

TEACHING OF ETHICS IN MEDICAL UNDERGRADUATE PROGRAMS

Ana Carolina Alvares Lavigne de Lemos Tavares¹, Ana Gabriela Alvares Travassos², Rodrigo da Silveira Tavares³, Maria Francisca Melo Pojal da Silva Rêgo⁴, Rui Manuel Lopes Nunes⁵

Abstract: Literature points to the existent diversity in medical graduate courses' curriculums, reinforcing the need to systematise and deepen more studies in this area with the aim of qualifying the formation of our future professionals. This study aims to understand the methods used in the teaching of Bioethics in medical graduation worldwide. It was characterised as an integrative review and the databases used were Pubmed, Scopus and Web of Science. In total 2993 articles were identified and 72 met the pre-selected criteria and were included in the review. The characteristics of teaching bioethics that stood out the most in the analysis were: teaching still very heterogeneous between different universities, use of various methodologies in the process of teaching/learning, teaching disconnected from the medical practice of students showing the need to integrate the curriculum with clinical practice and challenges of teaching-learning process. Most of the studies in this review lead us to understand that there is still no minimum parameters on the ideal method to teach bioethics, suggesting that it may affect the feeling of unpreparedness felt by students in face of ethical issues in clinical practice, despite the theoretical basis acquired.

Keywords: bioethics, core curriculum, medical education, medical ethics, teaching

Enseñanza de la ética en programas de pregrado médico

Resumen: La literatura apunta a la diversidad existente en los currículos de los posgrados de medicina, reforzando la necesidad de sistematizar y profundizar más estudios en esta área, con el fin de capacitar la formación de nuestros futuros profesionales. Este estudio tiene como objetivo comprender los métodos utilizados en la enseñanza de la bioética en la graduación médica en el mundo. Se caracterizó como una revisión integradora y las bases de datos utilizadas fueron Pubmed, Scopus y Web of Science. En total se identificaron 2.993 artículos, 72 cumplieron los criterios preseleccionados y se incluyeron en la revisión. Las características de la enseñanza de la bioética que más se destacaron en el análisis fueron: docencia aún muy heterogénea entre diferentes universidades, uso de diversas metodologías en el proceso de enseñanza/aprendizaje, docencia desconectada de la práctica médica de los estudiantes, mostrando la necesidad de integrar el currículo con la práctica clínica y los desafíos del proceso de enseñanza/aprendizaje. La mayoría de los estudios de esta revisión nos lleva a entender que aún no existen parámetros mínimos sobre el método ideal para enseñar bioética, sugiriendo que puede impactar en la falta de preparación que sienten los estudiantes ante cuestiones éticas en la práctica clínica, a pesar de las teorías base adquiridas.

Palabras clave: bioética, currículo básico, educación médica, ética médica, docencia

Ensino da ética nos cursos de graduação em medicina

Resumo: Vários estudos relatam a diversidade existente nos currículos da graduação em medicina, reforçando a necessidade de sistematizar e aprofundar mais estudos nesta área com o objetivo de qualificar a formação dos nossos futuros profissionais. Este estudo tem como objetivo compreender os métodos utilizados no ensino da Bioética na graduação em medicina em todo o mundo. Esse estudo caracterizou-se como revisão integrativa e as bases de dados utilizadas foram Pubmed, Scopus e Web of Science. No total, foram identificados 2.993 artigos e 72 atenderam aos critérios pré-selecionados e foram incluídos na revisão. As características do ensino da bioética que mais se destacaram nas análises foram: ensino ainda muito heterogêneo entre as diferentes universidades, utilização de diversas metodologias no processo de ensino / aprendizagem, ensino desvinculado da prática médica dos alunos evidenciando a necessidade de integração curricular com a prática clínica e os desafios do processo ensino-aprendizagem. A maioria dos estudos desta revisão nos leva a entender que ainda não existem parâmetros mínimos sobre o método ideal de ensino da bioética e traz como um desafio importante o despreparo sentido pelos alunos frente às questões éticas na prática, apesar da fundamentação teórica adquirida.

Palavras-chave: bioética, currículo básico, educação médica, ética médica, ensino

¹ Faculty of Medicine of the University of Porto, Portugal. Department of Health Sciences of the University of Santa Cruz, Ilhéus, Brasil. ORCID: <https://orcid.org/0000-0003-0651-980X>

Correspondence: aclavigne@uol.com.br

² Department of Life Sciences of the State University of Bahia, Salvador, Brasil. ORCID: <https://orcid.org/0000-0001-9242-828X>

³ Metropolitan Union of Culture and Education, Itabuna, Brasil. ORCID: <https://orcid.org/0000-0003-0245-3591>

⁴ Faculty of Medicine of the University of Porto, Portugal. ORCID: <https://orcid.org/0000-0001-8083-7895>

⁵ Faculty of Medicine of the University of Porto, Portugal. ORCID: <https://orcid.org/0000-0002-1377-9899>

Introduction

The ethical training received by healthcare professionals, especially physicians, varies considerably according to academic institutions. In stark contrast to the other academic aspects of medical education, ethics has no standardized curriculum to stipulate subject matter, workload, timing, or assessment practices let alone universal minimum requirements to guide its implementation(1).

In 2008, a systematic review analysed 30 years of studies published on ethics, bioethics and deontology education in Brazilian medical schools. The authors could only find three studies published in three different decades that documented a stagnation in the number of specific subjects for medical ethics, low workload and the reduced number of teachers exclusively dedicated to the discipline. The article emphasizes the need for a consensus among those responsible for medical ethics and bioethics education regarding the process of ethics education for medical students(2). The concept of bioethics as a scientific discipline emerged in the 1970s through Van Potter's seminal writings and, within the healthcare field, it defines and defends over time the values considered essential in a pluralist, multicultural society to resolve the ethical dilemmas of daily life(3). It is also important to highlight the emergence of new medical ethics in the form of a set of major principles that guide the application of clinical practice and human-subjects research, which, as such, also serve to support the resolution of ethical conflicts. Hence the need, in modern society, for a consensus on the ethical principles fundamental at a cross-cultural level(4).

A review of ethics education in undergraduate medicine reveals profound flaws in the literature and describes encountering two main perspectives on the purpose of teaching medical ethics. The first is as a means of creating virtuous doctors while the second reflects the need to provide doctors with a set of skills to analyse and resolve the ethical dilemmas they may encounter in their practice. This dichotomy in the literature demonstrates the lack of consensus on the objectives underlying of medical ethics education(5). A European study published in 2009 addresses the importance of teaching clinical ethics to healthcare

professionals and presents a multidisciplinary and pluralistic reflection on bioethics in problems affecting human beings as a result of advances in biology and medicine(6). Yet, almost a decade later, Gulino et al. (2018)(7) report that in Italy, bioethics coursework is still infrequently offered to students and is not subject to any established academic standard.

This initial analysis demonstrates the heterogeneity of teaching medical ethics and bioethics in medical graduation making it imperative to conduct more in-depth studies in this area so we can most effectively equip our future healthcare professionals with the knowledge required to be ethical medical practitioners. Given these considerations, the objective of the present study was to delineate and analyse the methods used to teach medical ethics and bioethics in medical education programs worldwide.

Methods

This integrative review study involved the following six stages. In the first stage, a theme was identified and a research hypothesis or question selected; the second stage consisted of establishing criteria for the inclusion and exclusion of studies identified by searching the literature; in the third stage, pre-selected (based on title and abstract) and selected studies (based on full text) were identified; the fourth stage required categorizing the selected studies using a synthesis matrix; in the fifth stage, the groups of thematically-related studies were analysed and the results interpreted; finally, in the sixth stage, the knowledge and insight acquired in the fifth stage were reviewed, synthesized, and herein presented(8,9). The research question guiding this review was: How is bioethics education carried out in graduate medical training around the world?

Three major health databases were queried for relevant articles: Pubmed, Scopus and the Web of Science. The keywords used to filter studies based on their presence in the title and abstract were "Bioethics" and "Medical Ethics". This literature search was not delimited by a publication period to ensure the inclusion of all potentially relevant studies in the ensuing analysis. The quality and eligibility of each study were independently de-

terminated by two researchers (AT, RT). All data were extracted manually, not by extraction software. The results from all of the qualified studies were critically reviewed by three researchers (AT, AGT, RT) and two coordinators (FR, RN). Any disagreements regarding an article's relevance were resolved by reaching a consensus among the authors.

To be included in the present study, articles were required to fulfil the following criteria: written in English and Portuguese; medical school-related; relating to Curriculum and/or Medical Education. Articles that did not address medical courses/curricula specifically were excluded as were those on masters and doctoral-level programmes, articles that address healthcare areas other than medicine, letters to the editor, comments, editorials, case studies, conferences, symposia, points of view, and communications.

A total of 2,993 articles were identified. The studies were carefully analysed by title, abstract, and finally, the complete texts. This process resulted in 72 articles that met the inclusion criteria. Figure 1 illustrates the diagram of the selection process, which was performed according to the PRISMA guidelines(10).

To enable downstream analyses of the articles, data extraction tables were prepared by the authors with the following relevant information: title; journal and year of publication; authors; origin (country, city and/or region); objectives; method; instruments; sample; results and conclusions. After this initial characterization, we performed to a more in-depth reading to extract the central themes and most important conclusions of the articles. This information was extracted and summarized in three thematic categories: Methodological variations in Medical curriculum, Principle-practice disconnection in bioethics teaching and Challenges of teaching-learning process.

Results

A total of 72 studies were included in this review. Most of the analysed articles (70.1%) had been published since 2000. The oldest article in the sample was published in 1977. Roughly 28.6%

of the articles were published in the 1980s and 1990s. The countries that contributed the most publications on the subject were the United States (US) with 27.27% followed by the United Kingdom (UK) with 19.48%. Four studies involved the participation of more than one country. Medical education-related journals were the predominant publication outlet (41.6%) and journals dedicated to medical ethics and/or bioethics specifically were responsible for publishing 29.9% of the articles included in the present study.

Concerning methodology, 52.8% of the articles included in this review were empirical. There was a predominance of descriptive studies on the courses and curricula with 41.3% of the total, followed by 20 % of studies evaluating the learning process, and 12% of studies analysing student perception (Table 1). The review and comparative studies were similarly represented with approximately 10% of the articles each, while studies involving some type of intervention comprised only 5.3% of the total sample.

The characteristics of bioethics teaching in medical education that stood out the most from the analysis were: (1) use of different methodologies in the process of teaching/learning; (2) teaching disconnected from the students' clinical experiences (3) challenges of teaching-learning process in medical courses.

The following presents an analysis of each highlighted themes.

Methodological variations in medical curriculum

Of the articles covered in this integrative review, 31, 94% reinforce the notion that bioethics education is still quite heterogeneous, both in terms of its minimum requirement, in defining the primary objective of this course of study and in the diversity of the methodologies used to teach.

In the USA, some studies were carried out that affirmed the wide variation of ethics curricula in medical schools(1,11,12) and the need to standardize the content within this discipline(5). A study published in 2015 concludes that a methodological strategy of incorporating written eth-

ics projects and a glossary of basic concepts into the curriculum increases medical students' moral reasoning capabilities(13).

The study published jointly by American and Canadian authors in 2004(14) that explores North American medical ethics curricula also states that there is no common standard for ethics education. A 2016 study in Canada(15) also reflects the need for students to have a tailored ethics curriculum particularly within a culturally diverse group of medical students.

In Turkey, a study was conducted in 2009(16) that reports how ethics is taught in medical schools in a very diverse manner and with the increase in medical schools the need for standardization becomes more pressing(17).

Studies show that ethics are consolidated in medical curricula across the European Union and highlight a significant disparity in the characteristics of programs across schools(18,19) in addition to a considerable debate over the most effective learning and teaching approaches(20).

Further evidence of the lack of clarity and uniformity in the objectives of medical ethics education is provided in a study published in 2016(21) on medical schools in English-speaking countries (mainly the UK, US and Australia) and in another published in 2017 in Saudi Arabia(22).

Four researchers(23,26) compared teaching methodologies for teaching ethics, analysing the effectiveness between traditional methodologies and those considered active methodologies such as problem-based learning (PBL), team-based learning (TBL) and use of role-playing. The results showed no significant differences between the learning in the two groups.

Some studies revealed that small-group-based teaching approaches positively impact student learning(27-31), however the results still cannot confirm whether the improve cognitive performance was accompanied by a change in the students' attitudes.

Principle-practice disconnection

Most of the articles (38.8%) included in this

integrative review deal with a major difficulty often cited: the disconnection between the ethics taught in a classroom and those relevant to students' contemporary clinical practice. This discordance and its frequent mention in the literature strongly support the pressing need to integrate the curriculum.

In the 1980s, three studies were published describing the evolution of ethics education in the US(32-34) and their main conclusion was that ethics education should be applied in practice allowing for better doctor-patient decision making. The studies published by Howe (1987) (35), Bresnahan and Hunter (1989)(36) and Ollick (2001)(37) stress the importance of including integrated ethics in all years of an academic medical training program, while Hart (1995)(38) supports starting ethics coursework in student's second year when students tend to emerge from innocence. Some studies propose an educational intervention that incorporates medical ethics training in the context of clinical training, which has been shown to increase confidence and clinical decision-making capacity(39,40) reinforcing the need for ethics education to permeate everyday experiences(41). The influence of behaviour models on student's ethics training is highlighted in order to bridge the gap between theoretical teaching and applied practice(42,43).

Two studies published in 2010, one in the US(44) and the other in Canada(45), conclude that centralizing the patients and their vulnerabilities, from the beginning of medical education, can foster a deeper integration of the various elements – bioethics and clinical sciences – in medical school curricula.

In Japan, Miyasaka et al. (1999)(46) verified that the integration in the clinical cycle of medicine graduation was very diverse. In South Africa, Moodley (2007)(47) verified that the ethics coursework taught in medical schools was inconsistent, with an existing gap between the first and fifth year of the medical graduation course. A study published jointly by the US and Canada in 2004(14) also concludes that the greatest challenge facing the field is overcoming the lack of coordination between the pre-clinical and clinical training periods.

Several studies describe the sense of unpreparedness that learners experience when ethical issues arise in practice, even with the appropriate conceptual training, and emphasize the importance of students having role models when learning to implement their ethical training(48-52).

Puthuchery (1980)(53) analysed the curricula of medical schools in the US, Germany, the Netherlands, Australia and the UK and proposed a core curriculum integrating an ethics course for each year of the medical graduation course. A review study published in 1986(54) examines ethical education in various cultures over the past two decades and concludes that teaching ethics integrated into the clinic could improve clinical performance and personal satisfaction of students. In England, Delaney and Kean (1988)(55) examine ethics education in British colleges and emphasize the importance of teaching this unique discipline using a practical and case-oriented approach. A survey was conducted at medical schools in the UK to describe how ethics was taught in 2004(56) and the results show that the most highly rated aspects of the courses were their integrated nature and small-group-based approach.

In Saudi Arabia, Mattick (2006)(57) recommends that bioethics in the Islamic world be taught in clinical settings. In Jerusalem(58), a study conducted in 2008 further confirmed that medical ethics is an integral part of medical training and not an isolated discipline because it contributes greatly to the fundamental principles underlying medical practice. The most recent study within this group was published in 2018 in New Zealand(59) and the findings demonstrate the value of integrating pre-clinical years with the clinical ones towards instilling sound ethical clinical reasoning among medical students.

Challenges of the teaching-learning process

The following articles describe some local experiences in medical ethics education in addition to covering aspects considered as challenges by the authors.

The oldest article of this nature was published in 1977 in England(60) by a working group formed to evaluate the curriculum of a medical school

and concludes that medical ethics has its place in this curriculum.

In 2010, two studies were published reviewing the first model curricula on medical ethics and law within the medical education system in the UK and conclude that the main content is consistent with the guidelines for graduate-level ethics education in addition to the important role played by the faculty(61,62).

An article (63) published in 2014 presents a guide prepared by the Institute of Medical Ethics (IME) for the evaluation of ethics and medical law in medical schools in the UK. Four surveys assessed whether the recommendations offered by medical institutions were implemented in the curricula of UK-based medical schools(64-67), in which all confirmed positively. Only Brooks & Bell (2017) warn that these data do not comprehensively reflect the current state of UK-based medical schools due to the major limitation of a low participation rate.

A study from the 1990s in India found its medical ethics programme well-suited to meet its needs(68) and in 2018, D'Souza(69) published follow-up study with a proposal for a new bioethics curriculum, namely, the horizontal and vertical curriculum of integrated bioethics, based on the basic principles outlined by the UNESCO (United Nations Educational, Scientific and Cultural Organization) curriculum.

In Brazil, the National Curricular Guidelines for Undergraduate Medical Courses include several bioethics elements(70). A study conducted in Singapore in 2011(71) concludes that pioneering the development of a formal ethics curriculum significantly affected the ethical development of first-year medical students. In China, a study that examines ethics education in three medical schools concludes that the future of medical ethics education development in China was quite promising(72).

A study published in Canada in 2016(73) also describes an innovative cross-cultural course in clinical ethics that considers biomedicine, bioethics and cultural constructs with the objective of providing ample skills for effectively resolving with

cross-cultural ethical dilemmas in clinical care.

A major challenge here illustrates the surprising lack of medical ethics education in a study carried out in Africa in 2017(74) and signals the urgent need to formally include this topic in medical school curricula to ensure that ethical practices are maintained by future students generations of health professionals.

Other authors point out as challenges the need for reflection and consequent revision of curricula to fit the needs of the modern world. A study(75) was conducted in 2014 to determine to what extent the recommendations made in the 2010 IME consensus statement had been incorporated into UK-based medical schools relative to “early life” teaching and assessment; the results showed that only two schools had a clear place for this topic in their curriculum. A study from Saudi Arabia in 2011(76) discusses how the approaches used in ethics education make teaching difficult. Moreover, in Pakistan(77) a survey revealed the need to review the undergraduate medical bioethics curriculum. Whereas in Sri Lanka in 1992(78), the inability of the traditional medical ethics program to deal with modern ethical issues was described.

Tweel (1982) focused on five doctrines based on ethical principles to improve medical training in American schools, which were considered at the time as an essential ideal to be pursued(79). Another study that also originates in the US(80) highlights the challenges associated with the hidden curriculum inherently present in medical training and demonstrates the importance of this problem and the difficulty in finding a solution.

To conclude this category, an article published in 2005 in England(81) warns of the dangers of the irresponsible use of the four-principles approach in undergraduate medical curricula, culminating in a mistaken sense of having a complete ethics module.

Discussion

This integrative review was carried out to better understand the methods used in teaching bioethics in undergraduate medical courses. The articles selected for analysis in the present study

have contributed several important aspects of the development and optimization of the teaching-learning process, providing descriptions of the practices in medical schools across the globe, the most striking characteristics and pressing challenges experienced over time, some of which persist even now, that aid in the reflection of medical educators today.

The first thematic category deals with the methodological variations in medical curriculum. How ethics is currently taught differs widely and we need to weigh the positive and negative aspects of this heterogeneity. The constantly increasing cultural diversity characteristic of modern culture makes the variability between teaching methods necessary; however, medical educators must be attentive to the minimum required standards in terms of the content covered and learning objectives necessary to ensure effective ethics training. A World Health Organization bulletin stresses that since 1999, medical schools have been strongly encouraged to include medical ethics and human rights training in their curricula and that one of the greatest challenges would be developing an ethics guide that transcends social, cultural and national issues(82). In addition, the World Medical Association (WMA)(83) in 2006 and UNESCO(84) in 2008 published suggestions for basic curricula that are adaptable to different contexts; thereby reinforcing that the objective of medical ethics education is to enable students to identify ethical conflicts and act rationally towards resolving them.

Some studies point out that the methodologies proved best for the knowledge acquisition, such as teaching in small groups and TBL, are unable to measure the outcome of the formative process, which is the long-term acquisition of skills and abilities in the field of ethics capable of changing students' attitudes, also explored in other articles(85-87).

The second category highlighted was principle-practice disconnection, most of the articles that comprise this grouping explain and support the need for integration between basic classroom lessons and real-life clinical applications. Some studies point out that medical education is more effective when linked to daily practices(88), which

justifies the notorious concern of educators about the feeling of unpreparedness among students when first dealing with conflicts that arise in healthcare practice(89-92). These studies support implementing a curriculum that contributes both to the acquisition of theoretical knowledge and practical skills, namely 'soft skills'; however, some also acknowledge that this is a very complex process(93,94) with no theoretical or practical model to guide this integration(95). Curriculum integration is as delicate as it is important to educators because the intensity inherent to medical training in practice can easily turn detrimental when it occurs without proper critical reflection and guidance from role models(96).

Finally, the last category dealt with the challenges of the teaching-learning process in situations that range from the absence of the subject of ethics felt by students in Africa, to the need to adapt the bioethics curricula in some Asian countries, to the challenges in the implementation of already consolidated curricula, such as in the UK and US. There is no consensus on the objectives and best practices in teaching ethics(97), but there is an understanding that a solid knowledge of ethics is essential to sound clinical practice (95) inextricably associated with the influence of a hidden curriculum in the development of future physicians(98). The need to think about changes in the formative processes underlying healthcare courses that take into account the public health needs of populations(99) in line with the challenges of the 21st century by drawing from the fundamental skills imparted by a comprehensive medical training is also stressed(100).

Conclusions

Trying to answer the research question of how to understand the methods used when teaching of bioethics in medical contexts, most of the studies in this review, taken together, lead to the conclusions that there is still no minimum curricular parameters about the ideal way to approach this crucial matter.

The studies published in the US best portray this aspect of the non-homogeneity of teaching and the need for standardization. Some countries, such as the UK, report that ethics coursework

already occupies an established place in their curricula, in addition to investing in recent decades in adopting the recommendations agreed upon by their medical institutions. The aspects most highly recommended in some studies are the nature of the integrated curriculum and teaching in small groups.

An important aspect highlighted in the vast majority of studies is that ethics education should be applied to students' clinical practices and allowed to permeate their daily experiences. While this is undoubtedly a powerful educational element, some studies also draw attention to the challenges of a hidden curriculum that neither the institution nor the educators have control over or the capacity to measure.

One of the biggest challenges facing the field is the perception of learners, in several studies of this sample, of unpreparedness concerning ethical issues in clinical practice even with sufficient conceptual training and the importance of role models in this training process. Bioethics is still a very subjective subject with evaluation formats that do not allow the knowledge incorporated into students' attitudes to be measured. Further studies are needed to determine the relationship between the methods used to teach bioethics and the attitudes and practices of medical students, as well as the long-term outcome. And finally, the main message that remains from this review is that the study of bioethics in medical courses does not have minimum curriculum parameters in the world and this is an important need.

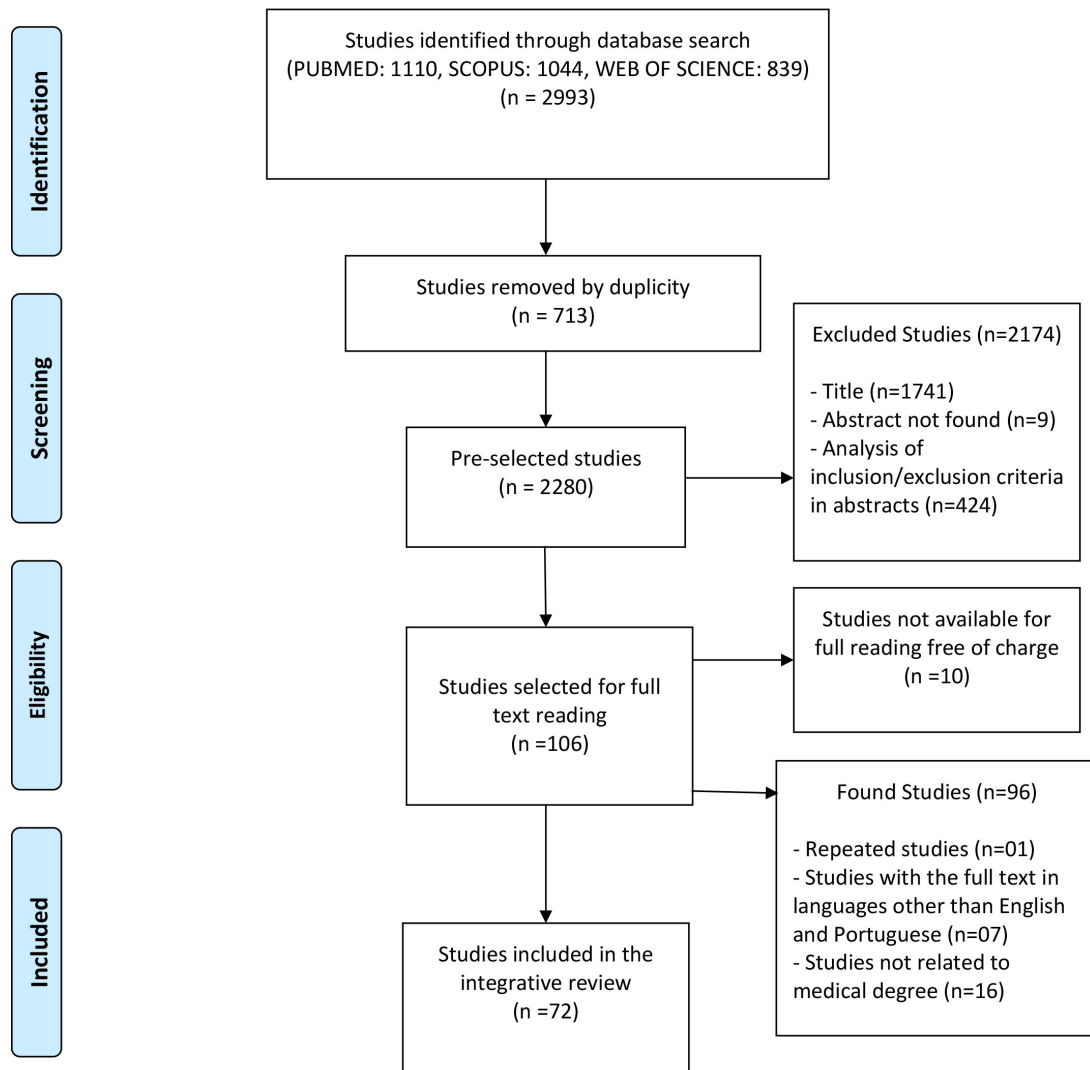


Figure 1: Diagram of the selection process of the articles according to Prisma's standards.

Table 1. Empirical studies included in the integrative review.

Title/ Place / year	Objectives	Methodology
Medical students' evaluations of different levels of medical ethics teaching: implications for curricula(35) USA 1987	To report the evaluations given by clinical medical students over medical ethics teaching.	-137 preclinical and 216 clinical medical students -Michigan State University College of Human Medicine and Osteopathic Medicine
Attitudes of medical students to the teaching of medical ethics(55) UK 1988	To report medical students' views on teaching ethics.	- A questionnaire was sent to the first preclinical and second clinical years - Only 30% of the sample responded - Oxford University
Review of the teaching of medical ethics in London medical schools(64) London 1990	To determine the extent and format of ethics teaching in the London medical schools.	-London medical schools. -Questionnaire was presented to representatives of medical college offices and students of all London medical schools.
A data generated basis for medical ethics: Categorizing issues experienced by Students during Clinical Training(42) USA 1995	To use issues identified by students in order to establish an experience and evidence-based approach to medical ethics education	-628 sophomore and senior students -249 students responded - State University of New York at Buffalo School of Medicine and Biomedical Sciences. -Questionnaire
Changing Attitudes About End-of-Life Decision Making of Medical Students During Third-Year Clinical Clerkships(43) USA 1999	Evaluate changes in medical students' attitudes about end-of-life decision making.	-96 out of 104 third-year medical students -Pre- and post-course survey -Emory University School of Medicine
An international survey of medical ethics curricula in Asia(46) Japan 1999	To characterise the medical ethics curricula at Asian medical schools.	- A total of 100 medical schools responded -Mailed survey of 206 medical schools
A process evaluation of medical ethics education in the first year of a new medical curriculum(28) UK 2000	To evaluate the process of medical ethics education in the first year of a new learner-centred, problem based, integrated medical curriculum.	- 238 students - 30 clinical tutors - Glasgow University's - A qualitative, multi-method approach - Open questionnaires, focus groups and tutor evaluation rating scales
Impact of a new course on students' potential behaviour on encountering ethical dilemmas(29) UK 2001	To evaluate the effectiveness of small-group ethics teaching in an integrated medical curriculum.	- A total of 111 first-year students participated and a control group of 51 from the last year participated - University of Glasgow Medical School -Quasi-experimental, pre- and post-test, non-equivalent control group design
Ethics Education in U.S. Medical Schools: A Study of Syllabi(1) USA 2002	To determine the scope and content of required, formal ethics components	-87 out of 121 representatives of medical schools in the U.S. - Questionnaire

<p>A Survey of Medical Ethics Education at U.S. and Canadian Medical Schools(14)</p> <p>USA / Canada 2004</p>	<p>To explore the content, timing, course format, faculty, and curricular resources devoted to medical ethics</p>	<ul style="list-style-type: none"> - 85 U.S. and 06 Canadian respondents - Questionnaires mailed to 125 U.S. medical schools and 16 Canadian schools
<p>Bringing Ethics Education to the Clinical Years: Ward Ethics Sessions at the University of Washington(39)</p> <p>USA 2006</p>	<p>To develop an educational intervention to incorporate medical ethics training as a part of students' professional development within the context of clinical training.</p>	<ul style="list-style-type: none"> - 89 third-year students on medicine -30 clinical faculty participated as facilitators. -Written evaluations were collected from students and faculty at each session
<p>Medical ethics and tomorrow's physicians: an aspect of coverage in the formal curriculum(57)</p> <p>Saudi Arabia 2006</p>	<p>To review the current status of bioethics teaching in medical schools.</p>	<ul style="list-style-type: none"> - 14 clinical departments and 201 students participated - College of Medicine, King Faisal University Dammam, Saudi Arabia - Cross-sectional study
<p>Undergraduate ethics teaching: revisiting the Consensus Statement(65)</p> <p>UK 2006</p>	<p>To determine whether the recommendations of the Consensus Statement published 7 years ago have been implemented.</p>	<ul style="list-style-type: none"> - A total of 22 / 28 (79%) medical schools completed the survey -Postal questionnaire survey of 28 UK medical schools.
<p>Teaching ethics in Europe(18)</p> <p>France 2006</p>	<p>To carry out an appropriate overview and inventory of the teaching of ethics within the European Union Schools of Medicine.</p>	<ul style="list-style-type: none"> - A questionnaire was sent by email to 45 randomly selected medical schools from each of 23 countries in the European Union - 25 schools of medicine from 18 European countries were included (response rate = 56%). - Questionnaire
<p>Teaching and assessing medical ethics: where are we now?(56)</p> <p>UK 2006</p>	<p>To characterise UK undergraduate medical ethics curricula and to identify opportunities and threats to teaching and learning.</p>	<ul style="list-style-type: none"> - 14 out of 16 medical schools responded - UK medical schools - Postal questionnaire - Completed responses were received from 22/28 schools (79%).
<p>Effects of an additional small group discussion to cognitive achievement and retention in basic principles of bioethics teaching methods(30)</p> <p>Indonesia 2009</p>	<p>Investigate the effects of an additional small group discussion in basic principles of bioethics conventional lecture methods.</p>	<ul style="list-style-type: none"> -A total of 70 participants -Faculty of Medicine, University of Riau, Pekanbaru. - Randomized controlled trial with parallel design.
<p>Medical Students' Affirmation of Ethics Education(40)</p> <p>USA 2009</p>	<p>To assess the effects of two different types of research ethics training on medical students' attitudes.</p>	<ul style="list-style-type: none"> - 83 out of 300 medical students were invited via e-mail to participate -University of New Mexico - Randomized, controlled experiment
<p>The effect of team-based learning in medical ethics education(31)</p> <p>Republic of Korea 2009</p>	<p>Evaluated the impact of TBL on student engagement and satisfaction and assessed educational achievements.</p>	<ul style="list-style-type: none"> - 132 out of the 160 first-year medical students completed the survey (response rate, 79.5%). - The 160 students were assigned to 26 teams of six or seven students each -Chonnam National University Medical School.

End-of-life ethics and disability(45) Canada 2010	To explore ways of teaching bioethical issues to first year medical students.	<ul style="list-style-type: none"> - 6 Medical students, 4 Community resource speakers and 5 External faculty members were interviewed - 9 medical students, 5 Faculty members and 6 External faculty members participated in the focus group - University of Manitoba - Multiple qualitative methods - Participant observation
Interns' Perceptions on Medical Ethics Education and Ethical Issues at the Dokuz Eylul University School of Medicine in Turkey(49) Turkey 2010	To investigate interns' perceptions of medical ethics education and ethical issues.	<ul style="list-style-type: none"> - 80 of the 119 interns at the clinics (67.2%) responded - Dokuz Eylul University School of Medicine - Questionnaire
Evaluating the Effects of an Integrated Medical Ethics Curriculum on First-year Students(71) Singapore 2011	Analyses the effects of the new curriculum on first-year students' knowledge, confidence and opinions in relation to the subject.	<ul style="list-style-type: none"> - A group of first-year students - Experimental group (n = 119) - Control group (n = 164) - National University of Singapore Yong Loo Lin School of Medicine - Cohort-based quasi-experimental - Pre-course and post-course questionnaire
Teaching of Medical Ethics: Students' perception in different periods of the course(51) Brasil 2011	To identify the perception of medical students about ethical conflicts during their academic practice, in two different periods of the course	<ul style="list-style-type: none"> - 110 student responded the questionnaires (71.4%) - Medical School of Federal University of Sergipe (UFS), - Cross-sectional study
Reform in medical ethics curriculum: a step by step approach based on available resources(27) Iran 2011	To revise the medical ethics curriculum at the School of Medicine	<ul style="list-style-type: none"> - A total of 113 were returned (response rate of 82.5%). - Tehran University of Medical Sciences - Questionnaire
Use of role play in undergraduate teaching of ethics - an experience(26) India 2012	Try to assess the dramatization in relation to the lecture by analysing student feedback.	<ul style="list-style-type: none"> - 96 students of 2nd year MBBS. - All the students actively participated in the group activity
Meaning and value in medical school curricula(101) Australia 2012	Identify ethical and professional concerns comparing ethics curricula with themes that emerged from a qualitative study of medical practitioners.	<p>Consisted of two components:</p> <ul style="list-style-type: none"> - <i>Curriculum analysis</i>: 32 curricula identified through a database search - <i>Qualitative study</i>: semi-structured interviews were conducted with 20 medical practitioners
Ethics teaching on 'Beginning of Life' issues in UK medical schools(75) UK 2013	To audit the extent to which the recommendations made in the 2010 IME consensus statement regarding the teaching of 'Beginning of Life' issues are being met in UK medical schools.	<ul style="list-style-type: none"> - 21 out of all 32 undergraduate medical schools in the UK responded - Web-based questionnaire

Teaching medical ethics: problem-based learning or small group discussion?(24) Iran 2013	To compare PBL and SGD methods in teaching medical ethics.	- Twenty students were randomly assigned into two groups - Qom University of Medical Sciences
Teaching and evaluation methods of medical ethics in the Saudi public medical colleges: cross-sectional questionnaire study(102) Saudi Arabia 2013	Studying the current teaching methods and evaluation tools used by the Saudi public medical schools.	- Saudi public medical schools - cross sectional study - Self-administered online questionnaire
How medical students learn ethics: an online log of their learning experiences(66) London 2015	To determine the totality of the medical students' learning of ethics and law.	- King's College London School of Medicine - Number of participants: 99 - Cohort size: 2164 - Percentage of group (%): 4,57%
Ethics competences in the undergraduate medical education curriculum: the Spanish experience(19) Spain 2016	To investigate if there are differences in medical ethics education between different schools of medicine in Spain.	-2569 subjects belonging to 44 medical schools in Spain -Observational, descriptive-comparative, and transverse
Developing a bioethics curriculum for medical students from divergent geopolitical regions(15) Canada 2016	To determine the content and format of an ideal bioethics' curriculum for a culturally.	- 10 students -The 2013 IPEME student cohort was approached and asked to participate in an individual, semi-structured interview - Qualitative study - Interview
Medical Ethics Education in China: Lessons from Three Schools(72) China 2017	Examined ethics education at three medical schools in China to understand their curricular content, teaching and learning methods, forms of assessments, changes over time, and what changes are needed for further improvement.	- Altogether, 232 out of 404 GMU students, 99 out of 200 PKU students, and 76 out of 270 WU students responded to the survey -Faculty members that answered the survey: 0 out of 4 of the GMU, 2 out of 4 of PKU and 7 out of 14 of WU -Wuhan University School of Medicine (WU), Guangzhou Medical University GMU, and Peking University School of Medicine (PKU) - Survey
Ethics teaching in a medical education environment: preferences for diversity of learning and assessment methods(52) United Arab Emirates 2017	To examine medical students' perceptions toward ethics and professionalism teaching, and its learning and assessment methods.	- A total of 108 out of 128 students participated. - United Arab Emirates University - Self-administered questionnaire
Teaching, learning and assessment of medical ethics at the UK medical schools(67) UK 2017	To evaluate the UK undergraduate medical ethics curricula against the Institute of Medical Ethics (IME) recommendations.	- Completed responses were received from 11/33 schools (33%). - Questionnaire survey of the UK medical schools

Must we remain blind to undergraduate medical ethics education in Africa? A cross-sectional study of Nigerian medical students(74) Nigeria 2017	To determine the views of Nigerian medical students on medical ethics education and medico-ethical issues related to the doctor-patient relationship, as well as the ethical/professional dilemmas with which they may be confronted.	- The sample included 100 males (71.4%) and 40 females (28.6%) - final year medical students - University of Nigeria - Cross-sectional survey -Self-administered structured questionnaires
Preclinical Students' Views On Medical Ethics Education: A Focus Group Study In Turkey(50) Turkey 2018	To receive the opinions of the preclinical medical students on medical ethics education.	- the sample consisted of 18 out of 21 students -Qualitative research method - Focus group interviews
Moving Beyond the Theoretical: Medical Students' Desire for Practical, Role-Specific Ethics Training(48) USA 2018	To discover, from the students' perspective, how ethics pedagogy prepares medical students for clerkship and what gaps might remain.	- Three focus groups ($n = 5, 3, 5$) of third- and fourth-year medical students -University of Pennsylvania. - Pilot study - Qualitative study
Comparison of lecture and team-based learning in medical ethics education(25) Turkey 2019	To compare the lecture-based class and TBL method.	- 163 out of 188 students participated in both of the TBL and lectures during four cycles in 2013–2014 academic year. - Prospective controlled follow-up study - Instruments: In-class engagement measure; Observation process; Feedback forms

List of Abbreviations

- USA (United States of America)
- UK (United Kingdom)
- PBL (Problem Based Learning)
- TBL (Team Based Learning)
- IME (Institute of Medical Ethics)
- UNESCO (United Nations Educational, Scientific and Cultural Organization)

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Authors' contributions

- ACALLT - participated in the elaboration of the project, study design, data collection and analysis, article writing.
- AGAT - participated in the study design, orientation of the data analysis, review of the writing of the article.
- RST - participated in the study design, data collection and analysis, review of the writing of the article.
- MFMP SR - participated in the definition of the study design, orientation of the data analysis, review of the writing of the article.
- RMLN - research advisor, participated in the elaboration of the project, study design, project review and the writing of the article.
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