM, Block JP, et al. A systematic review of calorie labeling and modified calorie labeling interventions: impact on consumer and restaurant behavior. Obesity. 2017;25(12):2018–44.
14 Cantu-Jungles TM, McCormack LA, Slaven JE, Slebodnik M, Eicher-Miller HA. A meta-analysis to determine the impact of restaurant menu labeling on calories and nutrients (ordered or consumed) in U.S. Adults. Nutrients. 2017;9(10):1088.
15 Kiszko KM, Martinez OD, Abrams C, Elbel B. The influence of calorie labeling on food orders and consumption: a review of the literature. J Community Health. 2014;39(6):1248–69.
16 Alamer NA, AlOmar RS, AlKaltham SM, AlYami RS, AlRashidi FN, AlJrri MM, et al. Perceived effect of calorie count display on customers' eating behaviors in food facilities of eastern Province, Saudi Arabia: a mixed method study. J Multidiscip Healthc. 2020;13:1849–61.
17 Alassaf HI, Alaskar YA, Alqulaysh BF, Alshehri MA, Alnosian MY, Alshamrani AA, et al. Assessment of knowledge, attitudes and practices of Saudi adults about calorie labeling in central Saudi Arabia. Saudi Med J. 2020;41(3):296–303.
18 Alkhathami AA, Duraihim AT, Almansour FF, Alotay GA, Alnowaiser HS, Aboul-Enein BH, et al. Assessing use of caloric information on restaurant menus and resulting meal selection in Saudi Arabia: application of the theory of planned behavior. Am J Health Educ. 2021;52(3):1–10.
19 Al-Otaibi H, Al-Sandal T, Elkatr HO. Is calorie labeling on menus related to weight disturbances among females in Saudi Arabia? J Nutr Metab. 2021;2021:4041451.
20 Goldschmidt AB, Wall MM, Choo THJ, Evans EW, Jelalian E, Larson N, et al. Fifteen-year weight and disordered eating patterns among community-based adolescents. Am J Prev Med. 2018;54(1):e21–9.
21 Løvhaug AL, Granheim SI, Djojosoeparto SK, Harrington JM, Kamphuis CBM, Poelman MP, et al. The potential of food environment policies to reduce socioeconomic inequalities in diets and to improve healthy diets among lower socioeconomic groups: an umbrella review. BMC Public Health. 2022;22(1):433–14.

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Awareness and Readiness of Healthcare Workers Regarding National Transformation Program in the Health Sector in Tabuk Region, Saudi Arabia

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Keywords
Awareness and readiness · Healthcare workers · National Transformation Program · Health sector · Saudi Arabia

Abstract
Introduction: The National Transformation Program is a program that aims to develop the necessary infrastructure and create an environment that enables the public, private, and non-profit sectors to achieve Vision 2030 in Saudi Arabia. This study aimed to assess the awareness and readiness of healthcare workers regarding the National Transformation Program in the health sector of Tabuk region, Saudi Arabia. ***Methods:*** We conducted a cross-sectional descriptive study among healthcare workers in Tabuk region using a "Google Form" based questionnaire. We sent the web link to all (100%) employees' official email addresses through the Information Technology department's internal communication system. The study included only those who completed the "Google Form" with the required data. The "Google Form" inquired about the respondents' background characteristics, awareness regarding the National Transformation Program, and readiness for the transformation process. We analyzed the data with SPSS 16.0 for Windows and OpenEpi version 3.01. ***Results:*** Of 492 respondents, all (100%) had heard of the program and nearly three-quarters (71.5%) knew its strategic objectives, mainly through social media (72.4%). However, only about half of the respondents (49%) had a clear understanding of the institutional transformation process and the new model of care in the health sector. The main concern of the respondents was job security (41.1%), while the majority of them felt they were part of the program (89.9%) and supported it (92.2%). Their readiness for the transformation process was significantly higher ($p < 0.05$) among women and physicians than among men and other healthcare workers. ***Conclusion:*** Despite having a high level of awareness regarding the National Transformation Program in the health sector, some healthcare workers lacked a clear understanding of the institutional transformation process and the new model of care in the health sector. It is essential to address the expectations and concerns of different groups of healthcare workers to ensure their engagement and commitment to the program.

Introduction

Saudi Vision 2030 is a strategy to transform Saudi Arabia's economy by increasing its non-oil revenue and expanding its public services in areas such as health, education, infrastructure, recreation, and tourism [1, 2]. The aims are to boost business and investment, expand

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foreign trade, establish non-oil-based industries, and produce different kinds of goods and products for consumers [3]. To achieve Vision 2030 goals, the Kingdom has divided its plan into 3 5-year phases. The National Transformation Program (NTP) is the first phase, and it has its own goals and targets that have to be accomplished by 2020 [4, 5]. The NTP is one of the operational programs of Vision 2030, which aims to prepare government sectors to perform their roles in an efficient way to produce the highest quality of service [6].

Health Sector Transformation Plan (HSTP) is a long-term roadmap for the healthcare system reforming process [6]. Over the last 2 decades, the healthcare services system in Saudi Arabia has undergone significant changes [7]. The majority of these services, 60%, are offered by the Saudi Ministry of Health at no cost, while the rest are provided by other sources, such as the private sector [7, 8]. By 2020, the Saudi health system was expected to undergo changes and transformations to cope with future challenges [7]. The Saudi government had adopted a long-term strategic plan for 2010–2020 that aimed to decentralize healthcare delivery and provide advanced levels of care in each region [7].

Similarly, other GCC nations envisioned sustainable health sector development through long-term policies, such as Oman's Vision 2020 and 2040, the UAE, Bahrain, and Kuwait's Vision 2030, and Qatar's National Vision 2020 [9]. Reforming the healthcare system includes huge changes with big challenges, and it is variable from each country and from many aspects either the objectives of the reforming or the process of the reforming itself, or the outcomes. The current Saudi healthcare system has many flaws that have been revealed by various research papers. For example, a study by Sebai et al. [8] found that Saudi Arabia is facing high costs and concerns about the quality of healthcare services. According to Saudi Arabia's Vision 2030, the government has planned to restructure and reform the healthcare system by involving the private sector and increasing its share from 25% to 35% in the coming years [10, 11].

Numerous aspects of health transformation have been studied in other countries and regions, such as the UK [12], the USA [13], Turkey [14], Iran [15], Cyprus [16], Greece [17], Canada [18], and South Asia [19]. However, the healthcare sector's reorganization may hamper clinicians' ability to apply evidence-based practices to patient care [20]. Privatization may affect access to medical care depending on the hospital's budgeting and payment systems, and policymakers should ensure quality and affordability for vulnerable groups [21]. Effective knowledge exchange is sustained through informal networking driven by mutual benefits and convergence in organizational and technological settings and goals among group members [12].

An earlier study assessed the preferences of Greek citizens for healthcare reform [17], but the perspective of healthcare providers was not evaluated. Healthcare providers are increasingly facing a wide range of social, financial, political, regulatory, and cultural challenges, associated with demands for higher efficiency, improved quality, and lower costs [22]. The Council of Cooperative Health Insurance (CCHI) announced its plan to enhance the level of medical services provided to its beneficiaries in Saudi Arabia and issued a decree that requires all healthcare providers to comply with certain standards and regulations [23]. To improve the quality of services and the satisfaction of patients, healthcare settings need to adopt a more modern and effective management approach [24]. Further studies are required to evaluate the update of quality measures in healthcare [25].

It is important to intensify the research activities related to the national transformation in the healthcare sector in Saudi Arabia for coming up with the best perceptions, which would help clarify the process of transformation more accurately, and give the decision-makers a clear perception regarding the transformation, and thus contribute to the success of the transformation and achieve the Vision 2030 goals. Data are lacking about the awareness and readiness of the healthcare providers regarding the National Transformation Program in the Kingdom's health sector. The national transformation in the healthcare sector is full of challenges that need to be studied and explored.

Healthcare workers are the key stakeholders in the National Transformation Program of the Saudi health sector. This program has implications for their roles, responsibilities, skills, performance, and satisfaction levels. Moreover, they can provide valuable insights and feedback on how the program affects the quality and efficiency of health services; it is important to understand their perceptions regarding the program. The success of this program largely depends on the awareness and readiness of healthcare workers, who are directly involved in providing and improving health services. Therefore, our study aimed to assess the awareness and readiness of healthcare workers in the Tabuk region about the National Transformation Program in the Saudi health sector.

Methods

This cross-sectional descriptive study was conducted in Tabuk region among selected healthcare workers from Civil Services and Hospital Operations Projects (HOPs) during the period between

Table 1. Total number of healthcare workers in Tabuk region by different categories

Categories	Civil services		Hospital operation projects (HOPs)		Total
	Saudi	non-Saudi	Saudi	non-Saudi	
Pharmacist	81	2	46	4	133
Health Assistant	48	152	6	1	207
Specialist Non-physician	340	20	278	25	663
Technician	962	5	423	19	1,409
Nurse	2,015	63	323	1,134	3,535
Physician	166	965	106	360	1,597
Administrative Personnel	999	–	380	1	1,380
Total	4,611	1,207	1,562	1,544	8,924

Data source: Human Resources Department, General Directorate of Health Affairs in Tabuk Region, Kingdom of Saudi Arabia; October 2018.

October 2018 and February 2019. A self-administered questionnaire was developed by our research team for the purpose of this study. The questionnaire was composed of 23 questions, divided into 3 sections including (a) demographic data of the research participants, (b) awareness-related information about the National Transformation Program in the Saudi health sector, and (c) readiness-related information about the National Transformation Program in the Saudi health sector. The questionnaire was designed to align with the objectives of the study. The questions were meticulously formulated to assess the intended variables, avoiding ambiguity, bias, irrelevance, and inconsistency.

Furthermore, the validity and reliability of the questionnaire were ensured by conducting a pilot test among 25 healthcare workers in King Fahad Specialized Hospital, Tabuk. A convenience sampling technique was employed to select a sample of 5% of the target population for the pilot testing. The pilot respondents provided feedback on each question (with answer options) regarding their clarity, relevance, and difficulty. The feedback and results of the pilot test were utilized to revise and refine the questionnaire. Subsequently, a "Google Form" was generated based on the final version of the questionnaire. As of October 2018, a total of 8,924 healthcare workers were working in different government health facilities in Tabuk region (Table 1). The predeveloped "Google Form" web link was sent to all (100%) healthcare workers in the Tabuk region to their official MOH email addresses through the internal communication system of the Information Technology department. Figure 1 illustrates the detailed steps of the methods of the present study in a flow chart.

The questionnaire included 10 questions on readiness for the transformation process. Answers to each of these questions were given scores from 1 to 5 indicating the level of readiness for transformation with a total score of 50 points. The answer strongly agree was given a score of 5, agree was given 4, neutral was given 3, disagree was given 2 points, and strongly disagree was given one point. We used a one-way ANOVA (analysis of variance) to test for differences in the mean scores of two or more groups based on one independent variable. The independent variable was the category of the respondents (gender, nationality, occupation, or years of experience), and the dependent variable was the readiness score. We reported the mean scores along with the 95% confidence intervals and the p values for each category. The p values were compared to a significance level of 0.05.

In this study, the minimum sample size was 369 (confidence level = 95% and margin of error = 5%). This sample size was calculated by using an online sample size calculator developed by SurveyMonkey [26]. The study included the healthcare workers who completed the "Google Form" with the required data. All collected data were analyzed using the statistical software titled "SPSS 16.0 for Windows" (SPSS, Chicago, IL, USA) and "OpenEpi" (Open Source Epidemiologic Statistics for Public Health) Version 3.01 [27].

Participation in this study was completely voluntary. Informed consent forms (separated from the questionnaire) were electronically signed by each participant and the principal investigator. Study participants had the right to refuse to take part in the study at the beginning, or to withdraw themselves from the study at any time. The participation was anonymous and the data for this study were kept completely confidential. Ethical approval for the study protocol was obtained from the Institutional Review Board (IRB), General Directorate of Health Affairs in Tabuk Region, Saudi Arabia (Approval Number: TU-077/019/005).

Results

A total of 492 healthcare workers responded to and completed the "Google Form." Table 2 presents the background characteristics of 492 healthcare workers in the health sector of Tabuk region, Saudi Arabia. Males (51.0%) and females (49.0%) were almost equally represented in the sample. The majority of the participants were Saudi nationals (89.8%), while only 10.2% were non-Saudi. Most of the participants worked at the primary health care centers and the Tabuk Regional Health Directorate (23.5% and 16.9%, respectively). The most common healthcare worker group was nurses (41.3%),

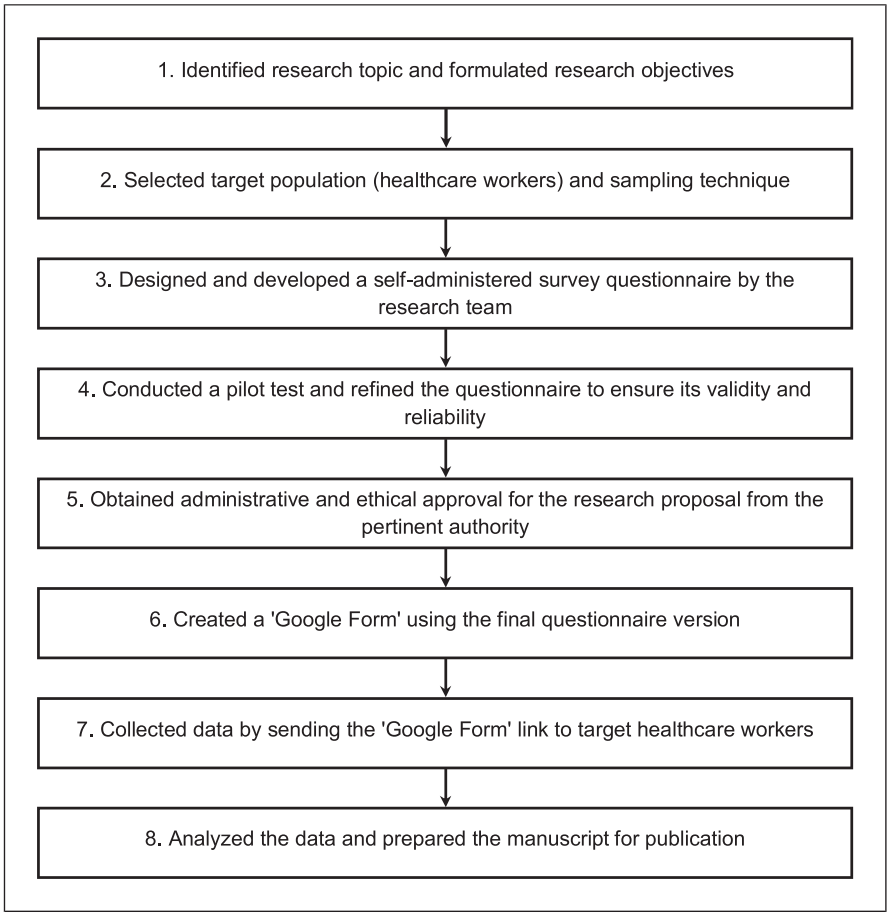

Fig. 1. A flowchart of the research methods applied.

followed by others (25.5%), which included pharmacists, technicians, and allied health professionals. The least prevalent group was physicians (14.0%). The majority (40.8%) of the participants had 6–15 years of work experience, while a few (5.1%) had less than 1 year.

Table 3 shows the awareness of 492 healthcare workers regarding the National Transformation Program in the Health Sector of Tabuk region, Saudi Arabia. All respondents (100%) had heard about the program, mostly through social media (72.4%). The majority of respondents (71.5%) correctly identified the strategic objectives of the program, which include facilitating access to health services, improving the quality and efficiency of health services, promoting health risk prevention, and enhancing traffic safety. About half of the respondents (49.1%) correctly defined the institutional transformation in the health sector as reorganizing the healthcare sector to make it more efficient and effective for the staff and citizens. Similarly, about half of the respondents (49%) appropriately explained the new model of care in the health sector as ensuring that the pathway of the patient is clear in the healthcare system. Job stability was the top concern for most respondents (41.1%) about the National Transformation Program in the health sector. Most of the respondents (89.9%) considered themselves a part of the program and agreed with it (92.2%). Only a few did not feel they were part of the program or did not support it (10.2% and 7.8%, respectively).

Table 4 illustrates the mean scores of respondents' readiness for the transformation process in the health sector in the Tabuk region, Saudi Arabia. Table 4 also reports the 95% confidence intervals and the significance levels of the differences between categories within each variable, using one-way ANOVA. Women showed a significantly higher score (39.3 ± 8.3 points) compared to men (36.8 ± 10.7 points), $p = 0.004$. Physicians showed a higher score (41.5 ± 8.1 points) compared to the administrative personnel (38.2 ± 9.5 points), nurses (37.6 ± 9.2 points), and other healthcare workers (36.9 ± 10.5 points), and these differences were statistically significant ($p = 0.011$). On the other hand, respondents' nationality and years of experience ($p = 0.649$ and $p = 0.097$, respectively) did not significantly affect the readiness scores.

Table 2. Background characteristics of healthcare workers (n = 492) in the health sector, Tabuk region, Saudi Arabia

Background characteristics	Category	n (%)	95% CI
Gender (n = 490)	Male	250 (51.0)	46.6–55.4
	Female	240 (49.0)	44.6–53.4
Nationality (n = 490)	Saudi	440 (89.8)	86.8–92.2
	Non-Saudi	50 (10.2)	7.8–13.2
Workplace (n = 486)	Primary Health Care Center	114 (23.5)	19.9–27.4
	Tabuk Regional Health Directorate	82 (16.9)	13.8–20.5
	King Fahad Specialist Hospital (KFSH)	58 (11.9)	9.3–15.1
	King Khaled Hospital (KKH)	54 (11.1)	8.6–14.2
	Maternity and Child Hospital (MCH)	36 (7.4)	5.4–10.1
	Al-Wajh Hospital	24 (4.9)	3.3–7.2
	Tayma Hospital	24 (4.9)	3.3–7.2
	Umluj Hospital	21 (4.3)	2.8–6.5
	Al-Amal Complex for Mental Health	20 (4.1)	2.7–6.3
	Al-Bada Hospital	20 (4.1)	2.7–6.3
	Haqel Hospital	15 (3.1)	1.9–5.0
	Duba Hospital	10 (2.1)	1.1–3.7
	Ashwag Hospital	5 (1.0)	0.4–2.4
	Abo Raka Hospital	3 (0.6)	0.2–1.8
Healthcare worker group (n = 487)	Physician	68 (14.0)	11.2–17.3
	Nurse	201 (41.3)	37.0–45.7
	Administrative personnel	94 (19.3)	16.0–23.0
	Others*	124 (25.5)	21.8–29.5
Work experience (n = 492)	<1 year	25 (5.1)	3.5–7.4
	1–5 years	170 (34.6)	30.5–38.9
	6–15 years	201 (40.8)	36.6–45.2
	>15 years	96 (19.5)	16.2–23.2

n, number of respondents; %, percentage; CI, confidence interval. *Others included pharmacists, technicians, and allied health professionals.

Discussion

The present study revealed that the awareness of the healthcare workers regarding the National Transformation Program in the health sector was high and positive. This is consistent with the Vision 2030 of Saudi Arabia, which aims to restructure the health sector in Saudi Arabia to be a comprehensive, effective, and integrated health system that is based on the health of the individual and society and depends on the principle of value-based care [10]. The program also focuses on improving access to health services, enhancing the quality and efficiency of health services, promoting health risk prevention, and enhancing traffic safety [4, 10]. These are some of the strategic objectives that the respondents correctly identified in this study.

Our study reported that most respondents correctly identified the strategic objectives of the program, defined the institutional transformation and the new model of care in the health sector, and expressed their support and involvement in the program. However, these findings are higher than those reported by other studies in different regions and countries, which showed lower levels of knowledge and acceptance of health system reforms among healthcare workers [28]. This could indicate a positive effect of the communication and engagement strategies implemented so far by the Saudi Ministry of Health to promote the program among healthcare workers. Moreover, our findings are aligned with several previous studies that highlighted the role of strengthening workforce efficiency and engagement and their readiness for change in facilitating successful healthcare reforms in Saudi Arabia [11, 29–32].

However, a number of the respondents seem to have some confusion or lack of clarity about the institutional transformation process and the new model of care in the

Table 3. Awareness of healthcare workers (*n* = 492) regarding National Transformation Program in the health sector, Tabuk region, Saudi Arabia

Question number	Questions with single select multiple answer options	*n* (%)
Q1	*Did you hear about the National Transformation Program in the health sector? (n = 492)*	
	Yes	492 (100.0)
	No	0 (0.0)
Q2	*Through which media did you hear about the National Transformation Program in the health sector? (n = 467)*	
	Social media (email-Snapchat-Twitter-Facebook)	338 (72.4)
	Workshops with managers and co-workers	44 (9.4)
	TV, radio, newspapers	41 (8.8)
	SMS via WhatsApp application	30 (6.4)
	Transformation Management Office	11 (2.4)
	Ministry of Health website	1 (0.2)
	All of the above	1 (0.2)
	None of the above	1 (0.2)
Q3	*What are the strategic objectives of the National Transformation Program in the health sector?* (*n = 492*)	
	Facilitating access to health services, improving quality and efficiency of health services, promoting health risk prevention, enhancing traffic safety	352 (71.5)
	Support staff development, training and development, professional promotions, job performance evaluation	58 (11.8)
	None of the above	21 (4.3)
	Not sure	61 (12.4)
Q4	*What is the institutional transformation in the health sector?* (*n = 491*)	
	Reorganizing the healthcare sector to make it more efficient and effective for the staff and citizens	241 (49.1)
	Improving citizen access to healthcare services	163 (33.2)
	Rewarding well-performing staff	16 (3.3)
	Supporting staff development	6 (1.2)
	None of the above	12 (2.4)
	Not sure	53 (10.8)
Q5	*What is the new model of care in the health sector?* (*n = 492*)	
	Ensure that the pathway of the patient is clear in the healthcare system	241 (49.0)
	Prevention of disease	128 (26.0)
	Early detection of diseases	49 (10.0)
	None of the above	9 (1.8)
	Not sure	65 (13.2)
Q6	*What is your main consideration about the National Transformation Program in the health sector?* (*n = 487*)	
	Job stability	200 (41.1)
	New salary scale	82 (16.8)
	Training and development	69 (14.2)
	Performance evaluation	62 (12.7)
	Benefits of change in future	49 (10.1)
	Career promotion	14 (2.9)
	Relocation of the workplace	7 (1.4)
	Providing better health services	1 (0.2)
	Actual health benefits for the public interest	1 (0.2)
	All of the above	2 (0.4)
Q7	*Do you consider yourself a part of the National Transformation Program in the health sector?* (*n = 489*)	
	Yes	439 (89.9)
	No	50 (10.2)
Q8	*Do you support the National Transformation Program in the health sector?* (*n = 489*)	
	Yes	451 (92.2)
	No	38 (7.8)

n, number of respondents; %, percentage.

Table 4. Respondents' score* of readiness for transformation process in the health sector, Tabuk region, Saudi Arabia

Variable	Category	Mean (±SD) score	95% CI	Significance (*p* value**)
Gender	Male	36.8 (±10.7)	35.5–38.1	$p = 0.004$
	Female	39.3 (±8.3)	38.2–40.3	
Nationality	Saudi	37.5 (±8.7)	36.7–38.3	$p = 0.649$
	Non-Saudi	38.1 (±9.9)	35.6–40.6	
Healthcare worker group	Physician	41.5 (±8.1)	39.2–43.8	$p = 0.011$
	Nurse	37.6 (±9.2)	36.3–38.9	
	Administrative personnel	38.2 (±9.5)	36.3–40.1	
	Others***	36.9 (±10.5)	35.2–38.6	
Work experience, years	<1 year	38.1 (±8.2)	34.2–42.0	$p = 0.097$
	1–5 years	39.1 (±8.8)	37.6–40.5	
	6–15 years	37.2 (±10.0)	35.9–38.5	
	>15 years	36.3 (±10.0)	34.4–38.2	

%, percentage; SD, standard deviation; CI, confidence interval. *The questionnaire included 10 questions on readiness for transformation. Answers to each of these questions were given scores from 1 to 5, indicating the level of readiness for transformation with a total score of 50 points. The answer strongly agree was given a score of 5, agree was given 4, neutral was given 3, disagree was given 2 points, and strongly disagree was given one point. **Based on the one-way ANOVA (analysis of variance). ***Others included pharmacists, technicians, and allied health professionals.

health sector. Only about half of them correctly defined or explained these concepts, which are essential for achieving Vision 2030. The institutional transformation refers to reorganizing the healthcare sector to make it more efficient and effective for the staff and citizens [10], while the new model of care relates to ensuring that the pathway of the patient is clear in the healthcare system [10]. These concepts involve changing the roles and responsibilities of different stakeholders in the health sector, such as providers, payers, regulators, and beneficiaries [29]. Therefore, it is important to increase the awareness and understanding of these concepts among healthcare workers as they are key players in implementing and sustaining the transformation.

The present study showed that social media was a major source of information about the National Transformation Program in the health sector for healthcare workers, indicating a need for more effective communication strategies from official channels. Another interesting finding from our study was that job stability was the top concern for most respondents about the National Transformation Program in the health sector. This may indicate some fear or uncertainty about how the transformation will affect their careers or employment opportunities. It may also reflect some resistance or reluctance to change their current practices or routines. Hence, it is important to address these concerns and provide reassurance and support for healthcare workers during the transformation process. It is also essential to highlight the benefits and opportunities that the transformation will bring for them and the entire society.

Our study results presented that most healthcare workers considered themselves a part of the programs and agreed with them, which indicates a high level of acceptance among this group. However, some respondents did not feel involved in or supportive of the program. This could have been caused by various factors, such as a lack of clarity about the health transformation process; perceived lack of transparency about the program and its vision; fear of being replaced by younger employees; or uncertainty that the program would benefit them.

The present study found that women had a significantly higher readiness score than men ($p < 0.05$) and that the mean score of physicians was significantly higher than that of administrative personnel, nurses, and other healthcare workers ($p < 0.05$). These results suggest that gender and occupation are important factors that influence the readiness for the transformation process in the health sector in the Tabuk region, Saudi Arabia. Moreover, these findings are consistent with some of the previous literature on readiness for change in the health sector. For example, a scoping review by Beasley et al. [33] found that gender and occupation were among the factors that influenced individual readiness for change in healthcare settings. Similarly, a study by Helfrich et al. [34] found that change commitment and change efficacy

varied by occupation and gender among employees of small businesses participating in a workplace health promotion trial.

This study has several advantages. First, it assessed the awareness, readiness, and concerns of the participants regarding the National Transformation Program in the health sector, which is a relevant and timely topic for Saudi Arabia. Second, it involved a large and diverse group of healthcare workers, which enhanced the reliability and applicability of the findings. Third, it used a "Google Form," which is a convenient and cost-effective way of collecting data from a diverse and geographically dispersed population. Furthermore, the study applied descriptive statistics and one-way ANOVA to analyze the data, which are appropriate methods for comparing means and proportions among different groups.

However, this cross-sectional study has some limitations. First, it only surveyed healthcare workers in Tabuk region, so it cannot generalize to the whole country. Second, it only provided a snapshot of the situation at the time of the research, so it may not reflect the countrywide state of affairs regarding the awareness and readiness of healthcare workers for the health sector transformation program. Third, it did not include qualitative data to explain the reasons behind the findings.

Our findings recommend that policymakers should continue to use social media and other channels to disseminate information and updates about the program to the public and the healthcare workers. The gender difference in readiness scores suggests that women may be more receptive and adaptable to the transformation process than men. Policymakers should consider the needs and preferences of both genders when designing and implementing the program. The variation in readiness scores among different healthcare worker groups implies that some groups may require more training and guidance than others to cope with the changes brought by the program. Policymakers should identify the specific challenges and opportunities faced by each group and provide tailored support and resources to enhance their skills and confidence in the new model of care.

Our findings also suggest that there is a need for more effective communication and education strategies to increase the awareness and readiness of healthcare staff for the transformation process. To include healthcare professionals in future advancement and improvements, they should be communicated with about the vision and benefits of the change, involved and empowered in the change process, provided with adequate training and support, and addressed for the emotional and psychological aspects of the change. These strategies can help reduce their fear, increase their trust, enhance their skills, and improve their motivation and well-being. Furthermore, addressing the concerns and expectations of different groups of healthcare workers is essential to ensure their engagement and commitment to the program. This way, the program can achieve its goals of improving the access, quality, efficiency, and safety of health services in Saudi Arabia. Given the importance and complexity of the Health Sector Transformation Program in Saudi Arabia, further research is needed to evaluate its progress, challenges, and outcomes.

Statement of Ethics

This study protocol was reviewed and approved by the Institutional Review Board (IRB), General Directorate of Health Affairs in Tabuk Region, Saudi Arabia. The approval number is TU-077/019/005. Participation in this study was completely voluntary. Informed consent forms (separated from the questionnaire) were electronically signed by each participant and the principal investigator. Study participants had the right to refuse to take part in the study at the beginning, or to withdraw themselves from the study at any time. The participation was anonymous and the data for this study were kept completely confidential.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

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Author Contributions

Khulud Ghalibi made substantial contributions to the conception, design, acquisition, analysis, and interpretation of data for this work. She was involved in drafting the manuscript and revising it critically for important intellectual content. Also, she gave the final approval for the version to be published. Hamza Mohammed Ibrahim Omer played a significant role in the collection, analysis, and interpretation of data for this study. He also participated in writing the manuscript and critically reviewing it for important intellectual content. Moreover, he approved the final version to be published. For this study, Mohammad Al Mamun contributed significantly to the data collection, analysis, and interpretation. He also helped write and revise the manuscript for intellectual quality. Furthermore, he gave his approval for the final version to be published. All authors take responsibility for the entire work and make sure that any issues related to the work's accuracy or integrity are properly addressed and resolved.

Data Availability Statement

All data generated or analyzed during this study are included in this article. Further inquiries can be directed to the corresponding author.

References

1 Saudi Vision 2030: Overview. 2022. [cited 2023 February 20]. Available from: https://na.vision2030.gov.sa/v2030/overview/.
2 Creating a vision for all. 2022 [cited 2023 February 20]. Available from: https://na.vision2030.gov.sa/v2030/creating-a-vision-for-all/.
3 Vision 2030. 2023 [cited 2023 March 02]. Available from: https://www.my.gov.sa/wps/portal/snp/content/saudivision/.
4 National transformation program. 2022 [cited 2023 March 26]. Available from: https://www.vision2030.gov.sa/v2030/vrps/ntp/.
5 National Transformation Program 2020. [cited 2023 March 01]. Available from: https://leap.unep.org/countries/sa/national-legislation/national-transformation-program-2020.
6 Health Sector Transformation Plan (HSTP) Guide. [cited 2023 March 24]. Available from: https://moh.gov.sa/en/Ministry/vro/Pages/manual.aspx.
7 Alharbi MF. An analysis of the Saudi healthcare system's readiness to change in the context of the Saudi National Health-care Plan in Vision 2030. Int J Health Sci. 2018;12(3):83–7.
8 Milaat W, Sebai Z, Al-Zulaibani AA. Health care services in Saudi Arabia: past, present and future. J Family Community Med. 2001;8(3):19–23.
9 Rahman R. The privatization of health care system in Saudi Arabia. Health Serv Insights. 2020;13:1178632920934497.
10 Health sector transformation program. 2022 [cited 2023 January 21]. Available from: https://www.vision2030.gov.sa/v2030/vrps/hstp/.
11 Alasiri AA, Mohammed V. Healthcare transformation in Saudi Arabia: an overview since the launch of vision 2030. Health Serv Insights. 2022;15:11786329221121214.
12 Cresswell K, Sheikh A, Franklin BD, Krasuska M, The Nguyen H, Hinder S, et al. Interorganizational knowledge sharing to establish digital health learning ecosystems: qualitative evaluation of a national digital health transformation program in england. J Med Internet Res. 2021;23(8):23372.
13 Gonzalo JD, Ahluwalia A, Hamilton M, Wolf H, Wolpaw DR, Thompson BM. Aligning education with health care transformation: identifying a shared mental model of "new" faculty competencies for academic faculty. Acad Med. 2018;93(2):256–64.
14 Caner A, Cilasun SM. Health care services and the elderly: utilization and satisfaction in the aftermath of the Turkish health transformation program. Gerontol Geriatr Med. 2019;5:2333721418822868.
15 Homaie Rad E, Yazdi-Feyzabad V, Yousefzadeh-Chabok S, Afkar A, Naghibzadeh A. Pros and cons of the health transformation program in Iran: evidence from financial outcomes at the household level. Epidemiol Health. 2017;18(39).
16 Wouters OJ, Kanavos PG. Transitioning to a national health system in Cyprus: a stakeholder analysis of pharmaceutical policy reform. Bull World Health Organ. 2015;93(9):606–13.
17 Souliotis K, Tsimtsiou Z, Golna C, Nikolaidi S, Lionis C. Citizen preferences for primary health care reform in Greece. Hippokratia. 2019;23(3):111–7.
18 Ouimet MJ, Pineault R, Prud'homme A, Provost S, Fournier M, Levesque JF. The impact of primary healthcare reform on equity of utilization of services in the province of Quebec: a 2003-2010 follow-up. Int J Equity Health. 2015;14(139):139–0243.
19 Islam A, Tahir MZ. Health sector reform in South Asia: new challenges and constraints. Health Pol. 2002;60(2):151–69.
20 Dadich A, Hosseinzadeh H. Healthcare reform: implications for knowledge translation in primary care. BMC Health Serv Res. 2013;13(490):490–6963.
21 Alkhamis AA. Critical analysis and review of the literature on healthcare privatization and its association with access to medical care in Saudi Arabia. J Infect Public Health. 2017;10(3):258–68.
22 Rose RC, Uli J, Abdul M, Ng KL. Hospital service quality: a managerial challenge. Int J Health Care Qual Assur Inc Leadersh Health Serv. 2004;17(2–3):146–59.
23 Decree issued to improve services of health care providers. 2016 [cited 2023 August 04]. Available from: https://www.arabnews.com/saudi-arabia/news/906761.
24 Alghamdi FS. The impact of service quality perception on patient satisfaction in government hospitals in southern Saudi Arabia. Saudi Med J. 2014;35(10):1271–3.
25 Alshammari F, Pasay-an E, Alboliteeh M, Alshammari MH, Susanto T, Villareal S, et al. A survey of hospital healthcare professionals' perceptions toward patient safety culture in Saudi Arabia. Int J Africa Nurs Sci. 2019;11:100149.
26 Dean AG, Sullivan KM, Soe MM. Sample size calculator; 2022. [cited 2023 January 24]; Available from: https://www.surveymonkey.com/mp/sample-size-calculator/.
27 Dean AGSK, Soe MM. OpenEpi: open source epidemiologic statistics for public health; 2013. [cited 2022 August 20]; Available from: https://www.openepi.com/Menu/OE_Menu.htm.
28 Saltman RB, Bankauskaite V, Vrangbaek K. Decentralization in Health Care. 1st ed. In: Figueras J, editor. European observatory on health systems and policies series. Berkshire: McGraw-Hill Open University Press; 2007.
29 Chowdhury S, Mok D, Leenen L. Transformation of health care and the new model of care in Saudi Arabia: kingdom's Vision 2030. J Med Life. 2021;14(3):347–54.
30 Rahman R, Al-Borie HM. Strengthening the Saudi arabian healthcare system: role of vision 2030. Int J Healthc Manag. 2021;14(4):1483–91.
31 Albejaidi F. An investigation into the challenges towards implementation of total quality management under the Saudi Healthcare National Transformation Program–2020. J Health Med Nurs. 2018;46:1–12.
32 Alharbi M. An investigation of the saudi healthcare system's readiness for change in the light of Vision 2030: the role of transformational leadership style. J Health Spec. 2018;6(2):45–.
33 Beasley L, Grace S, Horstmanshof L. Assessing individual readiness for change in healthcare: a review of measurement scales. J Health Organ Manag. 2021;35(8):1062–79.
34 Helfrich CD, Kohn MJ, Stapleton A, Allen CL, Hammerback KE, Chan KCG, et al. Readiness to change over time: change commitment and change efficacy in a workplace health-promotion trial. Front Public Health. 2018;6(110):110.

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Bridging the Gap: Fostering Collaboration between Academics and Regulators in Saudi Arabia's Dental Industry

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We would like to shed light on an important aspect of healthcare governance in Saudi Arabia and the need for improvements within the dental sector. The Saudi Vision 2030 presents a unique opportunity to establish a more effective oral healthcare system [1], and the government's initiatives led by the Saudi Ministry of Health are encouraging progress in the dental field. [2]

To ensure continued momentum and achieve optimal oral healthcare outcomes, it is crucial to invest in reinforcing regulations, advancing education, and leveraging cutting-edge technology. Following established guidelines will guarantee the highest quality, safety standards, and optimal dental care delivery.

Dental materials and devices play a significant role in the dental ecosystem, impacting clinicians, researchers, suppliers, and patients. In Saudi Arabia, the approval process for dental materials is overseen by the Saudi Food and Drug Authority (SFDA) [3], which rigorously reviews and regulates these materials to ensure safety and efficacy. Additionally, the High Commission for Industrial Security (HCIS) [4] contributes its oversight in protecting public health, particularly in cases involving materials containing medication or controlled substances. The SFDA's commitment and efforts are commendable, reflecting a mature and quality-focused establishment that serves as an exemplary regulatory body across the country.

While the SFDA handles the approval process, it is important to distinguish the role of the National Unified Procurement Company for Medical Supplies (NUPCO). NUPCO plays a crucial role in improving Saudi Arabia's healthcare system through centralized procurement processes. However, it functions as a logistical and supply chain entity rather than having the authority to grant approvals or permissions in the healthcare sector. Thus, while NUPCO aids in the efficient procurement of medical supplies, it is the SFDA that have the authority and responsibility for ensuring the safety and efficacy of dental materials and devices.

Although the SFDA has made significant progress in simplifying and expediting the approval process for dental materials, challenges remain for dental material consumers. Notably, there is a need for a comprehensive and easily accessible list of approved materials or devices, sorted by type or usage. Additionally, the lack of transparency surrounding the identities of the individuals responsible for evaluation and approval raises concerns about accountability. Furthermore, the absence of a dedicated dental department limits the availability of specialized support.

To overcome these challenges, a collaborative effort involving academia, field experts, dental specialty professional societies, and regulatory bodies is essential. By forging partnerships and actively involving these

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stakeholders, we can foster knowledge sharing, promote innovation, and streamline approval processes. Leveraging the expertise of academics allows the creation of context-aware standards, ensuring that dental materials meet the highest safety and efficacy benchmarks.

Establishing a dedicated dental department within the SFDA offers numerous advantages. It opens new career opportunities for dental graduates, facilitates collaboration among experts, enhances efficiency, transparency, and accountability, and allows for tailored standards and regulations that address the specific needs of the dental sector in Saudi Arabia.

Joint initiatives involving academia, industry, and regulatory bodies have the potential to attract funding for further research and implementation opportunities. This not only enhances patient care but also contributes to the overall advancement of the dental sector. Additionally, integrating experts and academia in the governance process addresses ethical, social, and environmental concerns related to dental materials. These collaborations facilitate the development and enforcement of proper ethical guidelines, promoting responsible innovation in the industry.

By implementing these recommendations and promoting collaboration between academia and the industry, a transparent, efficient, and context-aware process for dental materials approval and advancement can be established. This approach benefits both patients and professionals, ensuring the optimal use of dental materials in delivering high-quality oral healthcare. To successfully address challenges and promote the safe and effective use of dental materials and devices, ongoing dialog, information exchange, and the active involvement of all stakeholders are essential. By uniting to share knowledge, expertise, and resources, we can elevate the Saudi Arabian dental sector to new heights under the visionary framework of the Saudi Vision 2030.

Conflict of Interest Statement

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Author Contributions

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References

1 Vision 2030, Kingdom of Saudi Arabia. 2016 [cited 2022 May 20]. Available from: www.vision2030.gov.sa/.

2 Aldossary MS. Dental governance and the Saudi vision 2030: a narrative review. Saudi J Health Syst Res. 2022;1-7:1–7.

3 Saudi Food and Drug Authority [cited 2023 July 19]. Available from: https://www.sfda.gov.sa/en.

4 High Commission for Industrial Security, Ministry of Interiors [cited 2023 July 19]. Available from: https://www.moi.gov.sa/wps/portal/Home/sectors/industrialsecurity/!ut/p/z1/04_iUlDg4tKPAFJABjKBwtGPykssy0xPLMnMz0vM0Y_Qj4wyizfwNDHxMDQx8nb3c3YxcDRzN3YxdjY2NvAy0_fSj8KvIDg1T78gO1ARAG2izLk!/.

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