Medical Teacher

ISSN: (Print) (Online) Journal homepage: https://www.informahealthcare.com/loi/imte20

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To cite this article: Mun Kit Wong, Daniel Zhi Hao Hong, Jiaxuan Wu, Jacquelin Jia Qi Ting, Jia Ling Goh, Zhi Yang Ong, Rachelle Qi En Toh, Christine Li Ling Chiang, Caleb Wei Hao Ng, Jared Chuan Kai Ng, Clarissa Wei Shuen Cheong, Kuang Teck Tay, Laura Hui Shuen Tan, Yun Ting Ong, Min Chiam, Annelissa Mien Chew Chin, Stephen Mason & Lalit Kumar Radha Krishna (2022) A systematic scoping review of undergraduate medical ethics education programs from 1990 to 2020, Medical Teacher, 44:2, 167-186, DOI: 10.1080/0142159X.2021.1970729

To link to this article: https://doi.org/10.1080/0142159X.2021.1970729

MEDICAL TEACHER
2022, VOL. 44, NO. 2, 167–186
https://doi.org/10.1080/0142159X.2021.1970729

A systematic scoping review of undergraduate medical ethics education programs from 1990 to 2020

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ABSTRACT

Introduction: Ensuring medical students are equipped with essential knowledge and portable skills to face complex ethical issues underlines the need for ethics education in medical school. Yet such training remains variable amidst evolving contextual, sociocultural, legal and financial considerations that inform training across different healthcare systems. This review aims to map how undergraduate medical schools teach and assess ethics.

Methods: Guided by the Systematic Evidence-Based Approach (SEBA), two concurrent systematic scoping reviews were carried out, one on ethics teaching and another on their assessment. Searches were conducted on PubMed, Embase, PsycINFO and ERIC between 1 January 1990 and 31 December 2020. Data was independently analysed using thematic and content analysis.

Results: Upon scrutinising the two sets of full-text articles, we identified 141 articles on ethics teaching and 102 articles on their assessments. 83 overlapped resulting in 160 distinct articles. Similar themes and categories were identified, these include teaching modalities, curriculum content, enablers and barriers to teaching, assessment methods, and their pros and cons.

Conclusion: This review reveals the importance of adopting an interactive, multimodal and interdisciplinary team-teaching approach to ethics education, involving community resource partners and faculty trained in ethics, law, communication, professionalism, and other intertwining healthcare professions. Conscientious effort should also be put into vertically and horizontally integrating ethics into formal medical curricula to ensure contextualisation and application of ethics knowledge, skills and attitudes, as well as protected time and adequate resources. A stage-based multimodal assessment approach should be used to appropriately evaluate knowledge acquisition, application and reflection across various practice settings. To scaffold personalised development plans and remediation efforts, multisource evaluations may be stored in a centralised portfolio. Whilst standardisation of curricula content ensures cross-speciality ethical proficiency, deliberative curriculum inquiry performed by faculty members using a Delphi approach may help to facilitate the narrowing of relevant topics.

KEYWORDS
Medical education; medical ethics; teaching ethics; assessing ethics; medical school

Introduction

The belief that 'the practice of medicine is an intrinsically ethical enterprise' underlies the incorporation of ethics training programs within medical curricula today (Nandi 2000). In the United Kingdom, the General Medical Council (GMC)'s Good Medical Practice recommends 'an awareness of the moral and ethical responsibilities involved in individual patient care and in the provision of care to populations of patients' as a key competency (General Medical Council 2019). The importance of clinical ethics is also widely supported as an integral part of medical school curriculum in the United States by the Liaison Committee on Medical

Practice points

- An interactive, multimodal, interdisciplinary team-teaching approach should be adopted, involving community resource partners and faculty trained in ethics, law, communication, professionalism, and other intertwining healthcare professions.
- A stage-based, multimodal assessment approach should be used to evaluate knowledge acquisition, application, and reflection.
- To scaffold personalised development plans and remediation efforts, multisource evaluations should be stored in a centralised portfolio.

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Supplemental data for this article can be accessed here.

Education of the American Association of Medical Colleges (Glicksman 2016). The Consensus Statement Updated published in 2010 and the Romanell Report published in 2015 reiterate the notion that ethical competence requires cognizance of ethical dimensions in clinical practice, possession of requisite knowledge and skills, display of ethical sensitivity and confidence, clear justifications for clinical decisions made, and a willingness to continuously reflect and deepen knowledge on ethical issues (Carrese et al. 2015; Stirrat et al., 2010).

However, amidst efforts to instill portable ethical, moral, and professional skills in medical students and guide accountable practice across different clinical settings, questions have arisen as to the efficacy of prevailing ethics education programs. Indeed, research indicates that medical students feel underprepared when entering clinical practice, suggesting deficits in the pedagogical process (Brooks and Bell 2017). Increasingly complex moral and ethical issues in clinical practice, underpinned by evolving sociocultural influences, changing legal standards of practice, shifting public expectations upon the medical profession and escalating care costs and medicolegal concerns (Eckles et al. 2005; Millstone 2014; Sokol 2016) have led to medical schools adopting varied content and pedagogy to remain clinically appropriate, culturally sensitive, and contextually specific. In light of this, there is much contention as to how medical ethics may be best taught and assessed.

Multiple literature reviews have been conducted in the last 20 years. However, most present findings from the United Kingdom, United States and/or Australia (Musick 1999; Goldie 2000; Giubilini et al. 2016). Others establish narrower parameters, choosing to focus on specific teaching and assessment methods such as the utility of interprofessional education (Kurtz and Starbird 2016) or simulation-based pedagogical techniques in medical education (Tritrakarn et al. 2014). Notably, only three systematic reviews on undergraduate ethics education were identified in the literature. However, Souza and Vaswani (2020) confined their searches to 2015-2019 whilst Azim and Shamim (2020) focused solely on learning theories underlying ethics education. Despite including grey literature, Rahim et al. (2016) omitted letters and commentaries which we believe may offer rich insights and novel ideas. These three reviews also yielded a small number of included articles – 29, 6, and 17 respectively. As such, more research is needed to amalgamate the heterogeneity of practices compounded by the limited data available. To fill in this gap and to inform the design of ethics teaching and assessments, two concurrent systematic scoping reviews (SSR)s will be carried out to map available literature on teaching and assessment practices in undergraduate ethics programs.

Methods

The novel use of concurrent SSRs serve to facilitate effective identification of characteristics, patterns, relationships and disagreements amongst prevailing accounts. It also minimises the omission of pertinent articles (Mays et al. 2001; Hinchcliff et al. 2012; Boden et al. 2018).

In this review, we adopted Krishna's Systematic Evidence-Based Approach (SEBA) (Kow et al. 2020; Krishna et al. 2020; Ngiam et al. 2021; Zhou et al. 2021) to provide a stepwise description of the design, search process, data collection, analysis and synthesis of the SSR (henceforth, SSR in SEBA). This was to improve data reproducibility and accountability amidst methodologic and reporting variability across the literature (Davey et al. 2013; Greenhalgh and Wong 2014). Whilst SEBA's constructivist perspective captures the socioculturally informed nature of ethics, its adoption of a relativist lens allows it to map complex topics from multiple angles (Munn et al. 2018; Tricco et al. 2018). These will provide a more holistic picture of existing medical ethics training programs.

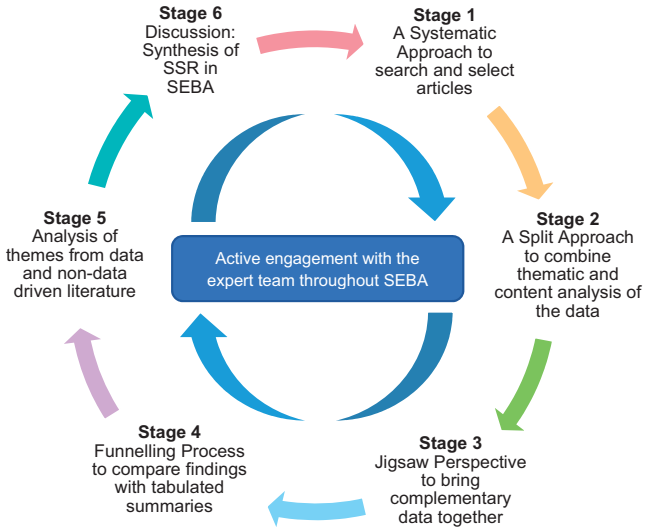

Figure 1. The six-stage SEBA process.

To further enhance the trustworthiness of the SSR in SEBA syntheses, the research team was supported by a medical librarian from the Yong Loo Lin School of Medicine (YLLSoM) at the National University of Singapore and the National Cancer Centre Singapore (NCCS), and local educational experts and clinicians at YLLSoM, NCCS, Palliative Care Institute Liverpool and Duke-NUS Medical School (henceforth the expert team). The expert team guided and reviewed the findings along with the research team through the following six stages of SEBA: the (1) systematic approach, (2) split approach, (3) jigsaw perspective, (4) funnelling process, (5) analysis of themes from data and non-data driven literature, and (6) discussion: synthesis of SSR in SEBA. (Figure 1).

Stage 1 of SEBA: systematic approach

Identifying the research question and inclusion criteria

To ensure effective oversight of the two SSR in SEBA syntheses, the expert team was involved in the design of both SSRs and assisted in determining the population, context and concepts to be evaluated.

Guided by the Population, Intervention, Comparison and Outcome (PICOS) elements of the inclusion criteria (Peters et al. 2015a,b), the primary research question for the SSR in SEBA on teaching ethics was 'how do medical schools teach ethics?' The secondary research question was 'what are the teaching modalities, curriculum content and their objectives?'

In turn, the primary research question for the SSR in SEBA on assessing ethics was 'how do medical schools

assess ethics?' The secondary research question was 'how are the outcomes of these programs assessed?' The PICOS, inclusion criteria and exclusion criteria may be found in Supplementary Appendix 1.

Searching

For both searches, two research teams comprised of eight members carried out independent searches of the PubMed, Embase, PsycINFO, and ERIC databases. In keeping with Pham et al. (2014)'s recommendations to ensuring a viable and sustainable research process, the research teams confined the searches to articles published between 1 January 1990 and 31 December 2020. All research methodologies in articles published or translated into English were included. The independent searches were first carried out between 14 February 2019 and 24 April 2019. These were reviewed between 18 October 2020 and 17 December 2020 and updated between 17 January 2021 and 17 February 2021, and 25 June 2021 to 30 July 2021.

Each member of the research team independently reviewed the titles on the preliminary list and employed 'negotiated consensual validation' (Sandelowski and Barroso 2006) within the team to achieve consensus on the final list of articles to be analysed.

Stage 2 of SEBA: split approach

Enhancing the reliability and transparency of the analysis, the SEBA methodology employs the split approach which sees the data accrued undergo concurrent thematic and content analysis. For each SSR, two teams of five researchers analysed the included articles. The first team used Braun and Clarke (2006)'s approach to thematic analysis whilst the second team employed Hsieh and Shannon (2005)'s approach to directed content analysis.

Thematic analysis

Braun and Clarke (2006)'s approach to thematic analysis was adopted to identify common themes across different goals and populations of medical students. Whilst circumventing the context-specific nature of medical ethics, it also circumnavigates the presence of a wide range of research methodologies used by the included articles and facilitates analysis of socioculturally influenced educational processes (Haig and Dozier 2003; Gordon and Gibbs 2014).

A reiterative step-by-step analysis was carried out with 'codes' constructed from the 'surface' meaning of the text. These 'codes' were categorised and organised into themes that were deemed to best represent the data. The codes and themes identified by individual members of the research team were reviewed and discussed at online meetings. 'Negotiated consensual validation' was used to achieve consensus on the final themes. Having each member independently analyse the same data provides investigator triangulation.

Directed content analysis

Hsieh and Shannon (2005)'s approach to directed content analysis was employed to enhance the validity of the themes identified and to address the relative failure of thematic analysis to contend with contradictory data.

Identifying and operationalising *a priori* coding categories on the teaching of ethics, the members of the team independently drew codes and categories from Sutton (2010)'s article entitled 'Ethics and law teaching and learning in undergraduate medicine' and McKneally and Singer (2001)'s 'Bioethics for clinicians 25. Teaching bioethics in the clinical setting.'

With regards to assessing ethical competence, codes and categories were drawn from Norcini et al. (2018)'s 'Draft 2018 Consensus Framework for Good Assessment,' Veloski et al. (2006)'s 'Systematic review of the literature on assessment, feedback and physicians' clinical performance: BEME Guide No. 7' and Watling and Ginsburg (2019)'s article entitled 'Assessment, feedback and the alchemy of learning.'

These codes were applied to the included articles. In keeping with deductive category application, any relevant data not captured by existing codes were assigned a new code. The independent findings were discussed online and 'negotiated consensual validation' was used once more to achieve consensus on the final code book for each review. The code book was used to analyse the remaining included articles.

Stage 3: Jigsaw perspective

Hinging on Moss and Haertel (2016)'s suggestion that complementary qualitative data should be read together to give 'a richer, more nuanced understanding of a given phenomenon,' the Jigsaw Perspective combines complementary pieces to create a holistic picture of the data.

Here, categories and themes identified in the Split Approach from each SSR in SEBA are compared and viewed as individual pieces of a puzzle. Complementary pieces are combined to create themes/categories to provide a more complete picture of the area of study. The research team then identified and combined overlapping themes/categories from each of the SSRs in SEBA to provide the basis for the synthesis of the discussion.

Stage 4: funnelling process

A third independent team tabulated summaries of the included articles on teaching and assessing ethics to ensure that key points of discussion and contradictory views are not lost. The teaching and assessment summaries may be found in Supplementary Appendix 2. These were performed in keeping with recommendations set out by Wong et al. (2013)'s RAMESES publication standards: meta-narrative reviews and Popay et al. (2006)'s 'Guidance on the conduct of narrative synthesis in systematic reviews.'

To further study the included articles, the team also adopted Phases 3 to 6 of France et al. (2019)'s adaptation of Noblit and Hare (1988)'s seven phases of meta-ethnography. As per Phase 3, the article's aim, methodology, key findings and conclusions were summarised and tabulated. As per Phase 4, the team juxtaposed the themes and categories by grouping them together. This was guided by the commensurate focus of the included articles from which the themes and categories were drawn from. These verified

themes/categories termed 'funnelled domains' form the basis of the new storyline or overarching explanation of the particular SSR.

To determine if the funnelled domains ascertained were consistent with current practice, the research team reviewed the ethics curriculum published on the official websites of the Top 20 medical schools featured in the 2020 Times Higher Education World University Rankings (The World University Rankings 2020). Information gleaned was compared with data gathered from the literature. Although the research and expert teams acknowledge that these rankings are not decisive indicators of effective medical ethics training, their inclusion provides an external source to verify the viability of the conclusions drawn and serve as points of comparison for potential programs.

The funnelled domains from both SSRs in SEBA were juxtaposed and grouped together and combined where possible. These combined funnelled domains form 'the line of argument' within the synthesis of the discussion section of this review.

Stage 5 of SEBA: analysis of data and non-data driven literature

As part of SEBA's reiterative process, data from grey literature and non-research-based pieces such as letters, opinion and perspective pieces, commentaries and editorials from the bibliographic databases, were thematically analysed and the results compared against the themes identified from peer-reviewed data. This analysis revealed no difference in the themes from the two sources of data suggesting that non-data driven articles did not bias the conclusions drawn.

Results

SSR in SEBA: teaching ethics

In the SSR in SEBA on teaching ethics, a total of 8732 abstracts were reviewed, 593 full text articles were evaluated, and 141 articles were included after scrutinising articles identified in the following SSR in SEBA on assessing ethics. This is outlined in Figure 2 below.

Of the 141 articles, 101 were primary studies, three were secondary systematic reviews and 37 were tertiary commentaries, literature reviews or descriptive pieces. Of the 101 primary studies identified, 80 were educational interventions, 13 were surveys disseminated to faculty, four were needs analyses and four were identifications of ethical challenges faced by students in their clinical rotations through case submissions. Themes and categories identified were similar and comprised of (a) teaching modalities and objectives, (b) curriculum topics and (c) enablers and barriers to teaching ethics effectively.

SSR in SEBA: assessing ethics

In the SSR in SEBA on assessing ethics, a total of 9910 abstracts were reviewed, 333 full text articles were evaluated, and 102 articles were included after scrutinising articles identified in the SSR in SEBA on teaching ethics. This is outlined in Figure 3 below.

Of the 102 articles, 71 were primary studies, two were secondary reviews and 29 were tertiary papers. Of the 71 primary studies identified, 61 were educational interventions and 10 were school surveys. Themes and categories identified were similar and comprised (d) assessment modalities and the (e) pros and cons of each assessment method.

Synthesising key information on teaching and assessing articles identified

Of the 243 articles ascertained above, 83 overlap, containing elements of both teaching and assessments to varying degrees (58 primary, two secondary, and 23 tertiary papers). There are thus 160 distinct articles included. Twenty-two articles pertained to preclinical medical students, 47 to clinical, 83 to both, and eight did not clearly delineate their target student population. Fifty-eight (36.3%) were carried out in the United States, nine (5.6%) in Canada and three (1.9%) broadly in North America. In addition, one (0.6%) was conducted in Central America, and one (0.6%) in South America. Thirty-nine studies (24.4%) were carried out in Europe, 13 (8.1%) in the Middle East, 12 (7.5%) in Asia and nine (5.6%) in Oceania. Eleven (6.9%) were international reviews and collaborations. The 13 school surveys were disseminated to faculty from 499 medical schools across USA, Canada, Europe, Saudi Arabia, and China to gather information on their respective ethics programs. Of the eight needs analyses and identification articles, responses were collected from more than 1600 students across USA, UK, and Egypt.

Teaching modalities

A spiralled, vertically, and horizontally integrated ethics curriculum was widely hailed as the ideal pedagogical approach to teaching ethics (Fox et al. 1995; Goldie 2000; Stirrat 2015). Yet whilst 21.3% (17/80) of the primary interventions described their ethics programs as 'integrated,' this term was not well elucidated. Some referred to integration as the general incorporation of ethics teaching into their medical education curriculum ($n = 6$) – alongside lessons in anatomy, for example (Stephens et al. 2019). Some studies indicated that their ethics courses were indeed integrated vertically and longitudinally across the undergraduate curriculum ($n = 11$). Others referred to integration as interdisciplinarity ($n = 12$), such as the teaching of ethics, humanism and professionalism together (Lewin and Lanken 2004). Yet still, one described their vertically integrated ethics program as running parallel to their medical education curriculum (Sullivan et al. 2020). This varied interpretation is highlighted in the primary surveys conducted across schools with differentiations made between modular and transversal teaching (Claudot et al. 2007) and the simultaneity of discrete ethics topics within integrated ethics teaching (Brooks and Bell 2017).

Moving from classroom to clinical practice, various teaching modalities were reported. 55% (44/80) of the primary interventions used didactic, large-scale lectures and seminars, and 28.8% (23/80) assigned readings from textbooks and provided printed handouts.

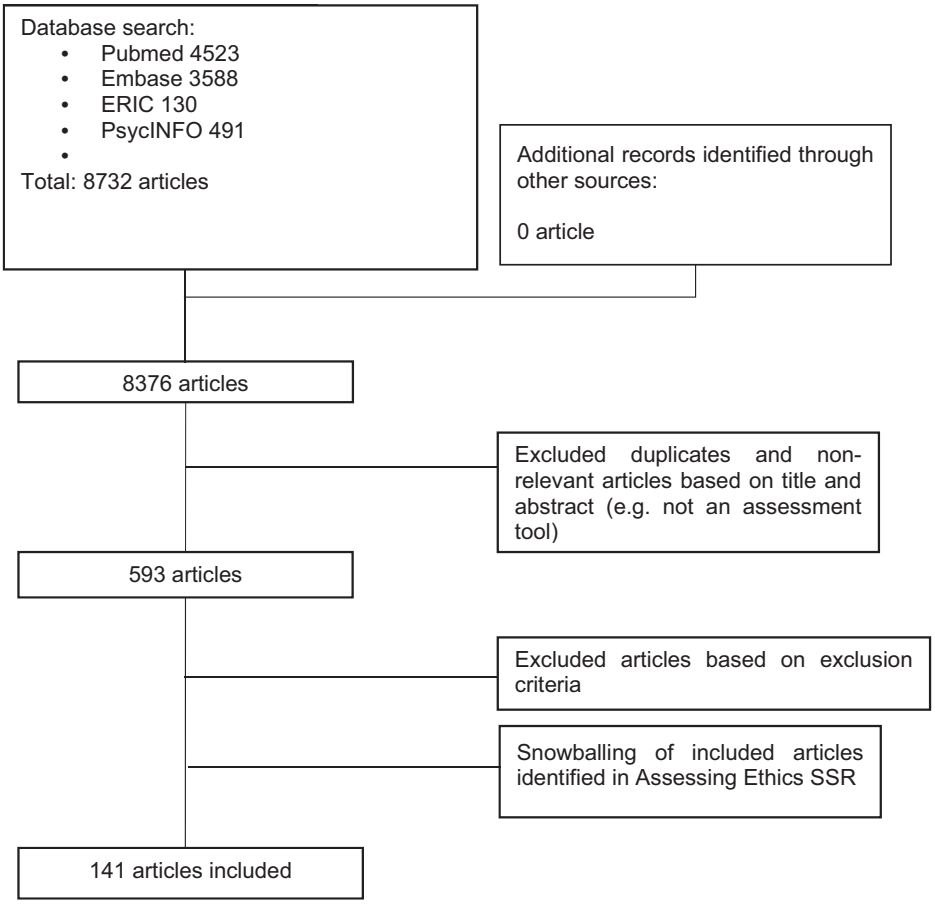

Figure 2. PRISMA flow chart for the teaching of ethics.

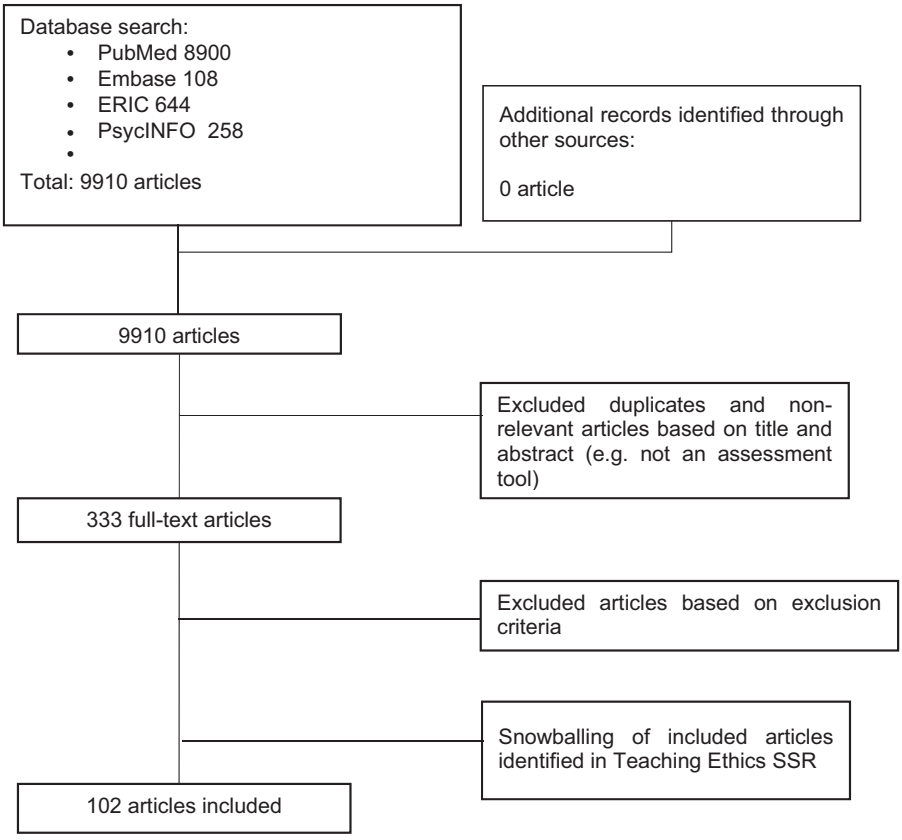

Figure 3. PRISMA flow chart for the assessing of ethics.

77.5% (62/80) offered opportunities for small group discussions through tutorials and post-lecture break-out sessions. 53.6% (43/80) focused on case-based learning, using either real case vignettes or constructed narratives. 10% (8/80) highlighted a problem-based learning approach. 12.5% (10/80) instructed students to give oral presentations and 8.75% (4/80) engaged students in structured debates. In addition, 18.75% (15/80) arranged for role play sessions and simulations with standardised patients.

These different modalities were augmented by multimedia technology in 12.5% (10/80) of the primary interventions. These included trigger films (short audiovisual scenes used to trigger discussions on ethics with learners) (Searight et al. 2020) and novel tools such as virtual reality systems to facilitate simulated interactions with various stakeholders (Torda 2020). 11.3% (9/80) used synchronous and asynchronous e-learning platforms, with live telemedicine consultations broadcasted to students for observation and further discussion in one instance (Bramstedt et al. 2014).

Clinical bedside teaching and grand rounds featured in 17.5% (14/80) of these interventions. Field visits took the form of home visits (Andre et al. 2003), overseas global health learning projects (Logar et al. 2015), and trips to the animal house to learn about research ethics (Patel et al. 2020). 7.5% (6/80) engaged students in reflective writing, collated longitudinally and housed in individual portfolios (Shamim et al. 2016; Cunningham et al. 2020).

Other modalities include mentorship ($n = 4$), research projects ($n = 4$), independent study ($n = 3$), consultations with ethics committees ($n = 2$), theatre ($n = 1$), creative writing classes and student art symposiums ($n = 1$). Interestingly, 10% (8/80) utilised formal medical humanities programs as avenues for ethics teaching.

These multimodal approaches were found to increase interest and receptivity towards ethics education amongst medical students (Roberts et al. 2005a; Lehrmann et al. 2009; McCullough et al. 2020).

Notably, only 26.3 (21/80) of these teaching interventions were facilitated by trained ethicists. 21.3% (17/80) adopted interdisciplinary team-teaching with faculty from law (Ales et al. 1992; Hope and Fulford 1994; Green and Sara 2002), nursing (Lin et al. 2013), social work (Machin and Proctor 2020), and spiritual leaders such as chaplains (Andre et al. 2003). Community resource partners were also invited as guest speakers – persons with disability were involved as curriculum developers and session facilitators (Kaufert et al. 2010) and families with breast cancer and organ transplant histories were also brought in to share their intimate experiences (Marcus et al. 2020).

Corroborating with findings from the rest of the literature, lectures, group discussions and case study analyses were revealed to be the three most dominant teaching methods. Large group teaching was argued to help in the development of students' normative identification with the medical profession (Goldie 2000) and a didactic, flipped classroom approach was deemed well suited for the conveyance of legal and knowledge-based concepts and difficult or introductory topics (Mattick and Bligh 2006a; Gewarges et al. 2020). Whilst interactive discussions allowed for students to contemplate and process their subjective personal views and experiences, role-play and bedside teaching were deemed most relevant to communication skill development (Gewarges et al. 2020; Qureshi and Zehra 2020).

Cordingley et al. (2007) argues that the presence of credible role models is critical in addressing contradictions in personal values, established codes of conduct, and unethical behaviour witnessed in practice – such as deliberate lies, discrimination and the students' own ingrained fear of whistleblowing (Caldicott and Faber-Langendoen 2005). This underscores the impact of the hidden curriculum in shaping internal moral compasses and manifestations of external behaviours when encountering ethical dilemmas first-hand (Hafferty and Franks 1994; Fox et al. 1995). Indeed, some authors alluded to its bearings on the professional identity formation of these doctors-to-be (Musick 1999; Rose and Rukstalis 2008; Carrese et al. 2015; Giubilini et al. 2016; McCullough et al. 2020).

Curriculum content. Whilst 35% (28/80) foregrounded ethics' entwinement with professionalism, effective and sensitive communication was also noted in 26.3% (21/80) as integral to displays of ethical competence. 23.8% (19/80) taught ethics, communication skills and elements of professionalism together. Legal ramifications in the management of ethical conflicts also saw 47.5% (38/80) of primary interventions incorporate law and health policy into the curricula.

Curricula taught may be divided into core and specialty content. Core curricula refers to broad, fundamental concepts that guide ethical justifications, professional conduct, and are applicable across specialities and clinical settings. These comprise of normative theories, key ethical principles, and established consensus on ethico-legal codes of conduct. Speciality curricula, in turn, are clinically contextualised and pertinent to narrower patient populations or research activity, their teaching determined by individual program goals and settings. It is noteworthy that there is no discernible divide in curricula content offered at the preclinical and clinical levels. Curricula content in the primary interventions identified are described below and presented in Table 1.

Core curriculum content include:

- Ethical theories: 53.8% (43/80) – key frameworks taught include the Four Principles (beneficence, non-maleficence, autonomy, justice) ($n = 22$), consequentialism ($n = 7$), deontology ($n = 6$), and virtue ethics ($n = 3$).
- Medical professionalism and negligence: 47.5% (38/80) – understanding and abiding by professional codes of conduct outlining ethical duties and responsibilities for good medical practice, content include identification and disclosure of medical errors and malpractice ($n = 17$), whistleblowing ($n = 9$), respecting the doctor-patient relationship and their boundaries ($n = 20$), and issues pertaining to one's student status and lack of adequate clinical supervision ($n = 10$)
- Patient autonomy: 52.5% (42/80) – respect for patient autonomy refers to respecting the patient's right to independent thought and decision-making without coercion.
- Patient capacity and competence: 26.5% (22/80) – discernment of the patient's decision-making capacity and

Table 1. Curricula content in primary intervention studies.

	Core content								Speciality content							
Author/Year	Ethical theories	Medical professionalism/ negligence	Patient autonomy	Patient capacity/ competence	Patient confidentiality	Truth-telling	Informed consent/ refusal	Justice and fair allocation of resources	End of life	Beginning of life and reproductive technologies	Research ethics	Children/ young people	Genetics	Mental disorders/ disabilities	Donation/ transplant
(Abdel-Halim and AlKattan 2012)	x							x							
(Aguilera et al. 2019)			x		x		x	x	x		x				
(Al-Haqwi and Al-Shehri 2010)	x	x	x		x	x	x	x	x	x	x		x		x
(Ales et al. 1992)						x			x	x		x			
(AlMahmoud et al. 2017)	x	x					x								
(Andre et al. 2003)		x		x		x		x	x	x			x		
(Barman et al. 2020)	x	x	x		x		x			x		x			
(Beigy et al. 2016)		x	x		x	x	x		x						
(Bentwich and Bokek-Cohen 2017)			x			x			x	x		x	x		x
(Bowsher et al. 2018)	x	x	x		x			x							x
(Brajenović-Milić et al. 2000)					x				x	x		x			
(Bramstedt et al. 2014)			x		x										x
(Burn et al. 2014)			x			x	x		x						
(Chin et al. 2011)	x		x	x	x	x	x	x	x	x					x
(Chung et al. 2009)	x	x	x		x	x	x	x	x					x	
(Coldicott et al. 2003)															
(Cunningham et al. 2020)		x													
(El-Shinawi et al. 2016)											x				
(Fins et al. 2003)									x						
(Fleetwood et al. 2000)					x				x						
(Friedrich et al.)	x		x					x							
(Fryer-Edwards et al. 2006)		x				x			x						
(Goldberg et al. 2018)	x	x						x	x						
(Goldie et al. 2000)	x			x		x		x	x						
(Goldie et al. 2002)	x	x	x		x	x		x	x	x	x	x		x	x
(Goldie et al. 2003)		x	x					x	x						
(Goldie et al. 2004a)		x	x		x										
(Goldie et al. 2004b)	x		x		x			x	x						
(Goldie et al. 2004c)		x	x			x		x	x	x	x	x	x	x	x
(Goldie et al. 2005)	x	x	x	x		x		x	x	x		x			
(González-López and Ríos-Cortés 2016)									x	x					
(Green and Sara 2002)			x		x			x		x					
(Green et al. 1995)		x	x	x	x		x	x	x	x		x	x	x	
(Hayes et al. 1999)	x			x			x	x	x						
(Hope and Fulford 1994)			x	x	x		x	x		x		x			
(Hurst et al. 2015)		x	x			x			x						
(Johnston and Haughton 2007)	x														
(Johnston and Mok 2015)			x	x	x	x		x	x	x	x	x		x	
(Kapp et al. 2012)			x	x			x	x						x	
(Kaufert et al. 2010)	x		x	x				x	x			x		x	
(Kong and Knight 2017)	x	x	x	x			x	x	x	x					
(Lewin and Lanken 2004)		x			x	x			x						
(Li et al. 2020)	x	x	x												
(Lin et al. 2013)	x														
(Lipman et al. 2001)	x														
(London and McCarthy 1998)		x													

(*continued*)

Table 1. Continued.

	Core content								Speciality content						
Author/Year	Ethical theories	Medical professionalism/ negligence	Patient autonomy	Patient capacity/ competence	Patient confidentiality	Truth-telling	Informed consent/ refusal	Justice and fair allocation of resources	End of life	Beginning of life and reproductive technologies	Research ethics	Children/ young people	Genetics	Mental disorders/ disabilities	Donation/ transplant
(Machin and Proctor 2020)	x	x													
(Malpas 2011)	x	x												x	
(Marcus et al. 2020)	x		x					x							x
(Mitchell et al. 1993)	x				x	x	x		x						
(Miyasaka et al. 2000)	x	x	x			x		x	x						
(Moodley 2007)	x	x		x	x			x	x	x	x		x	x	
(Mosalanejad et al. 2020)	x	x			x	x		x	x	x	x				
(Murrell 2014)		x													
(Myser et al. 1995)	x		x					x							
(Neitzke 1999)	x		x			x	x		x			x	x	x	
(Noone et al. 2013)		x	x	x		x	x		x		x	x			
(Olick 2001)	x	x	x		x		x	x							
(Parker et al. 1997)	x		x	x	x		x	x			x			x	
(Patel et al. 2020)	x				x		x			x	x				
(Qureshi and Zehra 2020)		x				x									
(Roberts et al. 1999)		x		x	x	x		x	x	x	x				
(Roberts et al. 2005a)		x		x	x		x								
(Roff and Preece 2004)	x				x	x	x	x	x	x	x	x	x		x
(Saad et al. 2017)	x	x							x	x					
(Searight et al. 2020)	x		x	x	x	x	x	x	x		x				
(Self et al. 1992)			x		x	x		x	x	x					
(Shamim et al. 2016)	x	x			x	x		x	x	x	x		x		
(Smith et al. 2004)		x			x		x			x		x			
(Stephens et al. 2019)	x	x	x	x	x		x				x				
(Stites et al. 2018)		x	x	x			x	x							
(Stoddard and Schonfeld 2011)			x		x		x	x	x		x				
(Strong et al. 1992)	x		x	x	x			x		x		x		x	
(Sullivan et al. 2020)	x						x	x							x
(ten Have 1995)	x	x	x		x	x		x	x		x	x			
(Torda 2020)	x	x	x	x	x		x			x	x	x			x
(Tsai et al. 2008)									x						
(Viñas-Salas et al. 2000)	x				x	x	x	x	x	x	x	x	x	x	x
(Wasson et al. 2015)								x							

competence includes identifying their ability to understand and weigh the risks and benefits of suggested interventions or treatments. For patients lacking capacity or competence, such as when unconscious, students must also navigate the family's role as proxy in decision-making processes ($n = 12$).

- Patient confidentiality: 46.3% (37/80) – understanding the ethical and legal boundaries of observing confidentiality, such as disclosing information to relatives, caregivers, or the public. Case scenarios of patients with HIV/AIDS, drug addictions, or undergoing sexual abuse may be used in discussions ($n = 8$).
- Truth-telling: 35% (28/80) – understanding value conflicts embedded within truth-telling, the legal and ethical boundaries of medical paternalism and withholding of information.
- Informed consent and refusal: 38.8% (31/80) – ensuring patients are provided with sufficient information to consent or refuse suggested interventions or treatments, and that conditions under which consent is taken is valid and free of coercion or deception.
- Justice and fair allocation of resources: 55% (44/80) – understanding concept of distributive justice, and legal and ethical boundaries when balancing individual and community interests in accessing healthcare resources.

Specialty curriculum content include:

- End of life: 53.8% (43/80) – understanding legal and ethical boundaries of end-of-life care provision, including euthanasia and assisted suicide ($n = 21$), withholding, and withdrawing treatments ($n = 12$), palliative care and advanced care directives ($n = 15$).
- Beginning of life and reproductive technologies: 33.8% (27/80) – understanding legal and ethical boundaries of abortion ($n = 13$), sterilisation ($n = 4$) and assisted reproduction ($n = 3$).
- Research ethics: 26.3% (21/80) – understanding legal and ethical boundaries of research processes and taking of informed consent, particularly in clinical trials.
- Children and young people: 22.5% (18/80) – understanding legal and ethical boundaries of caring for children and young people, including their autonomy and rights, parental involvement, and reportage of abuse ($n = 3$).
- Genetics: 13.8% (11/80) – understanding legal and ethical boundaries of genetic testing and counselling.
- Mental disorders and disabilities: 16.3% (13/80) – understanding legal and ethical boundaries of mental incapacity pertaining to consent, decision-making, and safeguarding the interests and dignity of patients with disabilities.
- Donation and transplants: 13.8% (11//80) – understanding legal and ethical boundaries of blood, bone marrow, and other organ donations and transplants.

Other ethics knowledge and skills taught include sensitivity towards sociocultural differences and contexts ($n = 31$), such as understanding the implications and influences of one's religion ($n = 16$), gender ($n = 3$) and race ($n = 3$) on ethical normativity and decision-making. Navigating financial concerns raised by patients ($n = 3$), awareness of global health ethics ($n = 1$) and violations of human rights ($n = 1$) were also broached.

In two needs analyses with two different school cohorts, preclinical students expressed greater desire for more ethical training, particularly in practical clinical ethics and professional development in relation to direct patient care (Roberts et al. 2005b; Lehrmann et al. 2009). Introduced early, many students favoured vertical ethics integration throughout all their academic years of study (Lehrmann et al. 2009; Fawzi 2011). Other needs include being better equipped with theoretical knowledge to 'recognise the character of the conflict' (Donaldson et al. 2010) and possessing greater moral courage to speak up when witnessing unethical behaviours (Caldicott and Faber-Langendoen 2005). When core and speciality modules were compared with the contents of ethics programs hosted by the Top 20 medical schools on the 2020 Times Higher Education World University Rankings (Supplementary Appendix 3), it was revealed that these modules largely coincided with data from the included articles. However, there exists no real consensus on specialty topics taught across the institutions, possibly due to the broad breadth of content available.

Enablers and barriers to teaching ethics

Enablers and barriers to the effective teaching of ethics are evident at the program and institutional levels.

Pertaining to program structure, enablers take the form of clearly defined student centric pedagogy (Jones and Verghese 2003; Kanter et al. 2007; Marcus et al. 2020), use of didactic and interactive approaches (Viñas-Salas et al. 2000; Lewin and Lanken 2004; Johnston and Haughton 2007; Tsai et al. 2008), timely, appropriate and effective feedback of students' performance (Mattick and Bligh 2006b; Hurst et al. 2015), and a safe environment to discuss sensitive topics (Kong and Knight 2017).

Conversely, barriers at the program level include poorly defined (Kaufert et al. 2010; Tritrakarn et al. 2014), narrow (Andre et al. 2003), largely didactic and clinically dissociated programs (Chung et al. 2009; Brooks and Bell 2017) that are badly integrated into the curricula (Carrese et al. 2015; Sherer et al. 2017). In addition, where hidden and informal curricula are inadequately supported, and negative role models prevail (Swenson and Rothstein 1996; Parker et al. 1997; Kapp et al. 2012).

Pertaining to resource availability at the institutional level, enablers include resources from the law, the arts and the humanities (Green and Sara 2002; Jones and Verghese 2003), and well-trained tutors who serve as positive role models (Goldie et al. 2004c; Lehmann 2004) and who positively influence the hidden and informal curriculum (Cordingley et al. 2007). Conversely, barriers at this level include tutors lacking in competence, motivation and adequate training and support as well as a narrow curricula and limited protected time which adversely affecting students' ability to properly assimilate knowledge, skills, attitudes and behaviour (Parker et al. 1997; Mattick and Bligh 2006a; Brooks and Bell 2017).

Assessment methods

Various methods to assess ethics knowledge, skills, and attitudes were identified within the undergraduate medical

curriculum. Assessment methods in the primary interventions identified are described below and presented in Table 2.

13.1% (8/61) of the primary interventions evaluated students through their class participation – through attendance taking and active contribution of ideas in class and group discussions. 21.3% (13/61) used case analyses to assess their students' ability to recognise ethical dilemmas presented and value conflicts experienced by the various parties involved. They were also evaluated by their ability to provide cogent justifications, with consensus cases used to appraise the alignment of their action plans with established professional consensus (Lohfeld et al. 2012).

16.4% (10/61) used Multiple Choice Questions (MCQ)s and 9.8% (6/61) used Short Answer Questions (SAQ)s to assess their students' ethics knowledge acquisition before and after teaching. Both were common assessment methods used in formal summative examinations, incorporated into 21.3% (13/61) of the primary interventions.

Whilst 29.5% (18/61) included written essays and research papers to assess students, 9.8% (6/61) used oral presentations and debates to evaluate their sensitivity and recognition of ethical issues as well as the clarity and rigour of their ethical reasoning. 41.0% (25/61) used observations that were structured as Objective Structured Clinical Examination (OSCE) examinations, roleplays, or evaluations by simulated patients. 18.0% (11/61) noted that assessments and feedback were provided by faculty and peers, with 360 evaluations conducted in real and simulated clinical encounters. These modalities served as both formative and summative assessments.

Reflective diaries identified in 14.8% (9/61) of the articles provided opportunities for reflection on attitudes and behaviours discussed in case vignettes or witnessed in clinical practice. 8.2% (5/61) utilised other student self-assessments. Scales such as the Self-Reflection and Insight scale may be used for self-monitoring and regulation of professional attitudes and behaviour. Some of these reflective writings were housed in portfolios to track the longitudinal development of their ethical competencies (n = 2). These modalities fostered self-awareness, personal and professional development and offered a closer look into the students' prevailing attitudes, beliefs, and the challenges they faced.

13.1% (8/61) used validated tools, with the most common tool being the Defining Issues Test ($n = 4$), which comprises of five scenarios where learners choose their action plan and 12 statements in order of their importance. Other tools include the Ethics and Health Care Survey Instrument ($n = 1$), the Toronto Ethical Sensitivity Instrument ($n = 1$)., Kohlberg's Moral Judgement Interview (MJI) ($n = 1$), Sociomoral Reflection Measure ($n = 1$), Values in Action Inventory of Strengths (VIA-IS) ($n = 1$), Liverpool Communications Skills Assessment Scale (LCSAS) ($n = 1$), Lind's Moral Competence Test ($n = 1$), Self-Reflection and Insight Scale (SRIS) ($n = 1$).

55.7% (34/61) of the primary interventions developed their own customised tools for the purpose of their study. Most often, these included MCQs, SAQs and case analyses. The writing of a novel or the filming of a short movie ($n = 1$) was also ascertained as an innovative method to creatively evaluate understanding of ethical issues.

Assessment modalities proposed in the other included articles overlapped significantly with those of the primary interventions. Liu et al. (2020) and Kotzee and Ignatowicz (2016) argue that assessing ethical knowledge application, skills and conduct should take precedence over route written assessments. Moreover, Wong and Cheung (2003) opine that evaluation of ethics should be an integral part of the medical school curriculum, that these assessments should be formal and weighted with the same importance as other core subjects within the undergraduate curriculum.

Pros and cons of assessment modalities

The pros and cons of prevailing assessment tools are outlined in Table 3 for ease of review. Factors for consideration include their logistical feasibility, validity and longitudinal or single-point nature. Whilst objective assessments such as SAQs and MCQs are fairly objective, efficient and versatile as both formative and summative assessments, they fall short as they focus primarily on evaluating regurgitable head knowledge, and are limited in their ability to present scenarios in a realistic, multi-faceted manner (Alkabba et al. 2013; Cummings et al. 2018). If used as standalones, they may deprive students of receiving in-depth feedback. Debates, oral presentations and open-ended assessments such as simulations and observations may mitigate these issues by allowing for personalised and timely feedback from patients, simulated patients, peers and faculty (Boon and Turner 2004; AlMahmoud et al. 2017). Used in tandem, a multimodal evaluation approach would help cement the development of an ethically sensitive, clinically relevant, culturally appropriate, self-reflective and confident clinician (Mosalanejad et al. 2020). In particular, reflective and longitudinal portfolios could bring these various tools together to give a holistic perspective of the learner's development (Azim and Shamim 2020; Langerman et al. 2020; Machin and Proctor 2020). They could serve to inform the learner of their improvements, gaps, rate of development and further facilitate their professional identity formation (Myser et al. 1995; Barman et al. 2020).

Stage 6 of SEBA: synthesis of SSRs in SEBA. In keeping with SEBA, this combined review was guided by the STORIES (Structured approach to the Reporting In healthcare education of Evidence Synthesis) statement (Gordon and Gibbs 2014) and Best Evidence Medical Education (BEME) Collaboration guide (Haig and Dozier 2003). This process was also shaped by the goals of the SSR which was to determine how medical ethics is taught and assessed in undergraduate medical school.

Discussion

In addressing its primary and secondary research questions, this SSR in SEBA reveals several key findings.

Firstly, there is significant variation amongst medical schools in their conception of an integrated ethics curricula. Lacking explication, it is difficult to discern and correlate student progress and satisfaction with specific integrated structures. Various recommendations and arguments were proffered that bear consideration, however.

Table 2. Assessment methods in primary intervention studies.

Author/Year	Class participation	Case analysis	MCQ	SAQ	Written short and long essays/ research papers	oral presentation /debates	Observations (OSCEs, Review recording of role play/ simulation)	Journal /Reflection /Diaries	Self-assessment	External assessments (360 Evaluation, peer, patient feedback)	Portfolio	Validated tools	Customised assessment tool/Survey	Formal exam	Clinical Assessment	Creative work (Novel/film)
(Abdel-Halim and AlKattan 2012)					X					x						
(Al-Haqwi and Al-Shehri 2010)	x			x	x								x	x		
(AlMahmoud et al. 2017)			x	x	x	x	x									
(Andre et al. 2003)	x				x											
(Barman et al. 2020)													x			
(Beigy et al. 2016)													x			
(Bowsher et al. 2018)								x								
(Burn et al. 2014)													x			
(Chin et al. 2011)													x			
(Cummings et al. 2018)													x			
(Fleetwood et al. 2000)									x	x				x		
(Friedrich et al. 2017)												x				
(Goldie et al. 2002)													x			
(Goldie et al. 2003)													x			
(Goldie et al. 2004a)													x			
(Goldie et al. 2004b)													x			
(Goldie et al. 2004c)												x				
(Goldie et al. 2005)													x			
(Green et al. 1995)												x				
(Hayes et al. 1999)													x			
(Hebert et al. 1992)													x			
(Johnston and Haughton 2007)		x	x										x			
(Li et al. 2020)							x						x			
(Lipman et al. 2001)	x	x														
(Liu et al. 2018)					x											x
(Lohfeld et al. 2012)												x		x		
(London and McCarthy 1998)				x									x			
(Machin and Proctor 2020)		x			x									x		
(Malpas 2011)								x								
(Marcus et al. 2020)													x			
(Mitchell et al. 1993)					x		x							x		
(Miyasaka et al. 2000)		x														
(Mosalanejad et al. 2020)		x	x	x			x					x				
(Murrell 2014)					x							x				
(Myser et al. 1995)													x			
(Noone et al. 2013)			x			x										
(Parker et al. 1997)			x	x	x	x	x			x			x			
(Patenaude et al. 2003)												x				
(Pau et al. 2019)													x			
(Peter and Gallop 1994)													x			
(Phaosavasdi et al. 2010)														x		
(Pinijphon 2009)													x			
(Qureshi and Zehra 2020)							x					x				
(Roberts et al. 1999)			x		x		x		x	x						
(Roberts et al. 2005a)													x		x	
(Goldie et al. 2003)					x	x										
(Savulescu et al. 1999)													x			
(Searight et al. 2020)								x						x		

(*continued*)

Table 2. Continued.

Author/Year	Class participation	Case analysis	MCQ	SAQ	Written short and long essays/ research papers	oral presentation /debates	Observations (OSCEs, Review recording of role play/ simulation)	Journal /Reflection /Diaries	Self-assessment	External assessments (360 Evaluation, peer, patient feedback)	Portfolio	Validated tools	Customised assessment tool/Survey	Formal exam	Clinical Assessment	Creative work (Novel/film)
(Self et al. 1992)					x			x				x		x		
(Self et al. 1998)												x				
(Shamim et al. 2016)	x					x			x		x					
(Singer et al. 1994)							x									
(Singer et al. 1996)							x									
(Smith et al. 2004)					x		x									
(Smith et al. 1994)					x		x									
(Stephens et al. 2019)	x												x			
(Stoddard and Schonfeld 2011)	x				x									x		
(Strong et al. 1992)		x	x													
(Torda 2020)								x		x						
(Tsai et al. 2008)													x			
(Viñas-Salas et al. 2000)	x	x				x							x		x	

Brooks and Bell (2017) argue for the formalisation of ethics teaching within the school curricula to ensure adequate protected time. Goldie (2000) suggests that an isolated course in medical ethics may have the effect of 'marginalising' the discipline and rendering it a tangential by the by within medical practice. Glick (1994) concurs and deems the 'injection teaching' of pertinent modules along the curricula continuum critical to ensuring that ethical concepts are appropriately contextualized to concrete practice settings. Such horizontal integration would see emphasis on reproductive technologies during a course on obstetrics and gynaecology, and ethical issues surrounding clinical trials during a course on epidemiology. Aguilera et al. (2019) similarly recommend developing a 'tool kit' of teachable units to be seamlessly incorporated into formal education programs and tweaked to suit the students' learning pace, environment, and needs. On the other hand, short, modular courses discourages proper reflection and emphasizes rote learning and memorization, failing to provide the opportunity for in-depth analyses, debate and formulation of decision plans (Kanter et al. 2007).

The pairing and amalgamation of core and speciality topics in the data suggests a preference for vertical integration of discourse on morality and professionalism with clinically relevant applied ethics (Roberts et al. 2005b; Kong and Knight 2017). The lack of a Flexnerian divide between curricula content offered at the preclinical and clinical level also suggests that cognitive objectives commonly associated with preclinical teaching should not be disassociated from attitudinal objectives often associated with clinical training (Stirrat 2015). Such a vertical curriculum conflates theoretical and clinical competence to holistically develop the medical student's ethical knowledge, reasoning, and reflective abilities from early on.

In addition, Hope and Fulford (1994) argue that ethics, law and communication cannot be divorced from one another in the practice setting. The findings of this review echo this sentiment with many perceiving sensitive and effective communications as well as a strong grasp of legal implications within ethical situations to be key indicators of ethical proficiency and professionalism (Mattick and Bligh 2006a; Goldberg et al. 2018; Sullivan et al. 2020). For example, truth-telling and breaking bad news require empathetic communications coupled with a clear understanding of legal boundaries surrounding information disclosure and non-disclosure (Burn et al. 2014; Hurst et al. 2015). Key accreditation bodies such as the Accreditation Council for Graduate Medical Education (ACGME), CanMEDS and General Medical Council (GMC) similarly advocate for such competencies in their depiction of good clinical practice and professional conduct (General Medical Council 2009; Accreditation Council for Graduate Medical Education 2013; Frank et al. 2015). Despite only a minority of programs ensuring trained ethicists and facilitators from various faculties serving as session facilitators, Fox et al. (1995) and Kavas et al. (2020) both emphasise the importance of interdisciplinary team-teaching, propounding that this pedagogical approach is critical to advancing a wider, horizontally and vertically spiralled ethics strand within the larger medical education curriculum. During grand rounds and bedside teachings, Lehmann et al. (2018) suggests for the involvement of physicians, nurses, pharmacists, social

Table 3. Pros and cons of assessment modalities.

Pros	Cons
Class participation	
• Active participation ensures learners remain engaged in lessons	• Lacks proper focus on information taught in the curriculum • Aggravates the perception that ethical knowledge is less significant than clinical knowledge • May confine learning within the classroom which is undesirable given the wide array of online resources available
Case analysis	
• Considers various perspectives in an ethical dilemma • Considers sociocultural and contextual factors • Considers applications in 'real life' issues without direct observation	• Difficult to create • Prone to misunderstanding and misinterpretations • Dependent on the quality of information provided
Multiple choice questions (MCQ)s and short answer questions (SAQ)s	
• May be used as formative and summative assessments • Objective • Reliable • Reduces staff time needed for grading and identifies knowledge deficits and areas for improvement	• Only evaluates knowledge • Difficult to present scenarios in a realistic, multi-faceted manner • Does not provide enough data for assessors to discern patterns and interpret learners' decision making.
Essays and research papers	
• May be used as formative and summative assessments • Efficient • Objective • Logistically feasible • Able to focus on specific areas • Able to discern specific deficiencies • Allows deeper application of knowledge, reflection, and moral reasoning	• Not a holistic form of evaluation/may be narrow • Unable to apply knowledge effectively • Difficult to be objective • Insufficient inter-rater reliability • Deflection by writing and presentation style • Time consuming for learner and teacher • Requires experts or trained professionals to examine answers provided • Difficulty in contrasting and charting progress
Observations	
• Good formative method of assessment • Identifies deficits in clinical/practical settings • Identifies biases, professionalism lapses and problems with techniques • Able to provide immediate feedback • Able to provide constructive educational experiences • Facilitates reflection • Promotes the acquisition of knowledge in relevant clinical context • Allows longitudinal assessment • Sufficient inter-rater reliability	• Performance in simulations may not reflect true practice • Poor predictive validity • An undefined number of observations required to make a reliable assessment • Resource intensive (e.g. time, staff) • Simulated patients may lack objectivity
Oral presentations/Debates	
• Provides a practical clinical context • Encourages consideration of one's own principles • Encourages 'thinking on one's feet • Enhances maturation of moral sensitivity and ethical understanding • Promotes use of teamwork	• Resource intensive (e.g. time, staff) • Focuses upon assessing intermediate/ advanced skills and abilities
Reflective writing and self-assessment	
• Provides avenue for reflection on incidents and patients involved • Monitors learner's progress • Introspection facilitates reinforcement of good professional behaviour	• Portfolios remain poorly established in this field

workers, case managers, physical therapists, and home care specialists, and Gewarges et al. (2020) further adds to the list with specific suggestions of including the palliative care team and spiritual leaders.

Notably, a wide, heterogenous array of teaching modalities were identified in the literature. While traditional approaches such as large-scale lectures, seminars, and assigned readings were especially useful for delivering factual and legal content and establishing baseline codes of conduct, most interventions saw an amalgamation of these didactic methods with interactive approaches to stimulate experiential and transformative learning by examining views contrary to one's own and pushing the boundaries of one's competence (Goldie et al. 2000; Beigy et al. 2016; Bowsher et al. 2018). These 'combined sessions' saw small group discussions, problem-based case analyses, structured debates, student presentations, simulations and role play, multimedia, e-learning and clinical teaching incorporated together in various permutations in a multimodal approach.

The findings also reiterate that each assessment method has its advantages and disadvantages. Due to the complexity of attaining and assessing ethical competencies, no gold standard truly exists. However, in alignment with Barr et al. (2000)'s adaptation of Kirkpatrick's Hierarchy (Kirkpatrick 1967), the competency-based process we propose hinges on the following key domains: attention to ethical dimensions in clinical practice, imparting requisite ethics knowledge and skills to learners, nurturing ethical sensitivity and confidence when applying ethical principles, encouraging clear justifications for decisions made whilst considering locally-specific norms and culture, and motivating learners to reflect on and deepen knowledge on a wide array of ethical issues (Table 4).

This stage-wise approach considers the pros and cons of the different assessment modes revealed in our findings, allowing for optimal matching with intended outcomes. As portfolios are well suited to scaffold personalised development plans and remediation efforts based on long-term, multi-source evaluations (Davis et al. 2001; O'Brien et al. 2016, 2018), all participation records, assessment results and reflective writings should be collated and stored in a centralised portfolio. However, whilst our competency-based framework focuses on measurable outcomes in the learner, clear metrics for comparing ethical competence with positive changes in patient's safety, health status,

Table 4. Stage-wise approach to assessing ethics competency.

Adapted Kirkpatrick's hierarchy	Objectives	Assessment modalities
Level 1 (participation)	Provide a positive classroom experience by exposing students to medical ethics and encouraging the sharing of ideas	• Attendance record • Class participation • Students' satisfaction with ethics curriculum • Collated and stored in longitudinal portfolios to track participation and feedback
Level 2a (attitudes and perception)	Increase in awareness of various stakeholders and perspectives Providing immediate feedback to stimulate personal reflection	• Self-rated confidence in addressing ethical dilemma • Self-perceived improvement in expected attitudes • Evaluation of learner's ethical sensitivity via validated instruments such as the Toronto Ethical Sensitivity Instrument • Collated and stored in longitudinal portfolios to track progress and learning needs
Level 2 b (knowledge and skills)	Increase ability to scrutinise and synthesise information Increase awareness of knowledge deficits/ areas for improvement Increase application of moral reasoning in case studies within a controlled environment and subsequently in the clinical setting Provide immediate feedback to stimulate personal reflection	• Self-rated improvement in moral reasoning • Self-rated knowledge on medical ethics • Evaluation of learner's knowledge by assessors via MCQs, Essays, SAQs, case-based discussion • Evaluation of learner's skills by assessors via OSCE, debates and observations in the clinical setting • Evaluation of learner's knowledge by assessors validated tools such as the Defining Issues Test, Ethics and Health Care Survey Instrument • Collated and stored in longitudinal portfolios to track progress and learning needs
Level 3 (behavioural change)	Regular internal reflection and immediate external feedback curbs stagnation and complacency Actual observable behaviour in the clinical setting provides a more accurate illustration of knowledge retention, ethical proficiency and assimilation into everyday professional conduct	• Reflective diaries and journals • Self-administered checklist to regulate own behaviour • Evaluation of interactions with patient via longitudinal use of portfolios • Observations and appraisals of learners' performance by supervisors or mentors in the postgraduate setting • Collated and stored in longitudinal portfolios to track progress and learning needs
Level 4a (organisation practice)	Changes in organisational delivery of care in healthcare institutions	• NIL in included articles
Level 4b (patient benefits)	Improvement in health and well-being of patients Giving due recognition to perspectives, values and outcomes of patients for whom clinicians are called to serve	• Patient and family feedback and satisfaction with how the ethical dilemma was handled • Collated and stored in longitudinal portfolios to track progress and learning needs

compliance and satisfaction, or changes in healthcare systems, policies and costs are not presently available due to a dearth in the literature.

Finally, it is clear that developing sustainable and inclusive cultures within institutions require concerted effort at the administrative and pedagogical levels (Fulford et al. 1997; Makoul et al. 1998; Kavas et al. 2020). Institutions should thus remain forward planning and undertake necessary measures to procure and budget resources strategically, allowing for protected time for ethics education (Al-Mahroos and Bandaranayake 2003; Lehmann 2004). Hafferty and Franks (1994) argue that medical ethics should be perceived, not as formal, objectifiable knowledge and skills, but as a crucial component of one's professional identity, largely influenced by the nuanced everyday hidden curriculum in the classroom and clinical setting. Indeed, Lynoe et al. (2008) and Mosalanejad et al. (2020) argue that increased and diminished interest in medical ethics is directly correlated to encounters with positive and negative role models. The findings verify that effects of the hidden curriculum may have profound ramifications on students. Faculty members should be trained as role model figures and mentors, committed to strengthening their moral courage and guiding them as they navigate complex ethical dilemmas (Caldicott and Faber-Langendoen 2005). Fostering a safe environment for exploratory learning is also especially important given their intrinsic value-based associations.

Limitations

Whilst it is our intention to appreciate the scope of available literature on ethics education in medical schools, our review is hindered by incomplete reports of assessment processes (Swenson and Rothstein 1996), a lack of information on the responsibilities of the host organisation and the influences of learning cultures on local programs (Lehmann et al. 2018; Safari et al. 2020). Similarly, limiting this review to publications in or translated into English also narrows our findings. The disproportionate number of articles sited within North America and Europe raises concerns as to the applicability of these findings beyond these practice settings (Souza and Vaswani 2020). As suggested by the wide range of Medical Education Research Study Quality Instrument (MERSQI) (Reed et al. 2008) and Consolidated Criteria for Reporting Qualitative Studies (COREQ) (Tong et al. 2007) scores yielded (Appendix 2), focusing on a narrower pool of included articles with threshold scores established may have allowed for greater focus to be placed on more methodologically rigorous

data. Reliance upon self-rated scales (Pfund et al. 2014) and tools still rooted in 'Cartesian reductionism and Newtonian principles of linearity' (Mennin 2010) that fail to consider the evolving nature of ethics training also underscore the need for further SSRs in SEBA and prospective studies.

However, despite these limitations, this review was carried out with the required rigour and transparency advocated by the SEBA methodology and builds on the strengths of Arksey and O'Malley (2005)'s, Levac et al. (2010)'s and Pham et al. (2014)'s protocols. The employ of Endnote, a bibliographic manager, ensured that all citations from the various databases were properly accounted for.

Conclusion

In answering its primary and secondary research questions, this review reveals the importance of adopting an interactive, multimodal and interdisciplinary team-teaching approach to ethics education. This will ensure that learners remain engaged and on the receiving end of expertise from community resource partners and faculty trained in ethics, law, communication, professionalism and other intertwining healthcare professions. Conscientious effort should also be put into vertically and horizontally integrating ethics into formal medical curricula to ensure contextualisation and application of ethics knowledge, skills and attitudes attained as well as protected time and adequate resources. A stage-based multimodal assessment approach, with optimal matching of methods to intended outcomes, should also be used to appropriately evaluate knowledge acquisition, application and reflection across various practice settings with targeted and holistic feedback provided. Whilst standardisation of curricula content ensures cross-speciality ethical proficiency in key concepts, deliberative curriculum inquiry performed by faculty members using a Delphi approach may help to facilitate the narrowing of relevant topics. This will ensure that the curriculum remains clinically and contextually appropriate. However, such discussions and curriculum modifications must remain reiterative and dynamic in order to accommodate shifting trends in local and global healthcare systems to better reflect relevant practices.

Acknowledgements

The authors would like to dedicate this paper to the late Dr. S. Radha Krishna whose advice and ideas were integral to the success of this study. Assistance provided by Ms. Alexia Sze Inn Lee reviewing the manuscript was greatly appreciated. The authors would also like to thank the reviewers whose comments greatly enhanced this paper. No funding was received for this study.

Disclosure statement

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the article.

Author contributions

All authors were involved in research design and planning, data collection and processing, data analysis, results synthesis, manuscript writing and review and administrative work for journal submission. All authors have read and approved the manuscript.

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Data availability statement

All data generated or analysed during this study are included in this published article and its supplementary information files.

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