

RESEARCH

Open Access



Current state of ethical challenges reported in Saudi Arabia: a systematic review & bibliometric analysis from 2010 to 2021

Alexander Woodman^{1*} , Khawaja Bilal Waheed², Mohammad Rasheed³ and Shakil Ahmad⁴

Abstract

Background: Over the past few years, five domains of importance about the current state of bioethics in Saudi Arabia have shaped the perspective of most research: doctor-patient relationship, informed consent, do-not-resuscitate, organ donation, and transplantation, medical students' knowledge and attitudes about medical ethics curriculum. This systematic review aimed to systematically identify, compile, describe and discuss ethical arguments and concepts in the best-studied domains of bioethics in Saudi Arabia and to present cultural, social, educational, and humane perspectives.

Methods: Six databases were searched using Boolean operators (PubMed, Embase, Web of Science, Scopus, CINAHL, Google Scholar) from December 2020–June 2021. The search and report process followed the statement and flow-chart of preferred reporting items for systematic reviews and meta-analyses (PRISMA).

Results: The search resulted in 1651 articles, of which 82 studies were selected for a final review and assessment. There is a gradual increase in research, whereby a substantial increase was observed from 2017. Most of the published articles focused on 'Organ Donation & Transplantation' with 33 articles, followed by 'Doctor-Patient Relations' with 18 publications. Most of the published articles were from Central Province (33), followed by Western Province (16). The authorship pattern showed a collaborative approach among researchers. The thematic analysis of keywords analysis showed that 'Saudi Arabia,'attitude PHC,'organ donation,'knowledge and education,'and 'donation' have been used the most commonly.

Conclusion: This systematic quantitative synthesis is expected to guide researchers, stakeholders, and policymakers about the strengths and gaps in knowledge and attitudes regarding medical ethics in Saudi Arabia, both among the general public and health professionals.

Keywords: Ethical challenges, Medical ethics curriculum, Doctor-patient relationship, Informed consent, Do-not-resuscitate, Organ donation and transplantation, Systematic review, Bibliometric analysis, Saudi Arabia

Background

The purpose of biomedical ethics is to study, build, and judge the criteria necessary to philosophically assess medical quandaries that demand otherwise morally gray or seemingly immoral solutions [1, 2]. Beauchamp and Childress (1979) proposed developing moral judgment in bioethics in terms of four principles (prima facie) that are a part of common morality (unphilosophical

*Correspondence: alexwoodman.ucla@gmail.com

¹ Yale Interdisciplinary Center for Bioethics, Yale University, New Haven, CT, USA

Full list of author information is available at the end of the article



commonsense and tradition) and are neither overarching nor overly specific: autonomy, beneficence, non-maleficence, and justice [2]. These principles are also a part of the Islamic bioethics present in Saudi Arabia [2, 4]. Thus, Islamic bioethics or Islamic medical ethics is a system of moral assessment made to identify, analyze, and solve ethical problems arising in medical practice and research based on Islamic moral and legislative sources (primarily Quran and Sunna and secondarily by ijma/ consensus of Muslim scholars, qiyas/ analogies from Quran or legal precedents) [2, 4].

There is extensive literature on theoretical discussions and fundamental issues to understand the current debates on bioethics within the Islamic moral and legislative sources as well as within Saudi healthcare system [2–4]. Hence a preliminary search of databases was conducted to look into most studied areas of bioethics in Saudi Arabia. The search showed that there are a few fundamental domains of importance to understanding the current state of bioethics in Saudi Arabia that have shaped the perspective of most research [3–5].

The first concern is physician–patient relations, which sets clear boundaries on what doctors are allowed and not allowed to do. According to Saudi Commission for Health Specialties (2015), the core of every successful physician–patient interaction is trust, integrity, and honesty. Healthcare professionals must be upfront with patients regarding their rights and responsibilities, and how those rights are supported through informed consent [4–6]. However, the physician–patient relationship in Saudi Arabia is different as Saudi patients cannot be isolated from their families. The family plays an essential role in decision-making in Saudi Arabia, and doctors recognize the importance of this domain in bioethics and its relation to the patient's family members [6–9]. Similar to decision-making, Saudi doctors recognize the importance of informed consent and its relation to the patient's family members. In this context, informed consent aims to inform not only the patient but the family of the expected consequences of the treatment course [8–10].

Illness in Islam is considered a trial through which the patient must persevere, and the doctor has no right to terminate a patient's life. When death becomes inevitable, as determined by the doctors assigned to terminally ill patients, the *Fatwa*¹ No. 12086 dated 30/6/1409 (1989) of the High Council of Scholars and *Ifta'a*² of Saudi Arabia, Riyadh, allowed the "Do Not Resuscitate Policy" if

three competent doctors deemed the available medical interventions to be futile (Permanent Committee for Scholarly Research and Ifta'a, 1989). The decisions and integrity of these specialists and competent doctors are to be respected [10]. The family must be informed of the decision, but they cannot interfere, as they are not considered qualified under the *Fatwa*. The *Fatwa* must be explained to the family. If the family still insists against the DNR policies, they should be offered to transfer the patient to a different hospital willing to accept the patient. Despite existing regulations and legislation, the debate about DNR practice continues to vary widely [6, 10].

The fourth most debated bioethical domain is organ transplantation, a common practice since the 1960s. Organ donation in Saudi Arabia has been rising, as awareness of this global phenomenon, which aims to save lives through altruism, has increased [6]. In 1985, the Saudi Center of Organ Transplantation (SCOT) was founded as the government agency. At present, SCOT oversees all national organ donation and transplantation activities in Saudi Arabia [11, 12]. Nevertheless, organ transplantation raises several ethical issues among healthcare providers and general public, including the definition of death, the decision to donate organs, organ procurement, and organ allocation [6, 13, 14].

In general, the development of medical ethics and its domains have been accompanied by numerous social, legal, and ethical debates [1–4]. Public opinion tends to be skeptical about such developments in science and is prone to showing significant ambivalence in their attitude. Moreover, the variance in ethical education in Saudi Arabia and other Middle Eastern countries reflects knowledge gaps among both undergraduate and postgraduate medical students and, in some cases, doctors [1, 2]. Bioethics curriculum development was seen as part of general steps forward in developing moral attitudes, the complexity of the healthcare system, ethical and legal issues that need to be addressed systematically and consistently through the integration into medical education [2–5]. This shift has resulted in the increasing involvement of scientists and clinicians in teaching medical ethics based on the ideas of the philosophers who pioneered the teaching of the subject [2–5].

While modern research in bioethics covers issues such as stem cell research, genetic and biobanking, cloning, and fertility treatment, the search for evidence showed that despite well-established *fatwas*, bioethics in Saudi Arabia is still on the rise, exploring the very foundations of medical ethics. Hence, this research cannot claim to have treated all domains of bioethics within the Saudi healthcare system. Rather, the aim is to present fundamental domains of bioethics that will shed light on

¹ Fatwa—religious decisions that are followed by healthcare providers in the Muslim world.²

² Ifta'a—A council charged with issuing religious verdicts fatwas, on matters that require deep study and interpretation of religious texts.²

essential ethical questions and applied ethics. These fundamental bioethical domains often challenge researchers and general public, as they contradict moral traditions and sometimes perceive matters in an unconventional light, which must take the entire spectrum of ethical theories into account [1, 2]. For this reason, this systematic review aimed to systematically identify, compile, describe and discuss ethical arguments and concepts in the most-argued domains of bioethics in Saudi Arabia and present cultural, social, educational, and humane perspectives.

Methods

Systematic reviews are best known as a consolidation of sources that help researchers to identify what is known with certainty, what is tentatively known, and where the gaps in knowledge are. The goal of systematic review is to reach broad conclusions that represent the findings of individual studies as a body of work, which is often referred to as synthesis [15–17]. In order to meet the goals of contemporary systematic reviews, a straightforward, transparent, and reproducible approach has been adapted, recommended, and used by previous researchers. This approach is essential for generating reliable data for future research and prospective policy development [18–20].

This systematic review has been carried in accordance with the following stages: (1) creating clear and explicit objectives, (2) definition of inclusion and exclusion criteria based on the objectives of the study and the selected the domains, (3) performing an effective and wide-ranging literature search based on the objectives and eligibility criteria, (4) exercising a methodological quality of studies, (5) extracting data from included studies, and (6) presenting findings of the review in the form of a descriptive summary in a table supplemented with text commentary [18–20].

Research aims and questions

To the authors' knowledge, there are no previous studies aimed to systematically identify, compile, describe and discuss ethical arguments and concepts in the best-studied domains of bioethics in Saudi Arabia and to present cultural, social, educational, and humane perspectives. Based on the aim of the study, the following questions were developed:

1. What do Saudi health professionals and the general public know about *fatwas* regulating the medical ethics curriculum, doctor-patient relationship, informed consent, DNR, and organ transplantation?
2. What is the attitude of Saudi health professionals and the general public about medical ethics curriculum,

doctor-patient relationship, informed consent, DNR, and organ transplantation?

What are the concerns of Saudi health professionals and students about medical ethics curriculum, doctor-patient relationship, informed consent, DNR, and organ transplantation?

Eligibility criteria

It is essential to specify the eligibility criteria (i.e., inclusion/exclusion) for studies that need to be met before being included in a systematic review. Failure to identify eligibility criteria can result in bias. The eligibility criteria should derive from the aims and research questions [12, 17, 21].

The inclusion and exclusion criteria of the current systematic review are as follows:

Inclusion criteria

- Publication Type: Published journal articles
- Language: Title/abstract level: only articles with at least an abstract in English
- Be explicitly concerned with normative ethical considerations of medical topics in Saudi Arabia
 - i. Pose an ethical question
 - ii. Determine ethical problems/challenges
 - iii. Address ethical decision making or the use of ethical frameworks for decision making
 - iv. Explore ethical views or reasons for/against a decision
 - v. Look for/produce experimental data for ethical decision making or ethical evaluation
 - vi. Examine ethical regulations or recommendations
 - vii. Studies highlighting or emphasizing upon physician-patient relationship (specifically informed consent), beneficence (DNR, organ donation and transplantation), non-maleficence (physician competency, standard of care) and justice (provision of care) were selected.

Exclusion criteria

- Articles published before 2010
- Randomized controlled trials (RCTs)
- Cohort studies
- Case-control studies
- Reviews and editorials
- Meta-analyses

Table 1 PubMed search strings stratified according to organizing concepts—explorative and refined

<i>PubMed explorative search</i>	
Date	December 2020–June 2021
Publication dates	2010–2021
Language	English
Search string	"Saudi Arabia"[Mesh]) AND "Bioethics"[Mesh]) AND "Ethics, Medical"[Mesh]) AND "Ethics, Professional"[Mesh]) OR "Ethics, Professional/legislation and jurisprudence"[Mesh]
<i>PubMed explorative search</i>	
Date	December 2020–June 2021
Publication dates	2010–2021
Language	English
Search string	"Saudi Arabia"[Mesh]) AND "Informed Consent"[Mesh]) AND "Consent Forms"[Mesh]) AND "Doctor-Patient Relations/ethics"[Mesh] OR "Doctor-Patient Relations/standards"[Mesh] AND "Delivery of Health Care/ethics"[Mesh] AND "Advance Directive Adherence"[Mesh] AND "Resuscitation Orders"[Mesh] AND "Tissue Donors/education" [Mesh] OR "Tissue Donors/ethics"[Mesh] AND "Organ Transplantation"[Mesh]) AND "Ethics, Professional"[Mesh] OR "Ethics Committees"[Mesh] OR "Ethics, Clinical"[Mesh]

The publication is written in a language other than English, e.g., Arabic.

Literature search

Six electronic literature databases were searched, covering the fields of healthcare sciences, ethics, and religion: PubMed, Embase, Web of Science, Scopus, CINAHL, Google Scholar. All databases were searched using Boolean operators (AND, OR, NOT) expressed in English through a combination of words in a single search. For instance, Ethical issues truth AND Saudi Arabia Ethical issues AND euthanasia OR do not resuscitate AND Saudi Arabia Islam ethics and organ donation OR transplantation and Saudi Arabia Medical ethics AND privacy confidentiality AND Saudi Arabia DNR OR DNT AND Saudi Arabia Do not resuscitate OR do not treat AND Saudi Arabia Medical issues OR bioethics AND Saudi Arabia. In addition to applying Boolean operators, National Center for Biotechnology Information (NCBI) filters were applied. This allowed to search for articles by type, year(s) of interest, species (i.e., humans), age, language, and other filters. The two search strings used for the PubMed database are presented in Table 1. An independent librarian at Prince Sultan Military College of Health Sciences (PSMCHS) reviewed and validated the final search strategies.

Selection process

The database was searched between December 2020 and June 2021. The first author originally made the selection. The second author then checked all selection results for inclusion and exclusion criteria. To reach a consensus, discrepancies were discussed and successfully resolved through discussion with the third author. The search and report process followed the statement and flowchart of Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Fig. 1). The full texts of potentially eligible records were retrieved and independently assessed for eligibility by the first and second authors.

Results

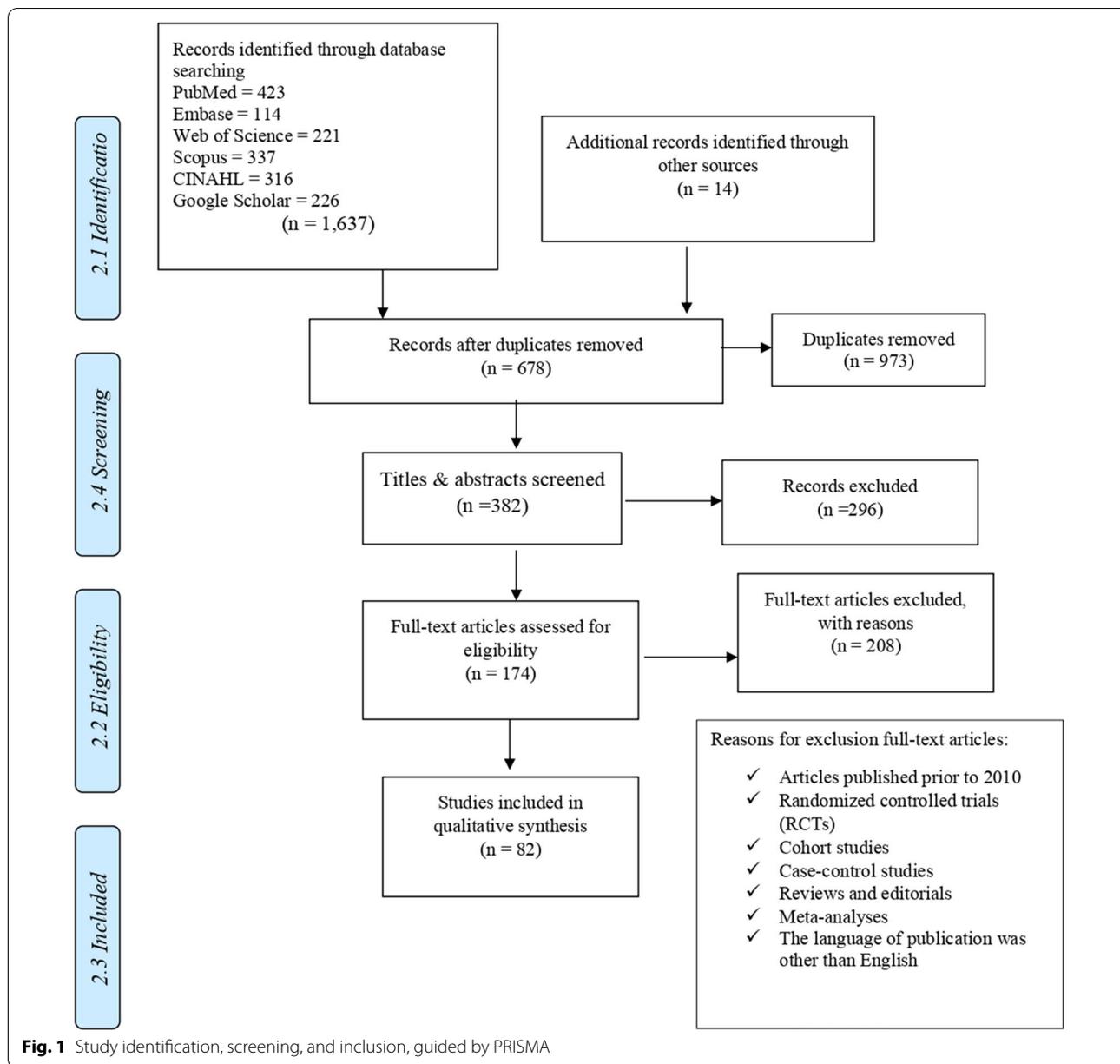
The database search resulted in 1,637 studies. Fourteen articles were included, sourced from the reference lists identified through the original database search. After removing duplicates (973), the relevant articles and publications were selected in two stages. During the first stage, the titles and abstracts of the articles were screened, and non-relevant articles were excluded (296). In the second stage, the full text of included studies was explored. Articles published before 2010, randomized controlled trials, cohort studies, case-control studies, reviews and editorials, meta-analyses, and publication language was other than English were excluded (208). As a result, 82 studies were selected for a final review and assessment (Fig. 1).

Data extraction

The following data items were extracted from the included studies and reported in Table 2: (1) author and year of publication of the study; (2) study setting, sample size, and characteristics of participants; (3) main findings of the research. An additional column has been added to show the definition and rules of the given bioethics domain in the Saudi setting (Table 2).

Overall research trends analysis

The total number of publications and citations of the medical ethics literature, based on study objectives, from 2010 to 2021 are shown in Fig. 2. The first five years (2010–2015) have observed little progress, and in 2011 there was no publication as such. However, the highest number of citations falls on articles published from 2010 to 2013. Although since 2017, the growth of publications has been gradually increasing, the number of citations has decreased from 2017 to 2021, with most of the publications having 0 citations. The publications peaked in 2020 (TP = 15), and the number of citations peaked in 2012 (TC = 138).



Thematic analysis of published articles

The thematic evaluation of five domains included in this research showed that the most publications were produced focusing on ‘Organ Donation & Transplantation’ with 33 articles, followed by ‘Doctor-Patient Relations’ with 18 publications (Fig. 3). The lowest publications were associated with ‘Medical Ethics Curriculum’ with ten articles. Furthermore, Fig. 3 shows the shift of ‘Do-Not-Resuscitate’ research streams with the highest number of publications released in 2019 and 2020.

Most productive provinces on medical ethics research

Figure 4 presents data on the publication of articles on medical ethics in Saudi Arabia and its provinces. The number of articles targeting Saudis from all provinces of the Kingdom was 17. The Central Province emerged the first in the number of publications (33), followed by the Western province with 16 publications. The Eastern and Southern provinces issued eight articles each, half the number of Western and Central Provinces. Although residents of the Northern province have been included in the articles targeting Saudis from all provinces, no

Table 2 Synthesis of included studies following domains

Definition of domain	Author	Study setting	Findings
<p><i>Medical ethics curriculum in Saudi Arabia</i></p> <p>Ethics is an emerging discipline in many medical schools in the Islamic world, being taught in some schools by non-specialists with limited experience in teaching ethics and not housed in proper ethics departments. Teaching medical ethics at the undergraduate level will expand the knowledge of the standards of professional conduct and prepare the graduates to face the ethical dilemmas arising from progressive advances in medical practice and science applications. In the Islamic world, medical school curricula should contain a study of the Islamic code of medical ethics. Islamic law is a compendium of ethics, morality, and legal rules. Islam considers medical ethics the same as ethics in other aspects of life. The syllabus should be logical and practical, parallel to the basic medical study program (Chamsi-Pasha & Al-Bar, 2016)</p>	Al-Haqwi, and Al-Shehri [22]	Medical students (n = 41) from Riyadh	<p>Strong agreement on the importance of learning the principles of medical ethics</p> <p>To a lesser extent, the contents of the course were relevant to Saudi culture</p> <p>A disagreement with the view that medical ethics was just common sense</p> <p>Participants could not decide whether the assessment methods were appropriate or not</p> <p>None of the students had received ethics courses in their basic study</p> <p>Only a few attended training courses about medical ethics</p> <p>The majority recognized that disclosure of patient information by a doctor is allowed if it would be beneficial to the society</p> <p>The majority wrongly mentioned that patient information can be disclosed to a third party without the patient's consent</p> <p>The majority were satisfied with the course and timing of medical ethics</p> <p>The method of instruction should be changed to case-based teaching</p> <p>Ethical issues based on Islamic <i>Fiqh</i> should continue to be discussed</p> <p>The majority wished to discuss issues related to the doctor-patient relationship and professionalism</p> <p>Preferred topics were brain death, organ transplantation, cosmetic surgery, abortion, terminal care, reproduction, doctors' rights, end-of-life issues, and medical errors</p> <p>All schools had a curriculum dedicated to medical ethics</p>
	Darwish and Sabra [23]	Medical students (n = 164) from Dammam	
	Alughaitheer et al. [24]	Medical students (n = 250) from Riyadh	
	Al Kabba et al. [25]	14 public medical schools in Saudi Arabia	

Table 2 (continued)

Definition of domain	Author	Study setting	Findings
			<p>Six schools had no ethics departments; three had a separate ethics department, five taught ethics as part of another department—family or community medicine</p> <p>Thirteen schools made learning medical ethics compulsory for students; five schools had taught ethics as an independent course; four as part of another course</p> <p>Lack of guidance on how to develop a uniform curriculum that addresses both the religious aspects and the practical professional aspects that are sourced from western or other non-Islamic sources to prepare the graduates to practice in non-Muslim countries, as well as dealing with non-Muslim patients</p> <p>Medical licensing bodies should establish benchmarks to guide the medical schools in the formulation of their curricula</p> <p>The majority believed in the ineffectiveness of patient's rights</p> <p>Half of the sample had perceptual knowledge about the Saudi Patient's Bill of Rights (PBR)</p> <p>Only a few participants knew some items of PBR</p> <p>Only one course within the curriculum was related to patient's rights</p> <p>Participants could recognize the ethical issues indirectly reflecting moral sensitivity</p> <p>The majority were able to utilize the ethical principles they learned during the course and apply these principles for the analyses of the cases</p> <p>Participants were able to recognize, analyze, and criticize unethical and unprofessional behaviors</p> <p>Participants had less experience in issues such as end-of-life, brain death, assisted reproduction, DNR</p> <p>The majority agreed that ethics should be taught in the residency curriculum</p> <p>Less than half agreed that there were no right/wrong answers to ethical questions</p> <p>The majority agreed that ethics is a discipline with its methods, literature, vocabulary, and content</p> <p>The majority disagreed with the statement that training in ethics did not help residents deal with ethical conflicts</p> <p>Only a few of participants agreed that the training was adequate to handle the ethical conflicts they were likely to face</p>
	El-Sobkey et al. [26]	Health professions' students (n = 239) from Riyadh	
	Alyousefi et al. [27]	Students (n = 247) from Riyadh	
	Ghamri and Al-Raddadi [28]	Residents (n = 88) from Jeddah	

Table 2 (continued)

Definition of domain	Author	Study setting	Findings
	AbuAbah et al. [29]	Doctors (n = 200) from Riyadh	The majority received only theoretical teaching on ethics during medical school Theoretical teaching does not address the practical dilemma after graduation The majority knew about the policy on DNR decision making, orders, and documentation A lack of knowledge about organ donation regulations, withholding or stopping mechanical ventilation, conflict with family, and advice from the ethics committee The majority required clear guidelines to make appropriate ethical decisions More than half of the participants understood the concept of brain death Uncertainty on whether brain death was synonymous with the patient demise The majority was aware of the importance of organ donation
	Alnajjar et al. [30]	Students (n = 113) from Jeddah	A lack of knowledge in research ethics and need to attend courses/ workshops The importance of teaching research ethics as a mandatory course and training all specialists in research ethics Positive attitudes towards ethics committees to review human research projects
<i>Doctor-patient relations</i> At the core of any successful doctor-patient interaction is trust. Integrity and honesty are necessary to achieve the trust of patients. Patients do not expect perfection in their care providers but need to know that their doctor is reliable and trustworthy. As communicators, doctors effectively facilitate the doctor-patient relationship and the dynamic exchanges before, during, and after the medical encounter (Saudi Commission for Health Specialties, 2015)	Alotaibi et al. [31]	Dental researchers (n = 660) from dental colleges of Saudi Arabia	More than three quarters of patients and one-third of doctors and nurses did not know about PBR
	Alghanim [32]	Patients, doctors, and nurses (n = 799) from Riyadh	Those who knew about PBR had little knowledge about the bill contents Health personnel dissatisfaction, insufficient number of staff, and lack of essential facilities in primary health care centers were obstacles in implementing PBR Almost half of the participants had little knowledge regarding medical ethics in general Nurses reported more significant knowledge of medical ethics compared to doctors
	Al Qarny et al. [33]	Health care workers (n = 224) from Taif	

Table 2 (continued)

Definition of domain	Author	Study setting	Findings
			<p>The majority knew that every patient must be treated with honesty and dignity</p> <p>Illegal pregnancy abortion cannot be recommended</p> <p>Patients with high socioeconomic class should not be treated with special care</p> <p>The majority knew that confidentiality should be kept and the patient should always be told if something was wrong</p> <p>Children should never be treated without the consent of their parents or guardians (except in an emergency)</p> <p>Almost two-thirds knew that doctors and nurses should not refuse to treat patients who behave violently</p> <p>The majority reported the positive influence of religion on health and in coping with diseases</p> <p>Religion rarely/never causes guilt, anxiety, or other negative emotions that lead to an increased patient suffering</p> <p>Patients frequently used religion to avoid taking responsibility for their health</p> <p>Family doctors were more likely to initiate religious discussions</p> <p>Doctors with intrinsic religiosity were more likely to share their religious views</p> <p>Most doctors did not avoid telling their patients bad news</p> <p>Almost half of the hospital doctors and a third of PHC doctors believed that the patient has the right to know the diagnosis</p> <p>Doctors found it easier to speak to the relatives of patients than the patients</p> <p>Doctors with higher qualifications had lower total scores in breaking bad news</p> <p>All participants indicated that the right to know the name of a doctor, to be treated with care and respect, the right to know treatment alternatives is among patient's rights</p> <p>Most doctors were aware of patients' rights to respect, privacy, and confidentiality</p> <p>A few participants reported that patients' rights were maintained</p> <p>A few participants agreed that patients have the right to access their medical records</p> <p>The majority agreed that unethical behavior occurred in their workplace</p>
	Al-Yousef [34]	Doctors (n = 225) from Riyadh	
	Al-Mohaimed and Sharaf [35]	Doctors (n = 458) from Qassim	
	Saleh and Kherideen [36]	Doctors (n = 246) from Mecca	
	Fayez et al. [37]	Health care workers (n = 370) from four tertiary hospitals in Saudi Arabia	

Table 2 (continued)

Definition of domain	Author	Study setting	Findings
			Confidentiality was compromised, informed consent was not being handled properly, and bad news was not delivered with the care it requires
			Doctors lacking empathy, patient autonomy was not fully respected
			Discrimination at the workplace
			Senior staff does not give enough consideration to ethical issues related to patients
			The residents were more likely to agree that unethical behaviors occur than staff
	Al Shahrani et al. [38]	Patients (n = 72) from Abha	The highest satisfaction rank was with the patient's expectations of treatment results followed by the work environment and reception and doctor-patient relationship
			Patients were delighted with the technical aspects of the treatment
			Most patients were dissatisfied with the explanation of the procedure during treatment
	Al-Zahrani et al. [39]	Primary health care doctors (n = 70) from Riyadh	The majority thought that lack of training, cultural norms, gender difference, and lack of time were the main barriers to applying effective communication with patients
			Using non-verbal cues to communicate with patients were used rarely
			There was no correlation between knowledge and practice of communication skills
			Doctors who consciously applied the communication skills in their practice scored better in daily practice
			Specialized and MBBS/MD doctors were more confident in their self-rating of communication skills
			The majority of residents evaluated their communication skills with lesser self-confidence
			Attendees' satisfaction with doctors' empathy was not high
	Al Ali and Elzubair [40]	Attendees (n = 374) & Doctors (n = 27) from Dammam	Elderly attendees and those with little education indicated greater satisfaction than younger and more educated attendees
			A specialty of the doctor-affected communication and patient satisfaction
			Family doctors were more closely linked to rapport building, psychosocial exchange, and patient-centeredness
			The high professional status of a doctor was positively related to satisfaction with doctors' empathy

Table 2 (continued)

Definition of domain	Author	Study setting	Findings
	Banaser et al. [41]	Adult patients (n = 22) from Riyadh	<p>The majority were optimistic about their experiences in a doctor-patient relationship</p> <p>Many recommended doctors and nurses should improve their interpersonal skills and take a more holistic, patient-centered approach</p> <p>Information provision was problematic for some participants who reported long delays</p> <p>Privacy was a significant area of concern for participants, especially females</p> <p>A high level of patient satisfaction was observed</p> <p>Patients were more satisfied with the treatment received in public than in private hospitals</p> <p>The majority were satisfied with the explanation regarding treatment procedures and prompt answering of their queries in public than private hospitals</p> <p>The overall level of satisfaction in a doctor-patient relationship was less than moderate</p> <p>Patients perceived self-efficacy was significantly associated with the patient's level of satisfaction with the doctor-patient relationship</p> <p>Participants with higher satisfaction with the relationship had a stronger sense of self-efficacy in managing their chronic illnesses</p> <p>Trustworthiness was the item that received the lowest score</p> <p>Agreement with the doctor on the nature of the medical symptoms received the highest score</p>
	Aljughaiman et al. [42]	Adult patients (n = 229) from Dammam	
	Alghabiwi et al. [43]	Adult patients (n = 253) from Riyadh	
	Elagi et al. [44]	General public (n = 830) from Jazan	<p>The majority were aware of the principles and essential role of family medicine, health conditions that family doctors can treat, and conditions they do not treat</p> <p>More than half of participants preferred first to seek health-care from specialists from other specialties</p> <p>Although participants were generally satisfied with having a family doctor involved in their care, only a few had a positive experience with family doctors</p> <p>Nearly a quarter complained of extended visits and long waiting times in family medicine clinics</p> <p>Overall, students demonstrated attitudes that favored patient-centeredness</p>
	Fothan et al. [45]	Medical Students (n = 210) from Riyadh	<p>There were no statistically significant differences identified between students' demographics and Patient-Practitioner Orientation Scale (PPOS) scores</p>

Table 2 (continued)

Definition of domain	Author	Study setting	Findings
	Almoallem et al. [46]	Doctors (n = 455) from Riyadh	<p>Disagreement among patients/family and doctors about treatment decision</p> <p>Treating patients with impaired or uncertain decision making</p> <p>Conflict with administration policies and procedures</p> <p>Scarcity of resources in the clinic</p> <p>Uncertainty whether to disclose the diagnosis to the patient by delivering bad news</p> <p>Conflict on the appropriateness of deciding on a "no-code status" with family or colleagues</p> <p>Improperly taken informed consent</p> <p>Female doctors were less confident about their knowledge of ethics</p>
	Habbash [47]	Resident doctors (n = 210) from Abha	<p>Older residents have higher scores in communication skills</p> <p>The female gender was associated with the best ability to ask questions</p> <p>Years of clinical experience were closely related to better communication skills</p> <p>Communication skills were affected by the level of residency and attendance at training</p> <p>There was a gap in knowledge of medical ethics</p> <p>The aspects of confidentiality were generally well understood</p> <p>Residents responded favorably to questions regarding beneficence and nonmaleficence</p> <p>It was confusing to decide whether to always agree to the patient's wishes or act in the interest of the patient despite their refusal</p> <p>Most participants supported informed consent</p> <p>Lack of knowledge about abortion ethics and legislation</p> <p>Most of the participants agreed to the refusal of examination of a female patient by a male doctor in the absence of a chaperone</p> <p>Negative attitude for earning a commission by referring patients for investigations or taking gifts/ incentives from drug companies</p> <p>Doctors working in public hospitals were more likely to have a higher level of patient trust compared to private hospitals</p>
	Al-Shehri et al. [48]	Resident doctors (n = 261) from Aseer	
	Aljaffary et al. [49]	Patients (n = 345) from Saudi Arabia	

Table 2 (continued)

Definition of domain	Author	Study setting	Findings
<p><i>Informed consent</i></p> <p>Before delivering medical treatment or carrying out an operative procedure, the legally competent patient's consent, be he/she male or female, shall be obtained. The doctor shall provide an adequate explanation to the patient or his/her guardian on the nature of the medical treatment or operative procedure he intends to apply (Saudi Ministry of Health, 1988)</p>	Al Qarny et al. [33]	Health care workers (n = 224) from Taif	<p>Patients with "good" self-assessment health status showed a higher level of trust</p> <p>Patients who were treated in private hospitals had a significantly lower score of self-assessment health status than those who were treated in public hospitals</p> <p>Support for informed consent by health care workers</p>
	Abolfotouh and Adlan [50]	Adult patients (n = 162) from Riyadh	<p>Most participants knew that patients should always be told if something was wrong</p> <p>Children should never be treated without the permission of their parents or guardians (except in an emergency)</p> <p>Almost two-thirds of participants knew that patients not only need to consent for operations but also for tests and medications</p> <p>The overall attitude towards informed consent was positive</p> <p>Poor quality of informed consent in terms of experience with the informed consent processes and the transparent delivery of information regarding risks</p> <p>More than half of the study sample trusted the doctor to decide on behalf of them</p> <p>Many participants were not interested in obtaining a copy of the informed consent</p> <p>Quality of scholarly consent score was higher when explained by the doctor and among younger patients</p> <p>The majority could recognize the meaning of general and specific consent</p>
	Darwish and Sabra [51]	Medical interns (n = 87) from Dammam	<p>The majority agreed that consent should be given for each new procedure and should be perceived as a continuing process rather than a one-off decision</p> <p>The majority decided that surgeons could exceed the consent in case of emergencies and the absence of a guardian</p> <p>Less than half of the participants agreed that the patient is allowed to look into his medical record or take a copy of it if asked for that</p>

Table 2 (continued)

Definition of domain	Author	Study setting	Findings
	Fayez et al. [37]	Health care workers (n = 370) from four tertiary hospitals in Saudi Arabia	The majority agreed that unethical behavior occurred in their workplace The confidentiality of patients was compromised Informed consent not handled properly
	Hammami et al. [52]	Adult patients (n = 488) from Riyadh	The informed consent process was essential to patients Males, pre-procedure, and older patients more favor a self-decision-making purpose Females and post-procedure patients more turn an information disclosure purpose More self-decision-making and more effective information disclosure was desired Mill's autonomy model of informed consent is preferred, which may be suitable for most patients, especially males and older patients Some patients showed a degree of dissatisfaction with the informed consent process
	Almohaimede et al. [53]	Patients (n = 138) from Riyadh	Dissatisfaction among patients regarding the experience of the informed consent process Lack of knowledge about the risks of the intervention and alternative management Half of the participants wished to be involved in decision-making One third had no time to comprehend the information provided A higher quality of informed consent was predicted when explained by the doctor About half of the participants believed that their decision was not necessary because the doctor had already decided for them
	Alsaihati et al. [54]	Surgeons (n = 140) from Saudi Arabia	Participants had acceptable knowledge about informed surgical consent The majority did not give full details to patients about the procedure before taking consent There was a careless approach in the consent process among surgeons Some considered consent as only a pre-operative routine or just signing the paper Some believed that the consent process is strange to Saudi psychology The majority were against applying for a license during all surgical procedure

Table 2 (continued)

Definition of domain	Author	Study setting	Findings
	Mahrous [55]	Patients or family members (n = 176) from Madinah	<p>There is a low level of awareness of patients' rights</p> <p>The consent form followed by complaint registration against a service provided was the best-known patients' rights variable</p> <p>About half of the sample had never heard about patients' rights</p> <p>More males, compared to females, signed a consent form upon hospital admission</p> <p>The majority had experience in obtaining informed consent for a surgical procedure</p> <p>Senior doctors were the main doctors taking informed consent from patients</p> <p>Interns were least exposed to observing surgical procedures than other team members</p> <p>Interns were the least comfortable while taking consent</p> <p>Participants considered parental consent mandatory and necessary from the moment the child is admitted to the hospital and during treatment</p> <p>Consent should be easily understandable and have the required information decision</p> <p>Obtaining consent from the child's father reflects a cultural difference between Saudi Arabia and other Middle Eastern countries</p> <p>About 30% of cosmetic procedures were performed without taking informed consent</p> <p>Quality of informed consent was generally poor, both in content and administration</p> <p>Issues related to lack or poor consent are getting focused only when the procedure ends up with adverse events or non-satisfactions but without actual association</p> <p>The majority preferred both parents to give consent, followed by either parent without differentiation between parents</p> <p>The majority preferred that parental consent forms be detailed enough to obtain the maximum information</p> <p>The majority preferred that the form seeking to obtain the permission of the child be short, not to increase the burden on the child since the decision belongs to the parents</p> <p>Most participants preferred to rely on a child's level of maturity rather than having reached a certain age so that they could give consent</p>
	Basharaheel et al. [56]	Surgical doctors (n = 188) from Jeddah	
	Alahmad et al. [57]	Nurses (n = 17) from Riyadh and Jeddah	
	Alsaidan et al. [58]	Patients (n = 246) from Al-Kharj	
	Alahmad et al. [59]	Doctors, nurses, parents, and medical students (n = 400) from Dammam, Riyadh, and Jeddah	

Table 2 (continued)

Definition of domain	Author	Study setting	Findings
<i>Do-not-resuscitate</i> <i>Fatwa</i> 12,086: this <i>fatwa</i> stipulates that judging resuscitative efforts to be of no avail and issuing a do-not-resuscitate (DNR) order is done by three "specialized and trustworthy" doctors and that the patient's family or legal guardian is not to be consulted when it comes to issuing the order (General Presidency of Scholarly Research and Ifta in Riyadh, 1998)	Aljohaney and Bawazir [60]	Residents (n = 157) from Jeddah, Makkah, Madinah, and Taif	A few participants considered the age of 13–14 suitable for a child to give a consent Most residents participated in DNR discussions with patients and family or surrogate decision-makers
	Amoudi et al. [61]	Interns and residents (n = 140) from Jeddah	The most common limitation to meaningful DNR discussions was a lack of understanding of the patient, the patient's family, or surrogate, followed by inadequate training Most residents believed that additional educational programs would enhance their competence in addressing issues related to DNR discussions Need for a structured curriculum to teach skills relating to end-of-life issues such as DNR orders to residents in the Saudi medical system A lack of familiarity with DNR policies in local hospitals Residents were more familiar with DNR Participants failed to affirm whether a clear local or national DNR policy exists Participants believed that the patient should be part of the decision-making process Half of the participants could define DNR order The majority required more in-depth knowledge The opinion of the participants regarding the compatibility of DNR order in terms of religion and ethics was divided due to ethical, religious, and medical factors
	Al Sheefet al. [62]	Outpatients/caregivers (n = 307) from Riyadh	

Table 2 (continued)

Definition of domain	Author	Study setting	Findings
	Gouda et al. [63]	ER & ICU doctors (n = 112) from Riyadh	<p>Most of the participants were aware of the existence of the DNR policy</p> <p>Two-thirds of the participants did not read the detailed policy</p> <p>The majority were in favor of having a DNR for themselves in case of a terminal illness</p> <p>The majority preferred the DNR order to be a doctor-directed decision</p> <p>Every patient should have advance directives</p> <p>The most important barriers for initializing and discussing DNR were lack of patient understanding, level of education, and the cultural background of patients</p> <p>Most Muslim doctors believe that DNR is not against Islamic rules</p>
	Madadin et al. [64]	ICU doctors (n = 42) from Al Khobar	<p>Participants were aware that DNR in Saudi Arabia is legal</p> <p>Cultural standards and religious beliefs do play a role in their decision-making but had less of an effect as compared to other clinical data such as comorbidities, age, and previous ICU admissions</p>
	Baharoon et al. [65]	Patients (n = 300) from Riyadh	<p>A lack of knowledge of the medical condition, advanced planning, and life support</p> <p>A will to participate in end-of-life care planning discussions with doctors</p> <p>The majority were able to make intelligent judgments about end-of-life decisions</p> <p>Limited knowledge of CPR or mechanical ventilation</p> <p>90% of participants formed an opinion about the desirability of intensive care</p> <p>Most participants wanted to be involved in the decision-making on DNR</p>
	Kaneetah et al. [66]	Adult patients and the general public (n = 1,693) from Mecca	<p>The majority had a lack of knowledge about the DNR practice</p> <p>A background in medicine and knowledge about DNR was associated with the acceptance of DNR</p> <p>The most common reasons for refusal DNR were of hope and religious concern</p>

Table 2 (continued)

Definition of domain	Author	Study setting	Findings
	Alsaati et al. [67]	Medical students (n = 429) from Jeddah	<p>The majority believed that there is a <i>Fatwa</i> that regulates DNR on the Islamic level</p> <p>Most of the participants were familiar with the DNR order</p> <p>Lectures in the medical schools on DNR were the primary source of information</p> <p>The majority of participants were not sure if there is a clear policy concerning DNR policy at King Abdulaziz University Hospital (KAUH) in Jeddah</p> <p>Lack of DNR understanding in patients and their families is one of the most important barriers that impede an effective DNR discussion</p> <p>The majority strongly agreed that patients should be involved in DNR decisions</p> <p>DNR orders were associated with a reduction in doctors providing clinical care</p> <p>The drop-in care after DNR was seen only among doctors rather than nurses</p> <p>Doctors need more insight into the true goals of DNR orders and should not equate them with withholding other therapeutic interventions</p> <p>Participants with higher educational levels were more familiar with the DNR term</p> <p>DNR was poorly understood due to religious and cultural factors</p> <p>There were no significant differences among age, gender, and responder status</p> <p>The majority of participants chose doctors like the one responsible for the DNR decision</p>
	Al Farhan et al. [68]	Patients (n = 72) from Riyadh	<p>The majority could not define DNR correctly</p> <p>DNR policy and procedure were not clear to them</p> <p>Half of the participants believed that DNR was a doctor's decision</p> <p>The majority felt that patients had the right to intensive care, despite terminal illness</p> <p>A few of samples reported that they would be comfortable discussing DNR with parents</p>
	Al Ahmadi et al. [69]	Participants (n = 400) from Jeddah	<p>DNR was poorly understood due to religious and cultural factors</p> <p>There were no significant differences among age, gender, and responder status</p> <p>The majority of participants chose doctors like the one responsible for the DNR decision</p>
	Aljethaily et al. [70]	Pediatricians (n = 203) from Riyadh	<p>DNR was poorly understood due to religious and cultural factors</p> <p>There were no significant differences among age, gender, and responder status</p> <p>The majority of participants chose doctors like the one responsible for the DNR decision</p> <p>The majority could not define DNR correctly</p> <p>DNR policy and procedure were not clear to them</p> <p>Half of the participants believed that DNR was a doctor's decision</p> <p>The majority felt that patients had the right to intensive care, despite terminal illness</p> <p>A few of samples reported that they would be comfortable discussing DNR with parents</p>

Table 2 (continued)

Definition of domain	Author	Study setting	Findings
	Almoallem et al. [46]	Doctors (n = 455) from Riyadh	<p>Non-Saudi doctors deciding on life-sustaining treatment or DNR consulted with the ethical committees more frequently than Saudi doctors</p> <p>Doctors who received their education and postgraduate training abroad were confident about their ethics knowledge in medical practice but had less confidence in making decisions about life-sustaining treatment or DNR orders</p> <p>Consultants compared with non-consultants had more knowledge about ethics, less conflict with family, and were at ease in making decisions about DNR or end-of-life</p> <p>Female doctors were less confident about making decisions about life-sustaining treatment or a DNR order</p> <p>Most of the nurses wanted there to be a legal basis for DNR policies</p> <p>The majority stated that they wanted to know more about patients' rights regarding the end-of-life and use of the DNR order</p> <p>The majority agreed that DNR orders support the treatment plan for terminally ill patients</p>
	Abu Yahya et al. [71]	Nurses (n = 157) from Riyadh	<p>Participant from rural areas was less likely to have information about organ donation than their counterparts in urban areas</p>
<p><i>Organ donation & transplantation</i></p> <p><i>Fatwa</i> No. 99: The Saudi Grand Ulema (1982) addressed the subject of organ transplants, which was unanimously sanctioned. It also sanctioned (by the majority) the donation of organs both by the living and by the dead, who made a will or testament, or by the consent of the relatives (who constitute the Islamic next of kin). The regulations in Saudi Arabia initially restricted genetically related donors or spouses, but many of these restrictions were later removed (Saudi Grand Ulema, 1982)</p>	Alghanim [72]	Residents (n = 897) from Saudi Arabia	<p>More than half of the rural respondents and more than 40% of the respondents living in the urban areas were not willing to donate organs and sign organ donation cards</p> <p>The main source of information about organ donation was a TV</p> <p>The majority reported that the contribution of health care providers in providing them with knowledge about organ donation and transplantation was "none" or "little"</p> <p>Reasons for refusal to donate were worries about receiving inadequate health care after donation, lack of family support, lack of incentives, not enough information about organ donation, fear of complications after organ donation, religion</p>

Table 2 (continued)

Definition of domain	Author	Study setting	Findings
	Hamdami et al. [73]	Adults (n = 698) in the outpatient setting from Riyadh	<p>Most respondents were in favor of posthumous organ donation</p> <p>The mandated choice system was the most preferred</p> <p>The presumed consent system was the least preferred</p> <p>Financial and medical incentives had a negative effect with a predominance of altruistic motives and belief in the sanctity of the body</p> <p>No association between favoring a consenting system and age, perceived health status, education level, or knowing an organ donor or recipient</p> <p>The level of awareness of transplantation and organ donation was high</p> <p>The main obstacle related to the concept that having one kidney may only expose the donor to potential medical problems</p> <p>Religion was not an obstacle</p> <p>Almost one-third of the participants reported that they had insufficient information about organ donation and transplantation</p> <p>No significant association of the willingness to donate with gender or age</p> <p>The main source of information regarding organ donation was media, mainly television</p> <p>Participants who did not encourage organ donation were concerned about fearing complications and not receiving adequate health care after donation</p> <p>The majority knew well which organs could be donated</p> <p>There was a lack of knowledge about the regulations and legislation of organ donation</p> <p>The majority were willing to donate organs with no significant differences in males and females</p> <p>Religion, money, and age of the recipient appeared to have no role in their will of organ donation</p> <p>Participants believed that governmental incentives in the form of monetary and health treatment for donor families and awards would be effective in promoting organ donation</p>
	Mohamed and Guella [74]	Adults (n = 497) from Dhahran	
	Harthi and Alzahrany [75]	Students (n = 400) from Taif	
	Soubhanmeyaz et al. [76]	Adults (n = 461) from the Western province	

Table 2 (continued)

Definition of domain	Author	Study setting	Findings
	Almohsen et al. [77]	Students (n = 195) from Qassim	<p>The primary source of knowledge on organ donation was a television</p> <p>The majority believed that there is low public awareness regarding the subject</p> <p>One-third of students knew about organ donation cards, but none had signed, due to fear of side effects</p> <p>There were misconceptions of the Islamic perspective, resulting in fewer donors</p> <p>Medical students showed higher knowledge about organ donation cards and the effectiveness of transplantation as treatment compared to non-medical students</p> <p>The majority (92.4%) did not know the religious point of view about brain death and had not heard of any existing decree or <i>Fatwa</i> regarding brain death in Saudi Arabia</p> <p>Almost half would accept the concept of brain death if one of their relatives had it</p> <p>The majority received their information about brain death from the media</p> <p>The majority had the impression that there is no difference between brain death and natural death</p> <p>The majority received information about organ donation from TV and social media</p>
	Al Bshabshe et al. [78]	Students (n = 873) from Abha	<p>The contribution of healthcare providers as a source of information was minimal</p> <p>An increase in the knowledge of the religious legislation (<i>Fatwa</i>) of organ donation</p> <p>More than half of the participants were willing to donate their organs</p> <p>Reasons for refusal were poor knowledge about organ donation, insufficient support of healthcare providers, religion, lack of family support, and fear of operations</p> <p>Participants accepted the concept of organ donation and were willing to donate</p> <p>Concerns remain on heart donation</p> <p>Almost a third of participants expressed a fear that healthcare professionals may make less effort to save the lives of potential donors</p>
	Hajjar et al. [79]	Social media users (n = 913) from Saudi Arabia	
	AlHabeeb et al. [80]	Adults (n = 1298) in 18 cities of Saudi Arabia	

Table 2 (continued)

Definition of domain	Author	Study setting	Findings
	Elsafi et al. [81]	Allied health students (n = 434) from Dhahran	<p>Overall knowledge of organ donation was adequate</p> <p>The majority were willing to be living donors for their families</p> <p>A few participants supported deceased organ donation and thought about an organ donation card</p> <p>The most frequent cause of refusal to donate organs was the mistrust of medical staff regarding brain death diagnosis</p> <p>Bodily concerns and religion were additional concerns</p> <p>Quite a few of respondents supported commercial donation</p> <p>The reason to donate organs was to help others and sympathy</p> <p>The main source of information was television, relatives/friends, and the Internet</p> <p>The majority showed a positive attitude towards organ donation</p> <p>There were few misconceptions and a lack of knowledge about organ donation, such as organ grafting from a male to a female or vice versa</p> <p>The two-thirds were in favor of brain-dead patients donating their organs</p> <p>Less than half were ready to donate their organs</p> <p>Reasons of refusal to donate were family consent; some wanted to keep all their organs intact, religion and medical history</p> <p>The majority knew about organ donation from the media</p> <p>Nearly half of the respondents believed that religion does not allow for organ donation</p> <p>Less than 3% knew the correct place to go for organ donation</p> <p>Participants with more knowledge were more willing to donate their organs</p> <p>The knowledge regarding brain death and organ donation was found to be poor</p> <p>More than half of the participants have not heard about the term 'brain death'</p> <p>Less than half of participants were in favor of organ donation from a brain-dead person, ready to donate the organs of a family member or a relative who is brain dead, willing to donate their organs</p>
	Sayedalamn et al. [82]	Students (n = 481) from Jeddah	
	Agrawal et al. [83]	Adults (n = 403) from Al-Kharj	
	Al Bshabsho et al. [84]	Students (n = 649) from the Southern province	

Table 2 (continued)

Definition of domain	Author	Study setting	Findings
	Al-Hussain et al. [85]	Adults (n = 409) from Riyadh	<p>More than half of the participants were aware of brain death</p> <p>The majority stated that it was acceptable to donate, according to religion</p> <p>More than half would agree to donate their organs in case of brain death</p> <p>The majority would donate their organs without discussing them with families or friends</p> <p>The level of organ donation awareness was high</p> <p>Organ donation awareness was found to be more in females, educated individuals, those with higher socioeconomic status, and married participants</p> <p>More than half of the sample expressed willingness to donate brain-dead relatives' organs</p> <p>Reasons for refusal to donate were body disfigurement, religion, unawareness, and family disagreement</p> <p>The majority has sufficient knowledge of organ donation and transplantation</p> <p>The degree of awareness positively impacted the willingness to donate</p> <p>Commonly cited the reason as a barrier to donation after death was the fear of premature termination of medical treatment to facilitate organ retrieval and transplantation</p> <p>Females scored higher than males in both the awareness and altruism</p> <p>The majority knew the concept and procedure of organ donation</p> <p>The majority agreed to sign donation cards by reasons of faith, good deed, importance of donation, and belief that organs are not beneficial after death</p> <p>Religion was not a barrier</p> <p>There was a lack of awareness about the Saudi Center for Organ Transplantation (SCOT)</p> <p>Participants showed an acceptable level of awareness about organ donation</p> <p>A generally positive attitude towards organ donation for any person regardless of age, religion, mental status, or health status</p> <p>Doctors' role as a source of information was poor</p> <p>Internet and mass media played the highest role as a source of information</p>
	Almufleh et al. [86]	Residents (n = 2,596) from Riyadh	
	AlHejaili et al. [87]	Students (n = 821) from Saudi Arabia	
	Alsharidah et al. [88]	Adult Saudis (n = 648) from Riyadh	
	Aziz et al. [89]	Adults (n = 350) from Aseer	

Table 2 (continued)

Definition of domain	Author	Study setting	Findings
	Alruwaili et al. [90]	Paramedical and medical students (n = 350) from Saudi Arabia	Eye donation awareness and willingness to donate are generally low in Saudi Arabia Less than 7% of medical students knew of the existence of eye banks
	Hazzazi et al. [91]	Students (n = 744) from Jazan	A lack of knowledge on hematopoietic stem cell transplantation (HSCT) Participants who registered in the Saudi stem cell donor registry (SSCDR) had better knowledge and attitudes towards HSCT than unregistered participants Long-term side effects of HSCT were the most common concern of the participants The time commitment was the main concern of the registered students
	Alnasyan et al. [92]	Adults (n = 1453) from Saudi Arabia	A positive attitude toward organ donation among the majority High rate of willingness to donate correlated to the high rate of educated participants The majority believed that consent should be acquired from the donor
	Alanazi et al. [93]	Residents (n = 1292) from Saudi Arabia	The level of knowledge about SCOT was as low as 12.6% The majority had no sufficient information about corneal donation and did not know how or where to apply to register as a cornea donor A significant correlation between participants' knowledge and willingness to donate The largest perceived barrier was the lack of information on where to donate or register as donors
	Almutairi [94]	Students (n = 425) from Central province	The main motive to donate was the religious belief of doing good and being charitable with their organs Medicine and physiotherapy students in their final year scored higher knowledge, attitudes, and willingness towards organ donation compared to dentistry, nursing, and paramedical counterparts
	Alnajjar et al. [30]	Students (n = 113) from Jeddah	Females scored higher than males in all the three domains of knowledge, attitude, and willingness toward organ donation The majority were aware of the importance of organ donation More than half of the participants expressed a willingness to donate the organs of family members if they were to be diagnosed with brain death

Table 2 (continued)

Definition of domain	Author	Study setting	Findings
	Albrahim and Jindan [95]	Adults (n = 1001) from Eastern Province	Participants had poor knowledge about corneal donation Less than one-third were favorable to postmortem corneal grafts Religion hindered the willingness to donate in about one-quarter of the sample
	Kazzaz and Dāar [96]	Pediatric intensivists (n = 100) from Central, Eastern, Northern, Western, Southern regions	Low perceived comfort levels in several organ donation competencies Comfort levels were influenced by the participants' frequency of exposure to donation after brain death, the health sector, and region of practice Participants viewed most of the competencies as important to their practice
	Thirunavukkarasu et al. [97]	Students (n = 400) from Jouf	Low comfort levels with competencies were associated with gaps in knowledge The most common organ that can be donated are kidneys, blood, heart, and eyes About two-thirds were not aware of SCOT and its activities The government has to promote organ donation to the public The majority were willing to donate their organs
	Oman et al. [98]	Students (n = 352) from Jeddah, Mecca, and Taif	Common barriers for organ donation were a lack of knowledge, founded and unfounded fear, and refusal from family members Most of the sample had poor knowledge about organ donation Higher knowledge in sixth-year students than second-year students The majority had an appropriate attitude about organ donation
	Altraif et al. [99]	Adults (n = 376) from Riyadh	A correlation between higher educational level, the knowledge of brain-dead donation, and the Islamic point of view More than half have heard about SCOT Health-related occupations showed more awareness about organ donation, SCOT, and willingness to donate their families' organs The main barrier for organ donation was lack of information, belief that organ donation disfigures the body and that donated organs can be misused or abused Most of the respondents preferred donating to young people

Table 2 (continued)

Definition of domain	Author	Study setting	Findings
	Gelidan [100]	Adults (n = 698) from Riyadh	<p>Almost all age groups knew about organ donation after death, with male prevalence</p> <p>Participants with higher education were more aware of organ donation</p> <p>Females were more enthusiastic and had significantly high acceptance of skin donation as compared to males</p> <p>Religious factors were the most common reason to refuse skin donation</p> <p>The majority supported organ donation</p> <p>More than half were willing to donate any organs</p> <p>The majority did not know the organ donation policies</p> <p>The majority showed high levels of knowledge about blood donation but poor knowledge about organ donation</p> <p>The majority of participants showed negative attitudes towards organ donation</p> <p>The main source of knowledge were friends and family</p> <p>Knowledge was depended on the education and occupation</p> <p>Saudi population was willing for organ donation in general and in specific conditions</p> <p>Females were more willing to donate their solid organs than males</p> <p>The donation was more likely among the young population</p>
	Darwish et al. [101]	Adults (n = 1508) from Saudi Arabia	
	Al-Oufi and Alghamdi [102]	Adults (n = 670) from Madinah	
	Bukhari [103]	Adults (n = 1099) from Saudi Arabia	

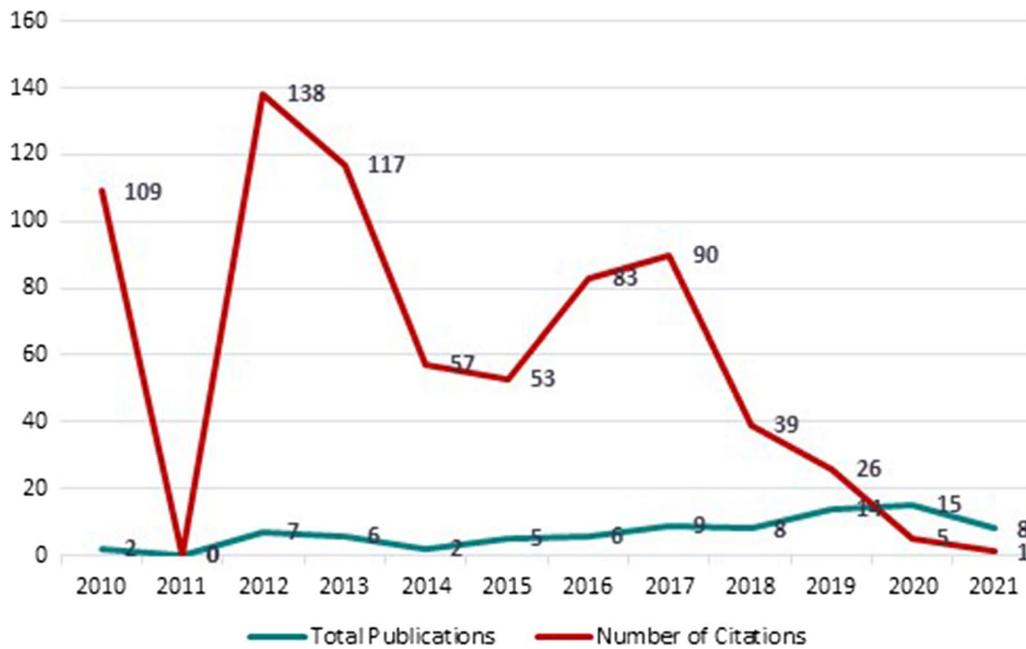


Fig. 2 Publishing and citations patterns of medical ethics articles 2010–2021

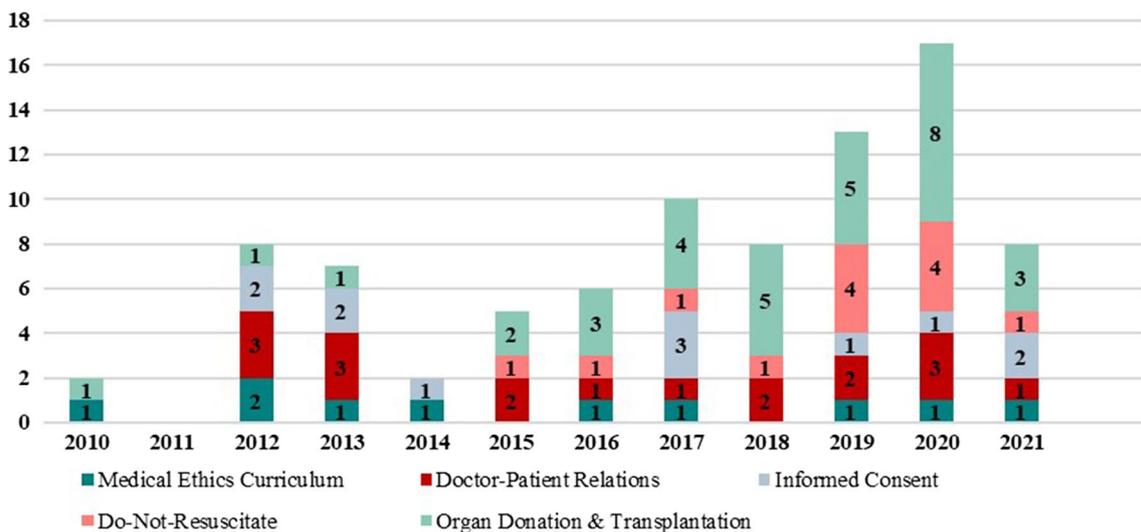


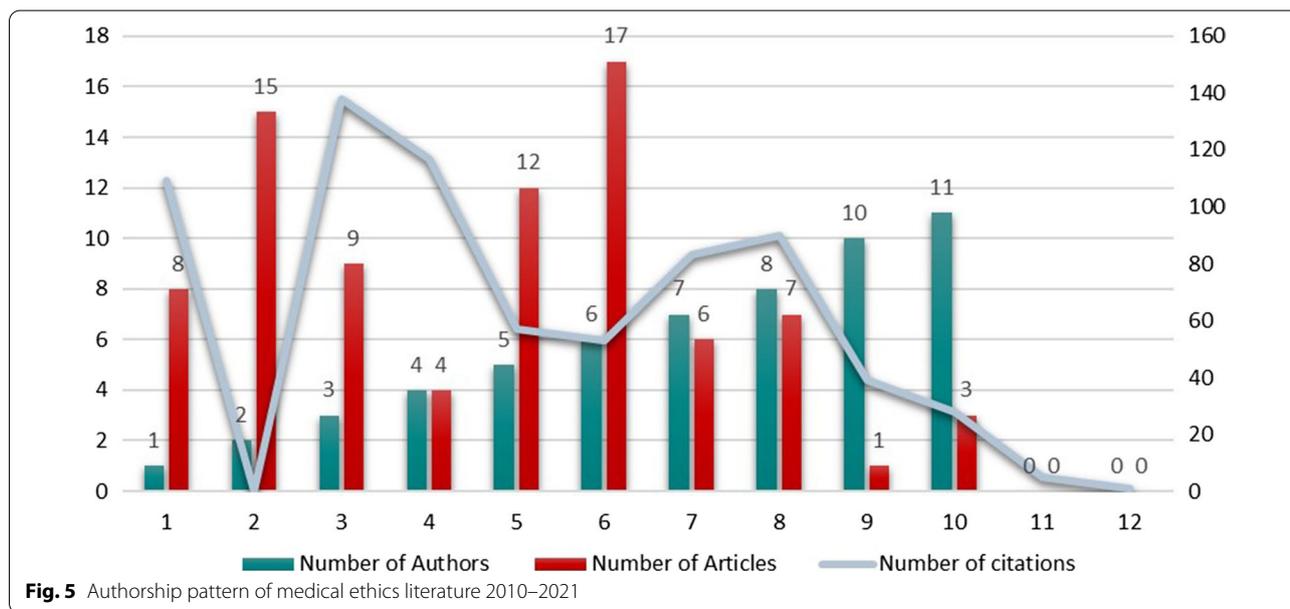
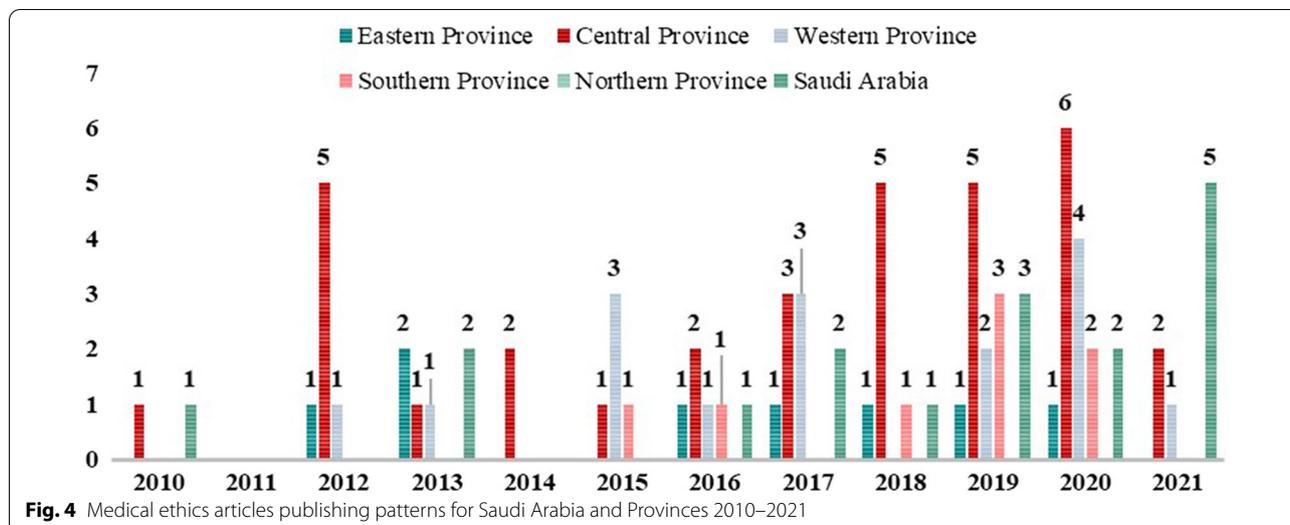
Fig. 3 Thematic analysis medical ethics articles 2010–2021

research has been identified where the target population would be residents of the Northern Borders Province only.

Authorship pattern

Figure 5 shows a sample of authorship of medical ethics articles included in this study. The authorship pattern ranges from a minimum of one author to a maximum

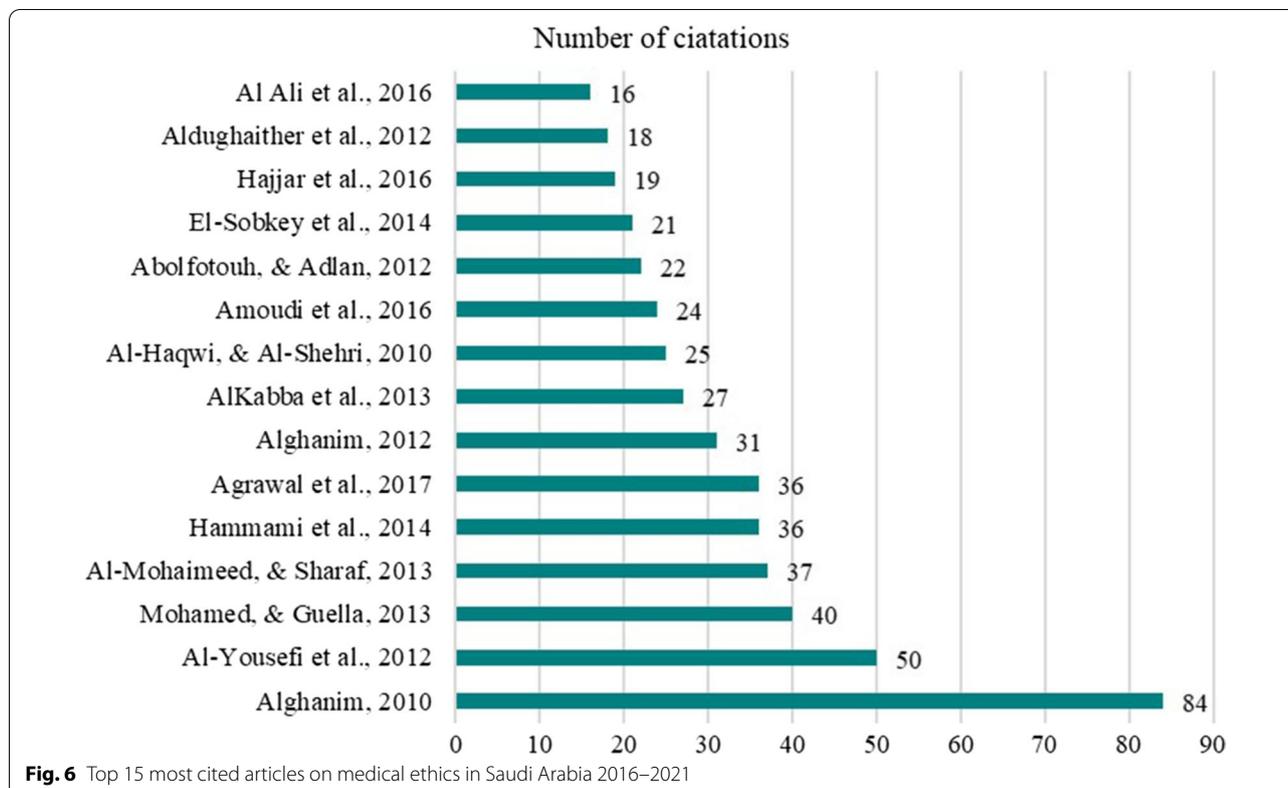
of 11 authors. Overall, these data indicate that medical ethics research has followed a collaborative approach in most cases involving two authors (15) and six authors (17). In addition, there are four publications with ten or more authors.



Highly cited articles on medical ethics research

Figure 6 presents the bibliographic information of the top 15 highly cited medical ethics articles included in this research. The top 15 highly cited articles’ citations and years ranged a maximum of 16 to 84 citations from 2010 to 2016. One article obtained 84 citations by Alghanim, S.A., 2010, entitled “Knowledge and attitudes toward organ donation: a community-based study is comparing rural and urban populations.” This article was followed by an article written by Al-Yousefi, N.A., 2012, entitled “Observations of Muslim doctors regarding the influence of religion on health and their clinical approach.” The article obtained 50 citations. A thematic evaluation

of the five domains included in this study found four articles in each of the following areas were among the most cited: ‘Organ Donation & Transplantation,’ ‘Doctor-Patient Relations,’ and ‘Medical Ethics Curriculum.’ However, despite publication growth in ‘Do-Not-Resuscitate’ research, only one article in this area has appeared on the most-cited list. This article was cited 24 times and was written by Amoudi, A.S., Albar, M.H., Bokhari, A.M., Yahya, S.H. and Merdad, A.A., 2016, entitled “Perspectives of interns and residents toward do-not-resuscitate policies in Saudi Arabia.” Remarkably, 24 of the 82 included articles received zero citations, with 11 published in 2020 and 7 in 2021.



Keyword analysis of medical ethics research in Saudi Arabia

The next cluster of keywords (Fig. 7) demonstrates that the issue was constantly discussed in the studied articles under consideration between 2010 and 2021. Each color represents a separate cluster, and clusters are arranged based on link strength and occurrence. Co-occurrence network of author keywords was a minimum number of occurrences: three (i.e., consent, DNR implementation, medical ethics, patient's rights).

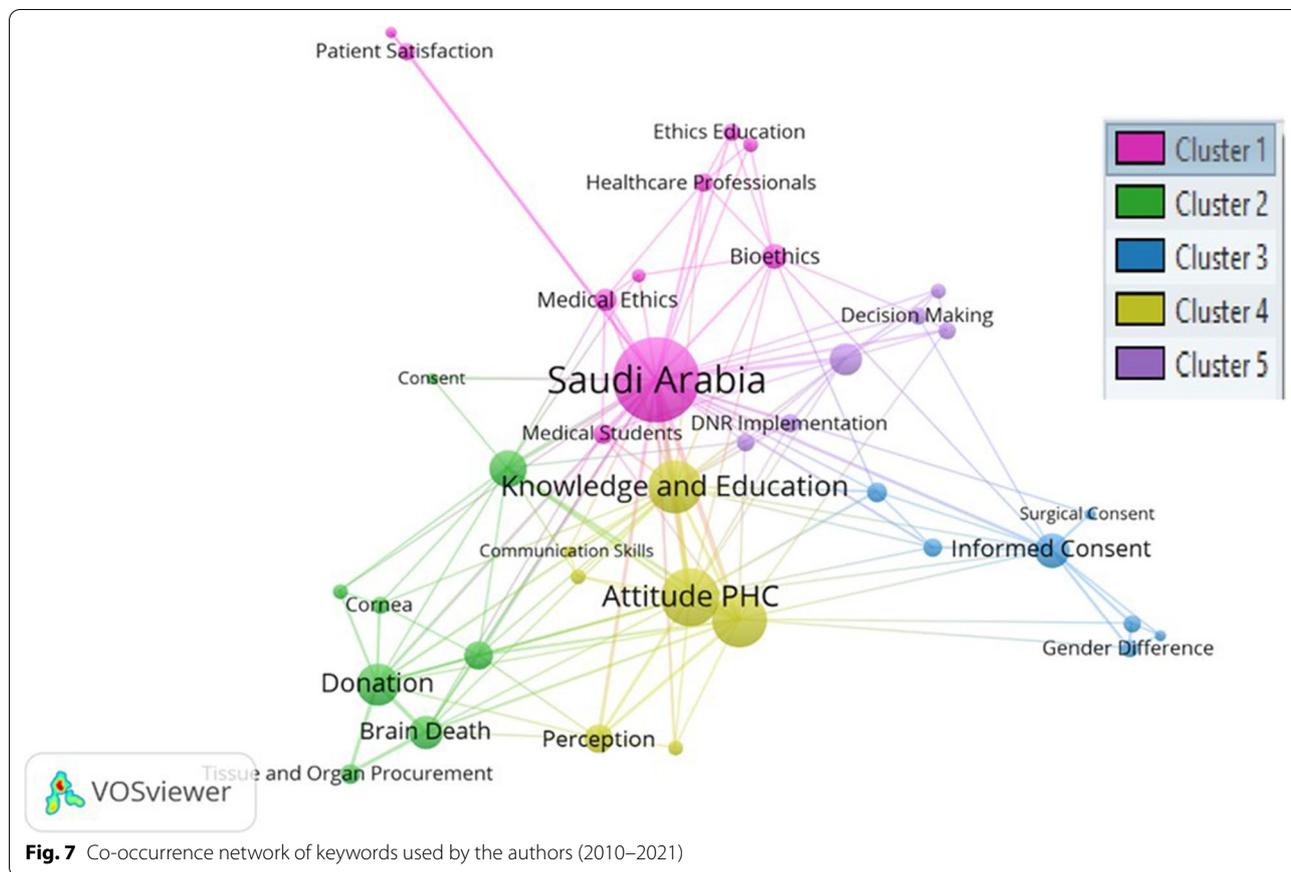
There are five clusters (indicating various colors) having a relationship. Cluster one is the strongest network relationship, followed by 2–5 clusters, respectively. Hence, the size of the bubble indicates the nature of the relationship with link strength and occurrence. The five keywords with the highest total link strength are 'Saudi Arabia' (link strength: 61), 'attitude PHC' (39), 'organ donation' (32), 'knowledge and education' (30), and 'donation' (21). The results confirm the importance of knowledge and education among health care providers and the general public to improve the attitudes towards medical ethics issues and concerns.

Discussion

This systematic review is the first organized synthesis of the five most debated bioethical domains that have been studied in the Kingdom of Saudi Arabia. Eighty-two studies were identified across five main domains for a final review and assessment: 'Medical Ethics Curriculum in Saudi Arabia,' 'Doctor-Patient Relations,' 'Informed Consent,' 'Do-Not-Resuscitate,' 'Organ Donation & Transplantation.' To the authors' knowledge, there are no similar systematic reviews in bioethical research in the Kingdom of Saudi Arabia, and therefore the direct comparison is not possible.

Medical ethics curriculum

In the past two decades, the discussion of bioethical issues in Saudi society has become increasingly important. However, it would be fair to note that there is still limited guidance on teaching and learning bioethics, which will inevitably have a tangible impact on society in the future [1, 2]. Despite the researchers' growing interest in medical ethics, this systematic review has shown that from 2010 to 2021, only ten articles were published studying the 'Medical Ethics Curriculum' in KSA [22–31]. Of these ten articles, the research by El-Sobkey et al. (2014) is in the list of the most cited articles with 21 citations.



Overall synthesis of this domain showed that regardless of the region, target population, most participants in all included studies agreed on the importance of studying the principles of medical ethics as a discipline with its methods, literature, vocabulary, and content [22–31]. Although some participants completed theoretical ethics classes while attending medical school, the theory does not address the practical ethical dilemma faced in daily practice after graduation [25, 27–29, 31].

Thus, there was a lack of knowledge about organ donation regulations, withholding or stopping mechanical ventilation, conflict with family, and advice from the ethics committee, religious aspects, brain death, DNR policies, the existence of the Saudi PBR [23, 24, 26, 27].

The conclusions and recommendations of all included articles were consistent, stating that teaching bioethics is a complex and long-term process that helps graduate and undergraduate students embrace the roots of their culture, knowledge, and principles [22–31]. While there is no single best model for teaching medical ethics, teaching bioethics is essential to educating medical students by developing a comprehensive bioethics curriculum. Students are encouraged to participate in all processes actively [22–31]. The learning outcomes for each activity

should be used as a guide for assessing the adequacy of the bioethics curriculum, together with an assessment of effectiveness.

Doctor-patient relations

The thematic evaluation found that ‘Doctor-Patient Relations’ with 18 publications was the second most studied domain. The synthesis of the included studies on medical ethics knowledge showed that most participants, mainly healthcare representatives had little knowledge about doctor-patient relations [32, 33, 36, 41, 42, 44, 45, 48]. However, there was a strong consensus that every patient should be treated with honesty and dignity. Patients of a high socioeconomic class should not be treated with extra care, and confidentiality should be maintained in all circumstances [32, 33, 36, 41, 42, 44, 45, 48].

Lack of training, knowledge of cultural norms, patient participation in decision-making, gender differences between patients and doctors, and a lack of time were major barriers to effective communication skills with patients and their families [32, 34, 37–40, 43, 46]. Patients recommended doctors and nurses to improve their interpersonal skills and take a more holistic, patient-centered approach. This can improve information delivery and

resolve disagreements between patients/family members and healthcare providers about treatment decisions [32, 34, 37–40, 43, 46].

The doctor's specialty influenced communication patterns and patient satisfaction. Family doctors were more closely associated with building rapport, psychosocial exchange, and patient orientation than other specialties. Senior medical specialists were more confident in their communication skills [34, 35, 38–41, 46–49]. Doctors working in public hospitals were more likely to have higher patient trust than private hospitals. Despite the general synthesis of results confirming patient satisfaction with explaining treatment procedures and the prompt response to their questions, some patients perceived the nurses as insufficiently responsive and compassionate [34, 35, 38–41, 46–49].

As shown, the doctor-patient relationship is a complex area made up of several factors, including doctor-patient communication, patient participation in decision-making, and patient satisfaction. Hence, in most cases, treatment is based on this relationship [2, 4, 7, 8]. The doctor and patient are expected and recommended to work together to improve psychopathological conditions, with particular attention to therapeutic relationships that affect the patient's thoughts, emotions, and behavior [32–49].

Informed consent

The third most studied domain of medical ethics research in Saudi Arabia was 'Informed Consent' with 12 publications. Health care providers supported informed consent. The majority agreed that consent should be given for each new procedure and should be perceived as an ongoing process, not a one-off decision, with parental consent being considered mandatory for children's treatment. However, there was low quality of informed consent in terms of experience with informed consent processes and transparency of risks [33, 37, 50, 51, 55–57, 59].

Although patients' opinions on the purpose of informed consent varied, the informed consent process and being aware of treatment was important for all [50, 52, 53, 55–57, 59]. In terms of the trust, some patients trusted the doctor to make decisions on their behalf, while others required more independent decision-making and preferably more effective disclosure of information. In addition, there was an overall poor quality of informed consent process and administration, knowledge of the risks of intervention and alternative treatment, and insufficient information included in informed consent [50, 52, 53, 58].

Remarkably, a study by Alsaihati et al. (2017) among $n = 140$ surgeons in Saudi Arabia found that while there

was sufficient knowledge about informed consent to surgery and how to obtain it, most surgeons did not fully inform patients about the procedure before obtaining consent. Some saw consent as just a preoperative routine or simply signing a document because the consent process is strange to Saudi psychology. The majority were against the use of consent for all surgical procedures [54].

Informed consent is a standard procedure for human studies involving individually identifiable data. The principle of informed consent is based on patient autonomy, which is explained as the legal embodiment of the idea that everyone has the right to make decisions that affect their well-being [6, 37, 52]. The Saudi Council for Health Specialties has developed guidelines on informed consent as part of the ethics of the medical profession. However, doctors' and patients' levels of awareness and adherence to these guidelines in Saudi Arabia remain unclear and controversial. Thus, these findings create a basis for introducing formal informed consent training to make written information more accessible to doctors and patients [6, 54].

Do-not-resuscitate

The synthesis of results showed that most healthcare representatives could define the order of DNR. Still, it required deeper knowledge to learn whether there is a clear local or national DNR policy. Those who knew about the policy did not read in detail [60–63, 67, 68, 70]. The most common limitation of essential discussions about DNR was a lack of patient understanding, educational level, cultural background of patients, and a lack of DNR policy knowledge by medical staff [60–64]. Most health care representatives wanted to learn more about patients' rights regarding end-of-life care and the use of the DNR order, as this would support the treatment plan for terminally ill patients [60, 62, 67, 68, 71].

Studies in which patients were included as a target population reported a lack of knowledge of the medical conditions for DNR practice [62, 65, 66, 68, 69]. Patients expressed a will to participate in discussions with doctors on planning end-of-life care and making their own decisions. Patients with higher levels of education, medical background, and knowledge of DNR were more likely to agree with DNR practice [62, 65, 66, 68, 69].

Non-Saudi doctors making decisions about life-sustaining treatment or DNR orders consulted with ethics committees in their hospitals more often than Saudi doctors [46]. Saudi doctors who received their education and postgraduate studies abroad were confident in their knowledge of ethics in medical practice but were less confident in making decisions about life-sustaining treatment or DNR orders [46].

Saudi Arabia's DNR Policy is a binding legal document formulated following the provisions of Islamic law, with a focus on Saudi patients, cultural background, and social needs [6, 10]. However, it has been shown that more efforts are required to improve and optimize end-of-life care and DNR policies by educating and training health-care personnel and the general public.

Organ donation and transplantation

The most studied domain of five included domains was 'Organ Donation and Transplantation,' 33 articles, with the most papers being published in 2020. Alghanim (2010) wrote the most cited article on knowledge and attitudes toward organ donation [72].

The synthesis of organ donation and transplantation data has led to several general conclusions reported by different authors. Thus, the overall knowledge about organ donation and transplantation varied based on the research objective (i.e., blood, skin, kidney donation). In general, the participants reported insufficient information about organ donation and transplantation [72, 75, 78, 90, 91, 95, 96, 102]. The main source of information about organ donation was TV, social media [72, 75, 77, 79, 81–84, 89].

Participants from rural areas were less likely to have information about organ donation than their counterparts in urban areas [72]. Organ donation awareness was higher in educated individuals with higher socioeconomic status and married participants [86, 87, 94, 99, 100, 102, 103]. The degree of awareness was found to impact the willingness to donate positively. Reasons for refusal to donate were the fear of premature termination of medical treatment to facilitate organ retrieval and transplantation, worries about receiving inadequate health care after donation, lack of family support, lack of incentives, not enough information about organ donation, fear of complications after organ donation, religion [72, 75, 79–83, 86, 95, 97, 99, 100].

In contrast to the stated barriers to organ donation, among those participants who expressed their will or were positive about organ donation and transplantation, gender, age of the recipient, religion and incentives did not appear to play a role. Moreover, organ donation was motivated by helping others and compassion, a good deed, the importance of donation, belief that organs are not beneficial after death, and an altruistic act [30, 73–76, 81, 85, 87–89, 93, 98, 101, 103].

Despite the Saudi Center for Organ Transplantation (SCOT) activities since 1985, there was a lack of knowledge on where to go for organ donation [83, 92, 97]. Thus, in the study by Alnasyan et al. [92], the level of knowledge about SCOT was only 12.6%. This is consistent with Thirunavukkarasu et al. [97], where about two-thirds of

the study participants were unaware of SCOT and its organ donation activities. Furthermore, in an earlier study by Agrawal et al. (2017), less than 3% knew the correct place to go for organ donation [83].

Organ transplantation is a life-prolonging and life-saving medical procedure in which an entire or partial organ of a deceased or living person is transplanted to another person. Islamic guidelines and Islamic law describe certain rules and regulations that allow organ transplants to be performed [6, 11, 12]. Organ donation is an act of mercy, benevolence, altruism, and love for humanity. Nonetheless, as can be seen from the literature cited, organ donation remains a very personal yet complex decision involving medical, legal, religious, cultural, and ethical concerns [6].

This bibliometric analysis was limited to five domains of bioethics within Saudi society. However, a literature search identified a number of articles addressing ethical issues related to the COVID-19 outbreak, such as the distribution of intensive care unit (IC) beds, digital tracking applications, vaccine distribution, the ethics of the general risks of COVID-19, risks in vaccine supply chain infrastructures, ethical issues in patient care, among others [104–107]. Hence, this study could start a series of systematic reviews that will explore all areas of bioethics in the Saudi health care system. Particular attention should be paid to study bioethical issues during COVID-19 pandemic [104–107].

Strengths and limitations

The strengths of the study design include its systematic approach, an explicit, transparent, and reproducible approach that has been adapted, recommended, and used by previous researchers. However, research design comes with potential limitations. Although researchers thoroughly searched databases to include all relevant articles, there is a chance that several important studies may have been overlooked. Thus, most literature on included domains have been written in Arabic, while this study was limited to English literature, causing a significant deficiency in including more studies, which ultimately affected the results and conclusion.

As mentioned, many *fatwas* govern bioethical research in different domains. However, including all domains in one systematic review would be incomprehensible and a source of bias. Therefore, based on this study, a new systematic review could be initiated to address areas such as stem cell research, genetic and biobanking ethics, cloning, and infertility treatment, among others.

This study of medical ethics in Saudi Arabia offers new avenues for future research even with limitations. Researchers and policymakers can formulate strategies based on these data. Furthermore, authors identified

evolving themes that have received little attention in previous research, including assisted reproductive technologies; medical, surgical, and ethical dilemmas of Siamese twins; hermaphroditism; genetic diseases. It is recommended that future research directions based on this bibliometric analysis of literature include comparative studies from developed and developing countries using more comprehensive demographic variables.

Conclusion

The overall aim of this study was to systematically identify, compile, describe and discuss ethical arguments and concepts in the five most-studied domains of bioethics in Saudi Arabia and present cultural, social, educational, and humane perspectives. From 2010 to 2021, 82 articles were found to be eligible. Most of the publications with the highest citations were from the Central Province. The articles were mainly published in the ‘Organ Donation and Transplantation’ domain. This systematic quantitative synthesis is expected to guide researchers, funders, and policymakers about the strengths and gaps in knowledge and attitudes regarding medical ethics in Saudi Arabia, both among the general public and health professionals.

Abbreviations

DNR: Do-not-resuscitate; SCOT: Saudi center of organ transplantation; PSMCHS: Prince sultan military college of health sciences; PHC: Primary health care.

Acknowledgements

NA

PROSPERO statement

PROSPERO does not currently (May, 2021) accept registrations for scoping reviews, literature reviews or mapping reviews. This decision should not stop you from submitting your project for publication to a journal.

Author contributions

Conceptualization and methodology A.W. Software, M.R.; Validation, W.K.B. and S.A.; Formal analysis, A.W. and M.R.; Resources, M.R.; Writing—original draft preparation, A.W.; writing—review and editing W.K.B. and S.A.; visualization, A.W., M.R., W.K.B.; supervision and communication, A.W. All authors have read and agreed to the published version of the manuscript.

Funding

All authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in this manuscript.

Availability of data and material

All data generated or analyzed during this study are included in this published article.

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

Competing interests

The authors have no competing interests to declare that are relevant to the content of this article.

Author details

¹Yale Interdisciplinary Center for Bioethics, Yale University, New Haven, CT, USA. ²Radiodiagnostic and Imaging Department, King Fahad Military Medical Complex, Dhahran, Saudi Arabia. ³Vice Deanship of Postgraduate Studies and Research, Prince Sultan Military College of Health Sciences, Dhahran, Saudi Arabia. ⁴Deanship of Library Affairs, Imam Abdulrahman Bin Faisal University, Dammam, Saudi Arabia.

Received: 8 April 2022 Accepted: 21 July 2022

Published online: 13 August 2022

References

- Düwell M. Bioethics: methods, theories, domains. Routledge. 2012. <https://doi.org/10.4324/9780203084205>.
- Al-Bar MA, Chamsi-Pasha H. Contemporary bioethics: Islamic perspective. Berlin: Springer Nature; 2015. <https://doi.org/10.1007/978-3-319-18428-9>.
- Atighetchi D. Islamic bioethics: problems and perspectives. Dordrecht: Springer; 2007. <https://doi.org/10.1007/978-1-4020-4962-0>.
- Bukhari AA. Universal principles of bioethics and patient rights in Saudi Arabia (Doctoral dissertation, Duquesne University). 2017.
- Abdel-Halim RE, AlKattan KM. Introducing medical humanities in the medical curriculum in Saudi Arabia: a pedagogical experiment. *Urol Ann.* 2012;4(2):73. <https://doi.org/10.4103/0974-7796.95549>.
- Hussein G, Alkabba A, Kasule O. Professionalism and ethics handbook for residents (PEHR): a practical guide. Riyadh: Saudi Commission for Health Specialties; 2015.
- Adlan AA. Informed Consent in Saudi Arabia. In: Beran R, editor, *Legal and Forensic Medicine*. Berlin, Heidelberg: Springer; 2013. https://doi.org/10.1007/978-3-642-32338-6_153.
- Chamsi-Pasha H, Chamsi-Pasha M, Ali AM. Patient-doctor relationships: Islamic views. *J Br Islam Med Assoc.* 2021;8(3):1–7.
- Chamsi-Pasha H, Albar MA. Ethical dilemmas at the end of life: Islamic perspective. *J Relig Health.* 2017;56(2):400–10. <https://doi.org/10.1007/s10943-016-0181-3>.
- Pasha HC, Albar MA. Do not resuscitate, brain death, and organ transplantation: Islamic perspective. *Avicenna J Med.* 2017;7(02):35–45.
- Shaheen FA, Al-Attar B, Follero PM, Kamal M. Critical pathways of deceased organ donation in Saudi Arabia: a 2 decade in comparison: 1997–2006 vs. 2007–2016. *Transplantation.* 2017;101:5122.
- Saudi Center for Organ Transplantation. Organ donation and transplantation. 2021. <https://www.scot.gov.sa/en> Accessed 9 Sep 2021.
- Alam AA. Public opinion on organ donation in Saudi Arabia. *Saudi J Kidney Dis Transplant.* 2007;18(1):54.
- Al-Bar MA, Chamsi-Pasha H. Organ transplantation. In *Contemporary Bioethics*. Cham: Springer; 2015. pp. 209–225. https://doi.org/10.1007/978-3-319-18428-9_13.
- Glass GV, McGaw B, Smith ML. Meta-analysis in social research. Incorporated: Sage Publications; 1981.
- Lopez-Lee D. Indiscriminate data aggregations in meta-analysis: a Cause for concern among policy makers and social scientists. *Eval Rev.* 2002;26(5):520–44. <https://doi.org/10.1177/019384102236522>.
- Polgar S, Thomas SA. Introduction to research in the health sciences E-Book. Amsterdam: Elsevier Health Sciences; 2011.
- Greenhalgh T. How to read a paper: the basics of evidence-based medicine. New York: John Wiley & Sons; 2014.
- Brown SJ. Evidence-based nursing: the research-practice connection. Burlington: Jones & Bartlett Publishers; 2014.
- Bruce N, Pope D, Stanistreet D. Quantitative methods for health research: a practical interactive guide to epidemiology and statistics. New York: John Wiley & Sons; 2018.
- Connaway LS, Powell RR. Basic research methods for librarians. Santa Barbara: ABC-CLIO; 2010.

22. Al-Haqwi AI, Al-Shehri AM. Medical students' evaluation of their exposure to the teaching of ethics. *J Fam Community Med*. 2010;17(1):41. <https://doi.org/10.4103/1319-1683.68788>.
23. Darwish MA, Sabra AA. Medical ethics: knowledge about confidentiality among medical university students, Eastern province Saudi Arabia. *J Am Sci*. 2012;8(6):299–304.
24. Aldughaiter SK, Almazziad MA, Alsultan SA, Al Masaud AO, Alddakkan AR, Alyahya BM, Alhassan HA, Albalawi RS, Alammam RA, Abaalkhail MS, Aljarallah JS. Student perspectives on a course on medical ethics in Saudi Arabia. *J Taibah Univ Med Sci*. 2012;7(2):113–7. <https://doi.org/10.1016/j.jtumed.2012.11.002>.
25. AlKabba AF, Hussein G, Kasule OH, Jarallah J, Alrukban M, Alrashid A. Teaching and evaluation methods of medical ethics in the Saudi public medical colleges: cross-sectional questionnaire study. *BMC Med Educ*. 2013;13(1):1–8. <https://doi.org/10.1186/1472-6920-13-122>.
26. El-Sobkey SB, Almoajel AM, Al-Muammar MN. Knowledge and attitude of Saudi health professions' students regarding patient's bill of rights. *Int J Health Policy Manag*. 2014;3(3):117.
27. Alyousefi N, Jarallah J, Alrowais N. Case-based teaching of ethics ethical challenges raised by undergraduate medical students during a bioethics course (What students bring to the classroom?). *Creat Educ*. 2016;7(1):86–92. <https://doi.org/10.4236/ce.2016.71009>.
28. Ghamri RA, Al-Raddadi RM. Assessment of perceived needs and preferences with regard to the education of residents in Medical Ethics in King Abdulaziz University Hospital. *J Fam Community Med*. 2017;24(3):189. https://doi.org/10.4103/jfcm.JFCM_34_17.
29. AbuAbah F, Alwan A, Al-Jahdali Y, Al Shaikh A, Alharbi A, Hamdan AJ. Common medical ethical issues faced by healthcare professionals in KSA. *J Taibah Univ Med Sci*. 2019;14(5):412–7. <https://doi.org/10.1016/j.jtumed.2019.09.001>.
30. Alnajjar HA, Alzahrani M, Alzahrani M, Banweer M, Alsolami E, Alsulami A. Awareness of brain death, organ donation, and transplantation among medical students at single academic institute. *Saudi J Anaesth*. 2020;14(3):329. https://doi.org/10.4103/sja.SJA_765_19.
31. Alotaibi DH, Alsinaidi AA, Alshaalan NS, Aljuanydil NA. Dental researchers' knowledge, awareness, and attitudes on the ethics and ethics committees at different Saudi Arabian universities. a cross-sectional study. *Int J Med Dent*. 2021;25(1):152–8.
32. Alghanim SA. Assessing knowledge of the patient bill of rights in central Saudi Arabia: a survey of primary health care providers and recipients. *Ann Saudi Med*. 2012;32(2):151–5. <https://doi.org/10.5144/0256-4947.2012.151>.
33. Al Qarny MA, Alsolfiani AM, Garny AG. Medical ethics knowledge and practice among healthcare workers at prince mansour military hospital. Taif Saudi Arabia: PMMH; 2012. *Int J Med Res Prof*. 2012;2(4):127–31.
34. Al-Yousefi NA. Observations of muslim physicians regarding the influence of religion on health and their clinical approach. *J Relig Health*. 2012;51(2):269–80. <https://doi.org/10.1007/s10943-012-9567-z>.
35. Al-Mohaimed AA, Sharaf FK. Breaking bad news issues: a survey among physicians. *Oman Med J*. 2013;28(1):20. <https://doi.org/10.5001/omj.2013.05>.
36. Saleh HA, Khereldeem MM. Physicians' perception towards patients' rights in two governmental hospitals in Mecca, KSA. *Int J Pure Appl Sci Technol*. 2013;17(1):37.
37. Fayez R, Nawwab A, Al-Jahdali H, Baharoon S, Binsalih S, Al SA. Negative ethical behaviors in Saudi hospitals: How prevalent are they perceived to be? -Statement agreement study. *Avicenna J Med*. 2013;3(03):57–62. <https://doi.org/10.4103/2231-0770.118458>.
38. Al Shahrani I, Tikare S, Togoo RA, Al Qahtani F, Assiri K, Al MA. Patient satisfaction with orthodontic treatment at king Khalid university, college of dentistry, Saudi Arabia. *Bangladesh J Med Sci*. 2015;14(2):146–50. <https://doi.org/10.3329/bjms.v14i2.17837>.
39. Al-Zahrani BS, Al-Misfer MF, Al-Hazmi AM. Knowledge, attitude, practice and barriers of effective communication skills during medical consultation among general practitioners national guard primary health care center, Riyadh, Saudi Arabia. *Middle East J Fam Med*. 2015;7(10):4–17. <https://doi.org/10.5742/MEWFM.2015.92680>.
40. Al Ali AA, Elzubair AG. Establishing rapport: physicians' practice and attendees' satisfaction at a primary health care center, Dammam, Saudi Arabia, 2013. *J Fam Community Med*. 2016;23(1):12. <https://doi.org/10.4103/2230-8229.172224>.
41. Banaser M, Stoddart K, Cunningham N. A qualitative study of patient satisfaction in oncology wards setting in Saudi Arabia. *Res Rev J Nurs Health Sci*. 2017;3(3):85–97.
42. Aljughaiman A, Alshammari A, Althumairi A, Alshammari A, Almasoud N, Nazir MA. Patient satisfaction with orthodontic treatment received in public and private hospitals in Dammam, Saudi Arabia. *Open Access Maced J Med Sci*. 2018;6(8):1492. <https://doi.org/10.3889/oamjms.2018.301>.
43. Alghabiwi RS, Palianopoulou M, Eklund-Karlsson L. The physician-patient relationship and its association with self-efficacy in female patients managing chronic diseases in Riyadh, Saudi Arabia. *J Community Med Public Health CHPH-130*. 2018. <https://doi.org/10.29011/CMPH-130/100030>.
44. Elagi AA, Jaber BA, Wassly AH, Ahmed RM, Bosily FA. Public's perception and satisfaction on the role and services provided by family physicians in Saudi Arabia: a cross-sectional study. *J Fam Med Primary Care*. 2019;8(10):3282. https://doi.org/10.4103/jfmpc.jfmpc_621_19.
45. Fothan AM, Eshaq AM, Bakather AM. Medical students' perceptions of the doctor-patient relationship: a cross-sectional study from Saudi Arabia. *Cureus*. 2019. <https://doi.org/10.7759/cureus.5053>.
46. Almoallem AM, Almudayfir MA, Al-Jahdali YH, Ahmed AE, Al-Shaikh A, Baharoon S, AlHarbi A, Al-Jahdali H. Top ethical issues concerning healthcare providers working in Saudi Arabia. *J Epidemiol Glob Health*. 2020;10(2):143. <https://doi.org/10.2991/jegeh.k.191211.001>.
47. Habbash AS. Communication skills of resident physicians in aseer region, Saudi Arabia. *Durham: Research Square*; 2020.
48. Al-Shehri E, Siddiqui AF. Knowledge, attitude and practice of medical ethics among resident physicians of specialty certificate in Aseer province, Saudi Arabia. *J Liaquat Univ Med Health Sci*. 2020;19(01):48–54.
49. Aljaffary A, AlThumairi A, Almarhoon L, Alsaawi G. Measuring patient trust in public versus private physicians in the Kingdom of Saudi Arabia (KSA). *J Multidiscip Healthc*. 2021;14:151. <https://doi.org/10.2147/JMDH.S286313>.
50. Abolfotouh MA, Adlan AA. Quality of informed consent for invasive procedures in central Saudi Arabia. *Int J Gen Med*. 2012;5:269. <https://doi.org/10.2147/IJGM.S29599>.
51. Darwish MA, Sabra AA. Medical ethics: awareness about consent and documentation among medical interns, University of Dammam, Saudi Arabia. *Int J Med Health Sci*. 2013;2(3):311–21.
52. Hammami MM, Al-Gaai EA, Al-Jawarneh Y, Amer H, Hammami MB, Eissa A, Qadire MA. Patients' perceived purpose of clinical informed consent: Mill's individual autonomy model is preferred. *BMC Med Ethics*. 2014;15(1):1–2. <https://doi.org/10.1186/1472-6939-15-2>.
53. Almohaimeed K, Almogheer R, Alsubaie A, A-Turki T, Almuhanna A, Aljarallah JS. Informed consent for invasive procedures: a perspective from Saudi Arabia. *Merit Res J Med Med Sci*. 2017;5(1):35–41.
54. Alsaighati AM, Alotaibi AB, Alhawaj AM, Alabdulsalam AM, Alajmi NA, Boukhet MT, Altulayqi WH, Alkahtani AS, Almarek NA, Alhussain ZA, Al-Sultan AS. Knowledge, opinions and attitude of surgeons in Saudi Arabia toward Informed surgical consent. *Egypt J Hosp Med*. 2017;69(4):2232–7. <https://doi.org/10.12816/0041522>.
55. Mahrous MS. Patient's bill of rights: Is it a challenge for quality health care in Saudi Arabia? *Saudi J Med Med Sci*. 2017;5(3):254. https://doi.org/10.4103/sjmms.sjmms_147_16.
56. Basharaheel H, Aidarous G, Halawani L, Bajeafer M, Al-Amoudi T, Al-Qurashi W, Al-Abbadi H. Attitude and practice of surgical informed consent among the surgical team in a teaching center: a cross-sectional study. *Int J Med Res Health Sci*. 2019;8(12):104–9.
57. Alahmad G, Al-Kamli H, Alzahrani H. Ethical challenges of pediatric cancer care: interviews with nurses in Saudi Arabia. *Cancer Control*. 2020;27(1):1073274820917210. <https://doi.org/10.1177/1073274820917210>.
58. Alsaïdan MS, Abuyassin AH, Alammam HS, Hussien G. Prevalence and quality of informed consent for patients undergoing cosmetic procedures: a cross sectional study. *Acta Bioethica*. 2021;27(1):37–48. <https://doi.org/10.4067/S1726-569X2021000100037>.
59. Alahmad G, AlSaqabi M, Alkamli H, Aleidan M. Ethical challenges in consent procedures involving pediatric cancer patients in Saudi Arabia: an exploratory survey. *Dev World Bioeth*. 2021. <https://doi.org/10.1111/dewb.12308>.

60. Aljohaney A, Bawazir Y. Internal medicine residents' perspectives and practice about do not resuscitate orders: survey analysis in the western region of Saudi Arabia. *Adv Med Educ Pract.* 2015;6:393. <https://doi.org/10.2147/AMEPS82948>.
61. Amoudi AS, Albar MH, Bokhari AM, Yahya SH, Merdad AA. Perspectives of interns and residents toward do-not-resuscitate policies in Saudi Arabia. *Adv Med Educ Pract.* 2016;7:165. <https://doi.org/10.2147/AMEP.S99441>.
62. Al Sheef MA, Al Sharqi MS, Al Sharief LH, Takrouni TY, Mian AM. Awareness of do-not-resuscitate orders in the outpatient setting in Saudi Arabia: perception and implications. *Saudi Med J.* 2017;38(3):297. <https://doi.org/10.15537/smj.2017.3.18063>.
63. Gouda A, Alrasheed N, Ali A, Allaf A, Al mudaiheem N, Ali Y, Alghabban A, Alsalolami S. Knowledge and attitude of ER and intensive care unit physicians toward do-not-resuscitate in a tertiary care center in Saudi Arabia: a survey study. *Indian J Crit Care Med Peer-rev Off Publ Indian Soc Crit Care Med.* 2018;22(4):214. https://doi.org/10.4103/ijccm.IJCCM_523_17.
64. Madadin M, Alsaffar GM, AlEsa SM, Khan A, Badghaish DA, Algarni SM, Menezes RG. Clinicians' attitudes towards do-not-resuscitate directives in a teaching hospital in Saudi Arabia. *Cureus.* 2019. <https://doi.org/10.7759/cureus.6510>.
65. Baharoon S, Alzahrani M, Alsafi E, Layqah L, Al-Jahdali H, Ahmed A. Advance directive preferences of patients with chronic and terminal illness towards end of life decisions: a sample from Saudi Arabia. *East Mediterr Health J.* 2019;25(11):791–7. <https://doi.org/10.26719/emhj.19.038>.
66. Kaneetah AH, Baowaidan FO, Abulaban BA, Sabban MF, Alshehri AS. The perspectives of the general population and relatives of cancer patients with respect to the do-not-resuscitate order. *Cureus.* 2019;11(1): e3968. <https://doi.org/10.7759/cureus.3968>.
67. Alsaati BA, Aljishi MN, Alshamakh SS, Banjar NS, Basharaheal HA, Alamri RS. The concept of do not resuscitate for students in King Abdulaziz University Hospital. *Indian J Palliat Care.* 2019;25(4):544. https://doi.org/10.4103/IJPC.IJPC_78_19.
68. Al Farhan A, Al Harthi M, Mosa MB, Moukaddem A, Al Jahdali H, Shamou J, Al Sayyari A, Baharoon S. Patient reluctance to accept Do Not Resuscitate order: impact on clinical care. *East Mediterr Health J.* 2020. <https://doi.org/10.26719/emhj.20.009>.
69. Al Ahmadi JR, Aljehani SN, Bahakeem LM, Hijan BA, Mayet SA, Badahdah YA. Knowledge and attitude toward do-not-resuscitate among patients and their relatives visiting outpatient clinics at King Abdulaziz University Hospital, Jeddah, Saudi Arabia. *Saudi Med J.* 2020;41(1):53. <https://doi.org/10.15537/smj.2020.1.24782>.
70. Aljethaily A, Al-Mutairi T, Al-Harbi K, Al-Khonezan S, Aljethaily A, Al-Homaidhi HS. Pediatricians' perceptions toward do not resuscitate: a survey in Saudi Arabia and literature review. *Adv Med Educ Pract.* 2020;11:1. <https://doi.org/10.2147/AMEPS228399>.
71. AbuYahya O, Abuhammad S, Hamoudi B, Reuben R, Yaqub M. The do not resuscitate order (DNR) from the perspective of oncology nurses: a study in Saudi Arabia. *Int J Clin Pract.* 2021;75(8): e14331. <https://doi.org/10.1111/ijcp.14331>.
72. Alghanim SA. Knowledge and attitudes toward organ donation: a community-based study comparing rural and urban populations. *Saudi J Kidney Dis Transpl.* 2010;21(1):23.
73. Hammami MM, Abdulhameed HM, Concepcion KA, Eissa A, Hammami S, Amer H, Ahmed A, Al-Gaai E. Consenting options for posthumous organ donation: presumed consent and incentives are not favored. *BMC Med Ethics.* 2012;13(1):1–4. <https://doi.org/10.1186/1472-6939-13-32>.
74. Mohamed E, Guella A. Public awareness survey about organ donation and transplantation. In *Transplantation proceedings.* vol. 45, No. 10. Elsevier; 2013. pp. 3469–3471. <https://doi.org/10.1016/j.transproceed.2013.08.095>.
75. Al-Harhi HA, Alzahrany OA. Perceptions and attitudes of Saudi adult population toward organ donation, Taif, Saudi Arabia. *Int J Med Sci Public Health.* 2015;4(8):1113–20. <https://doi.org/10.5455/ijmsph.2015.28042015235>.
76. Soubhanneyaz A, Kaki A, Noorelahi M. Survey of public attitude, awareness and beliefs of organ donation in western region of Saudi Arabia. *Am J Intern Med.* 2015;3(6):264–71. <https://doi.org/10.11648/j.ajim.20150306.18>.
77. Almohsen SS, Alobaishy SM, Alghammas NI, Albulayhi SK, Alrashid SM, Aljamal RY, Alotaibi MM, Dandash K. Attitudes and beliefs on organ donation among students in a university in Central Saudi Arabia. *Saudi Med J.* 2016;37(5):591.
78. Al Bshabshe AA, Wani JI, Rangreze I, Asiry MA, Mansour H, Ahmed AG, Assiri JM. Orientation of university students about brain-death and organ donation: a cross-sectional study. *Saudi J Kidney Dis Transpl.* 2016;27(5):966. <https://doi.org/10.4103/1319-2442.190865>.
79. Hajjar WM, Abdulqader SB, Aldayel SS, Alfardan AW, Alzaidy NI. Knowledge, attitudes, and beliefs toward organ donation among social media users. In *Transplantation proceedings.* vol. 48, No. 7. Elsevier; 2016. pp. 2418–2422. <https://doi.org/10.1016/j.transproceed.2016.02.097>.
80. AlHabeeb W, AlAyoubi F, Tash A, AlAhmari L, AlHabib KF. Attitude of the Saudi community towards heart donation, transplantation, and artificial hearts. *Saudi Med J.* 2017;38(7):742. <https://doi.org/10.15537/smj.2017.7.18178>.
81. Elsafi SH, Al-Adwani MM, Al-Jubran KM, Hassan MA, Al Zahrani EM. Factors influencing the willingness of allied health students to donate organs or tissues. In *Transplantation Proceedings.* vol. 49, No. 6. Elsevier; 2017. pp. 1215–1220. <https://doi.org/10.1016/j.transproceed.2017.03.085>.
82. Sayedalamin Z, Imran M, Almutairi O, Lamfon M, Alnawwar M, Baig M. Awareness and attitudes towards organ donation among medical students at King Abdulaziz University, Jeddah, Saudi Arabia. *J Pak Med Assoc.* 2017;67:1–64.
83. Agrawal S, Binsaleem S, Al-Homrani M, Al-Juhayim A, Al-Harbi A. Knowledge and attitude towards organ donation among adult population in Al-Kharj, Saudi Arabia. *Saudi J Kidney Dis Transpl.* 2017;28(1):81. <https://doi.org/10.4103/1319-2442.198150>.
84. Al Bshabshe AA, Al-Ghamdi BA, Habash S, Al-Harhi M, Dwaima M, Wani JI. Secondary school students' orientation toward brain death and organ donation in southern region of Saudi Arabia. In *Transplantation Proceedings.* vol. 50, No. 10. Elsevier; 2018. pp. 2950–2952. <https://doi.org/10.1016/j.transproceed.2018.05.020>.
85. Alhussain B, Alasmari B, Omair A, Altraif I, Altamimi A. Attitudes and perceptions towards organ donation in Riyadh. *J Health Spec.* 2018;6(2):68. https://doi.org/10.4103/jhs.JHS_153_17.
86. Almuffeh A, Althebaity R, Alamri AS, Al-Rashed NA, Alshehri EH, Albalawi L, Alameer R, Hajr E, Raslan IA, Alsaif FA. Organ donation awareness and attitude among Riyadh city residents, Saudi Arabia. *J Nat Sci Med.* 2018;1(2):59.
87. AlHejaili W, Almalik F, Albrahim I, Alkhalidi F, AlHejaili A, Al SA. Scores of awareness and altruism in organ transplantation among Saudi health colleges students-impact of gender, year of study, and field of specialization. *Saudi J Kidney Dis Transpl.* 2018;29(5):1028. <https://doi.org/10.4103/1319-2442.243947>.
88. Alsharidah DS, Al-Dossari FS, AlMahmoud N, Alanzan BA, Binkhulaif RJ, Bakhsh EM, Alkhalaf AA, Huzim BA, Sarhan NT, Sulayem LM, Elfeky DS. Assessment of knowledge and attitude toward organ donation among the Saudi population in Riyadh City. *Saudi J Kidney Dis Transpl.* 2018;29(6):1326. <https://doi.org/10.4103/1319-2442.248304>.
89. Aziz S, Al-Amri FH, Al-Zydy M, Asiri IN, Asiri MN, Mashiakhi SQ, Alsohaimi AM, Alrajhi MAM. General population awareness and attitude towards organ donation in Aseer region, Saudi Arabia: a survey study. *Indo Am J Pharm Sci.* 2019;6(2):3599–609.
90. Alruwaili KH, Alanazy TA, Zaki KA, Khulaif Alruwaili K, Alhamad TM, Alanazi MO. Awareness, knowledge, and attitudes regarding eye donation and corneal transplantation among medical and paramedical students. *Transplantation.* 2019;5:7.
91. Hazzazi AA, Ageeli MH, Alfaqih AM, Zakri AK, Elmakki EE. Knowledge and attitude towards hematopoietic stem cell transplantation among medical students at Jazan University, Saudi Arabia. *Saudi Med J.* 2019;40(10):1045. <https://doi.org/10.15537/smj.2019.10.24294>.
92. Alnasyan AY, Aldihan KA, Albassam AA, Alhusain FA, Al Tamimi AR. How informed are the Saudi public about the value of organ donation: a community-based cross-sectional study. *Saudi J Kidney Dis Transpl.* 2019;30(6):1236. <https://doi.org/10.4103/1319-2442.275467>.
93. Alanazi LF, Aldossari SH, Gogandy MA, Althubaiti GA, Alanazi BF, Alfawaz AM. Attitude, beliefs and awareness towards corneal donation in Saudi Arabia. *Saudi J Ophthalmol.* 2019;33(2):121–9. <https://doi.org/10.1016/j.sjopt.2019.02.003>.

94. Almutairi S. Knowledge, attitude, and willingness towards organ donation among medical and health sciences students in Central Region, Saudi Arabia. *Transpl Res Risk Manag.* 2020;12:23. <https://doi.org/10.2147/TRRM.S264872>.
95. Alibrahim E, Al Jindan M. Knowledge and attitude about corneal donation and transplantation in Eastern province: a population-based study [years]. *Age (Melbourne, Vic).* 2020;20(260):26–30. <https://doi.org/10.24911/IJMDC.51-1576182666>.
96. Kazzaz YM, Da'ar OB. Assessing comfort level of organ donation competencies among pediatric intensivists in Saudi Arabia: a national survey. *BMC Med Educ.* 2020;20(1):1–1. <https://doi.org/10.1186/s12909-020-02262-7>.
97. Thirunavukkarasu A, Alanazi MO, Albulayhid SB, Alinad AK, Alqader SA, Aljudia HA. Knowledge, attitude, and barriers toward organ donation among healthcare science students of Jouf University, Saudi Arabia: a cross-sectional study. *Int J Med Dev Ctries.* 2020;4(6):996–1001. <https://doi.org/10.24911/IJMDC.51-1589736821>.
98. Omran R, Yasawy MA, Al Harthi AA, Bokhari AY, Alabdali AS, Alzaidi MM, Almishal SM. Knowledge and attitude among medical students regarding organ donation in the western region of the Kingdom of Saudi Arabia. *Int J Med Dev Ctries.* 2020;4(8):1138–43. <https://doi.org/10.24911/IJMDC.51-1589941975>.
99. Altraif I, Altuwajiri N, Aldhhiban L, Alhoshan F, Alomari R, Moukaddem A, Alashgar H, Alqahtani F. Knowledge and attitude toward organ donation among medical staff and outpatients at King Abdulaziz Medical City, Riyadh, Saudi Arabia. *Saudi J Kidney Dis Transpl.* 2020;31(6):1344. <https://doi.org/10.4103/1319-2442.308343>.
100. Gelidan AG. Awareness and attitude of general population regarding allograft skin donation in Riyadh Saudi Arabia: cross-sectional study. *Burns.* 2020;46(7):1700–6. <https://doi.org/10.1016/j.burns.2020.04.002>.
101. Darwish TH, Alwesaibi AA, Hussain A, Alonayzan A, Al-Hassan ZJ, Alan-sari KY, Alsloom AM. Acceptance and awareness of Saudi population about organ donation and lung transplantation. *IJMDC.* 2021;5(1):86–92. <https://doi.org/10.24911/IJMDC.51-1604327410>.
102. Al-Oufi MA, Alghamdi RA. Perception and attitude among adults attending primary health care centers in Al-Madinah regarding blood and organ donation. *Int J Pharm Phytopharmacol Res.* 2021;11(1):50–62.
103. Bukhari MA. Willingness for solid-organ donation in Saudi Arabia: a sky-scape view. *Experimental and Clinical Transplantation: Official Journal of the Middle East Society for Organ Transplantation.* 2021.
104. Sahebi A, Moayedi S, Golitaleb M. COVID-19 pandemic and the ethical challenges in patient care. *J Med Ethics Hist Med.* 2020;13:24. <https://doi.org/10.18502/jmehm.v13i24.4955>.
105. Radanliev P, De Roure D, Ani U, Carvalho G. The ethics of shared Covid-19 risks: an epistemological framework for ethical health technology assessment of risk in vaccine supply chain infrastructures. *Health Technol (Berl).* 2021;11(5):1083–91. <https://doi.org/10.1007/s12553-021-00565-3>.
106. Radanliev P, De Roure D. Epistemological and bibliometric analysis of ethics and shared responsibility—health policy and IoT systems. *Sustainability.* 2021;13(15):8355.
107. Maeckelberghe E. Ethical implications of COVID-19: vulnerabilities in a global perspective. *Eur J Public Health.* 2021;31(4):iv50–3. <https://doi.org/10.1093/eurpub/ckab158>.

Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Ready to submit your research? Choose BMC and benefit from:

- fast, convenient online submission
- thorough peer review by experienced researchers in your field
- rapid publication on acceptance
- support for research data, including large and complex data types
- gold Open Access which fosters wider collaboration and increased citations
- maximum visibility for your research: over 100M website views per year

At BMC, research is always in progress.

Learn more biomedcentral.com/submissions

