Diversity in approach to teaching and assessing ethics education for medical undergraduates: A scoping review

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\section*{A R T I C L E   I N F O}

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\section*{A B S T R A C T}

There are diverse methods to teach medical ethics, and there is no single accepted approach towards its learning and assessment. The authors aim to explore the various strategies practiced to teach undergraduate medical students the fundamentals of medical ethics and their evaluation. The authors reviewed the articles published from January 2014 to September 2019. The authors searched PubMed for the relevant publications and extracted the information using a data extraction sheet. Twenty-nine articles were included for the review, which fulfilled the inclusion criteria. Case-based discussions were a widely accepted strategy to learn ethics. The studies highlighted a mixed teaching approach using multiple teaching tools. A qualitative approach was preferred for the assessment through reflections, simulated patient interactions, and development of portfolios. However, there are gaps in the existing literature on the assessment strategies for ethics education. Heterogeneity still exists in the planning of the curricula, teaching, and assessment methods. These curricula suit the cultural and religious set up of that particular country. Case-based discussion is a popular teaching strategy, and there exist numerous innovative and cost-effective active teaching strategies. There is a need for studies that are more rigorous to address the evaluation of the ethics curricula. This review would help educators to choose their preferred approach based on their teaching environment.

\section*{1. Introduction}

Medical ethics is a system of moral principles that apply values and judgments to the practice of medicine \cite{1}. Knowledge of medical ethics would aid a physician in making decisions during the care they provide with due consideration to ethical principles \cite{2}.

The Hippocratic oath has highlighted the relationship between medicine and ethics during ancient times \cite{3}. However, the present-day situation has called for efforts to incorporate ethics into the medical curriculum d/discipline-based, community-based/hospital-based, [2,4–6]. SPICES model (student-centered/teacher-centered, problem-based/information gathering, integrate elective/uniform and systematic/apprenticeship based) of curriculum plan proposed by Harden et al. is one of the oldest models and is one of the foundations for learning and assessing ethics teaching modules in the medical curriculum \cite{7}.

In 2012, the Medical Council of India (MCI) proposed guidelines for professional conduct, etiquette, and ethics for the practising doctors \cite{8}. It was followed by the introduction of AETCOM (Attitude, Ethics, and Communication) module in 2015 that played a significant role in implementing ethics in the undergraduate medical curriculum. Under the umbrella of AETCOM, elements such as fundamentals of bioethics, communication skills, medico-legal issues, and patient-doctor relationship were to be included in the medical curriculum \cite{9}.

There is a wide range of strategies used to teach ethics in medical education. Problem-based learning (PBL) and case-based discussions are highly effective, but their long-term effectiveness is debated \cite{10–12}.

Several reviews in the literature explore ethics education in the past [13–15]. Eckles et al. in their report, have highlighted the deficits in the literature on the teaching methods and measuring effectiveness in ethics education \cite{14}. Therefore, this review, while aiming to explore the different existing strategies practised in recent years by medical schools to teach their students the fundamentals of medical ethics and their assessment, intended to identify the current gaps in the literature. The study aims to identify the recent trends using the research question ‘What are the diverse methods to teach and assess medical ethics for undergraduate medical students, and how their outcome is evaluated?’
2. Methodology

The articles published during the last five years from January 2014 to September 2019, were reviewed in October 2019. We searched PubMed by building a search strategy using MeSH key terms 'ethics', 'medical ethics', ‘medical students,’ ‘education,’ ‘teaching,’ ‘techniques,’ ‘activities’ (Annexure 1). AD performed the initial search using the search strategy. At first, all the search results were screened for their titles and abstracts and selected the articles for full-text screening. Both the authors (AD & VV) then separately read the full texts of the selected articles and included the relevant publications for the final review. We scrutinized the reference lists of each included articles and added the related articles.

2.1. Inclusion and exclusion criteria

We included the studies published in the English language on teaching and assessing ethics to undergraduate medical students (first year to internship), which included research reports, viewpoints, and letters to the editor. We excluded the studies conducted only on research ethics, articles dealing with ethics in postgraduate medical education, and practising doctors and the unpublished data, such as conference presentations. We constructed a review protocol (Annexure 1) and presented the report according to the existing guidelines to conduct scoping reviews [16].

2.2. Extraction of data

The authors extracted the data using the data extraction sheet in excel format (Annexure 1). Demographic details (authors, place and year of work, country) and the details of the study design, teaching and assessment methods, highlights, outcome, etc. were extracted.

2.3. Summarizing and reporting

We tabulated the demographic details of the studies and described the different teaching and assessment methods used in each study. We identified the studies carried out to develop a curriculum for ethics education and discussed the ways of measurement of their outcomes.

We reviewed the articles qualitatively and coded for elements such as teaching methods, assessment methods, and outcome/evaluation. We identified the themes related to the different approaches in teaching and assessing medical ethics.

3. Results

The first search in PubMed resulted in 224 articles matching the search criteria. Title and abstract screening of these resulted in the selection of 40 publications for the full-text review. The authors reviewed all 40 full-text articles and considered 26 articles for the final report. From the reference list of these 26 articles, three more articles met the criteria to be included. We considered 29 publications for the final reporting. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram depicts the details of the search process (Fig. 1).

3.1. Demographic description of the studies

Of the 29 studies reviewed, there were 11 studies from the USA, nine from Europe, four from Asian countries, three from the UK, one from Africa and one from Canada. Of the 29 studies selected, 12 studies were published between 2014–15, and the remaining 17 were published between 2016–19. The studies were cross-sectional (eight), perspectives (seven), and research reports (five). Annexure 2 shows the detailed demographic picture of the studies.

3.2. Teaching methodologies for ethics

Themes were recognised from the studies to identify the teaching methods. Though they addressed similar topics of medical ethics, the teaching methods were heterogeneous. ‘Case-based discussions,’ ‘video/movies,’ ‘role modelling,’ ‘interactive lectures,’ and ‘patient interactions’ were construed as emerging themes.

The usage of case-based discussion as a teaching strategy was found in 15 studies. However, the formulation and the usage of cases was remarkably heterogeneous. A case-based approach was one of the powerful learning tools, considering the adequate preparations, and the active discussion with the facilitator [17]. The concept of peer teaching was an easy and effective method for teaching ethics [18]. In a study, there was a collection of medical genetics ethics cases constructed incorporating the essential topics [19]. In one study, there was an interprofessional approach practised, and the trained faculty facilitated the case-based discussion session [20]. Table 1 provides additional information on the case based discussion approach.

Streaming of videos and movies that emphasise an ethical value were found to be used as learning tools in six studies. Schochow & Steger in Germany surveyed the utility of the e-learning platform for the construction of multimedia tools and resources in medical ethics, history, and medical terminology in 31 different educational institutes [21]. Vergano et al. introduced a course of medical ethics for the critical care curriculum. The course had interactive training, clinical cases, videos, role-playing, small group discussions, and exercises [4]. Movies can address general, deontological, and distinctive ethical issues, principles of bioethics, and theories of ethics [22]. In a prospective cohort study, a cohort of medical students watched movies on topics such as truth telling, gender ethics, contraception, and lack of autonomy. The students reflected the importance of the course through a semi-structured interview [23].

‘Role modelling’ emerged as a theme in four studies, and ‘interaction with the patients’ in two studies. A questionnaire-based study described ‘role modelling’ as one of the excellent learning tools. The students strongly opined that the interactions with the patients and incorporation of ethical issues during teaching rounds help in a better understanding of ethics [6]. A report by Papanikitas et al. revealed the importance of interaction and peer support in ethics education [24]. A survey conducted in Poland and the USA by Makowska reported that growing up with a physician in the family would create an impact on the medical students concerning their interactions with the pharmaceutical agencies [25].

Four studies highlighted the importance of ‘interactive lectures’ in ethics education. Schillmann et al. in their survey across the German medical faculties, revealed lectures as one of the commonly used learning tools [26]. The combined practise of didactic lectures, case discussions, and a component of simulation would make ethics education work [27]. The use of theatre in medical ethics was one of the rarest but thought-provoking learning tools that were encountered. At Wake Forest University, the students in small groups first discuss and analyze the contextual material and characters, then formulate research to build the case and script the case in groups, and the post-performance discussion with the facilitator promoted learning [28].

3.3. Assessment of ethics education

Of the 29 studies reviewed, only 11 studies had emphasised on the assessment strategies for ethics education. Table 2 provides a comprehensive view of the different assessment tools practised.

3.4. Curriculum development and evaluation

Of the 29 studies, nine studies had curricula formulated for teaching ethics. Cheung developed a curriculum using the Structured Learning in Clinical Ethics (SLICE) model for the respiratory residency program.
The module addressed the end of life care and its ethical values. The students read assignments and actively participated in case-based discussions. The residents felt more at ease in handling the end of life situations, and the faculty who taught this curriculum said this module had reformed their attitude [29].

Trained faculty conducted case-based active learning workshops for undergraduate students in a Practical Curriculum in Clinical Ethics (PRACTICE) curriculum proposed by Aguilera et al. It had introduced a new pedagogical approach. It provided opportunities for new ethics faculty to gain experience in both subject material and content delivery [30].

An initiative to conduct faculty orientation workshops was taken by Smith in 2014, to facilitate and train the faculty involved in teaching ethics. The seminar titled ‘Ethics across the curriculum’ or ‘ethics boot camps,’ organised for the teachers involved in teaching ethics gave the faculty orientation, understanding and hands-on experience of how to conduct ethics classes [17].

Module for interns in Medical Ethics (MIME) developed by Mahajan et al. for the medical interns proposed a curricular pattern. The interns took this 18-h course through mixed learning strategies like games, interactive lectures, case-based discussions, role play, and cinema [31].

Students’ Medical Ethics Rounds (SMER) was a 3-h session proposed by Beigy et al. During this, the expert faculty addressed topics like confidentiality and honesty, medical team errors, informed consent, medical education ethics, conflicts of interest and end of life issues [32].

Goldberg et al. developed a four-week module on palliative care ethics (PCE) titled Acting Internship in Critical Care (AICC) for final year medical students implemented by an interprofessional faculty team. A student and faculty guide was provided as a resource material, containing the outline and structure of 1-h rounds and questions for facilitating the session. Students reported a better understanding of end of life care at the end of the rotation [20].

Simulation as a core strategy has transformed ethics education. Tritrakarn et al. introduced simulation-based clinical scenarios using various teaching tools such as manikins, task trainers, standardised patients, or role-play by staff, or students are often practised [27].

Biomedical Ethics and Humanities Scholarly Concentration (BEHM SC) was a unique curriculum developed by Liu et al. in which the students shadowed the ethics consults and attended ethics committee meetings. The students had to undertake a scholarly project required for their graduation [33]. Ethical Life Support (ELS) by Vergano et al. was a curriculum developed to sensitise the students towards the ethical issues in critical care. Airway–Breathing–Circulation–Disability sequence was converted into an Acknowledge–Be aware–Communicate–Deal approach [4].

These curricula are the result of tremendous effort and needed curriculum evaluation for their further improvement. Table 3 provides a summary of the curriculum evaluation of these modules.

4. Discussion

Teaching ethics in undergraduate medical education is an integral part of the medical curriculum across the world. However, it is still sporadic when it comes to developing a curriculum. The bulk of the
Table 1

| S. No. | Authors | Number of students trained | The topic for the cases | Setup |
|--------|---------|-----------------------------|-------------------------|-------|
| 1      | Cheung [29] | Not specified | End of life communication & care | Longitudinal over six years of undergraduate period |
| 2      | Schildmann et al. [26] | Students per year) | End of life care, patient autonomy, the beginning of life and research ethics (Top four topics) | Incorporated in the regular curriculum (N = 19) or as a separate model curriculum (N = 5) or a parallel curriculum (N = 4) Four-day long workshop conducted for the interns |
| 3      | Mahajan et al. [31] | 17 interns (pilot run) | Group dynamics; medical oaths; MCI and other regulations; principles of ethics, rights, and duties of patients and doctors; legal and ethical issues of body and organ donation, abortion, and MTP; Confidentiality, medical negligence, Euthanasia; Ethical dilemmas, and end-of-life care | Clinical ethics and end-of-life care One-day-long interactive session |
| 4      | Vergano et al. [4] | Not specified | Clinical ethics and end-of-life care | One-day-long interactive session Performing case study model |
| 5      | Goldberg et al. [20] | Final year students of 2015 (N = 28) and 2016 (N = 56) | Direct-to-consumer genetic testing, patient privacy, economic and legal issues of genetic testing | Two-hour session |
| 6      | Robeson & King [28] | Not specified | Bioethics & clinical ethics | Two-hour session |

Not all institutes who adapted ethics education assessed it.

The ethics curricula of medical schools address the concept of medical ethics keeping in mind the cultural values of that particular country [31]. These curricula included a wide range of topics, from ethical principles to end of life care [4,26,31].

There were nationwide surveys that revealed the current trend of ethics education in medical schools. Of the 44 medical schools in Spain, the authors compared the ethics curriculum between private and public schools, recently founded and the older schools. The number of credits for ethics was two times higher in newer schools when compared to the older ones. Only 1/5th of schools evaluated the ethics curriculum through practical application [5]. Schildmann et al. identified the courses related to the history, theory, and ethics of medicine in Germany [26]. Such surveys could provide a broader picture of the current trend in ethics education.

Case-based discussions were the widely accepted strategy to learn ethics [4,5,7–20,24,26,27,29–31,37–39]. There have been different approaches to case-based discussions. The case discussions allow students to participate actively and help them understand better. The discussions would enhance students’ capability to handle such situations in their later practice.

Bebeau, in her research report, opines that problem based practice (using cases) can be especially useful in helping students recognize and subsequently avoid personal interest arguments while conducting research [40]. Structured feedback should follow the case discussion, which would help students to build ethical reasoning [41].

Several studies highlighted a mixed teaching approach using multiple teaching tools for ethics [2,4–6,12,21,23,24,26,30–33,39]. However, lectures were one of the least used strategies. Lecturing, when kept short and interactive, has a benefit of making the students understand the concepts [26,27,31,39].

There is still a scarcity in the existing literature on the assessment strategies for ethics education. The studies, which assessed the students, used more of a qualitative approach such as reflections, simulated patient interactions, and development of portfolios [5,6,20,29]. Beigy et al. in their study, said that assessing students for their change of attitude was one of their challenges that needs further exploration [32]. There is a need to develop effective assessment strategies for ethics that would not only evaluate the knowledge and skills attained but the impact of their ethics education in their actual practise.

The articles reviewed revealed two types of curricula. The first type was an ethics curriculum for the medical undergraduates of first to final year [17,29–31,33]. The second type addressed only particular aspects of medical ethics like the end of life care, critical care, and clinical ethics [4,20]. A comprehensive approach to the curriculum would give a broader picture to the students, and the subject-specific curricula would make them correctly understand the ethical issues that would
help them handle such situations in real-life practise.

Timely evaluation of the formed curricula is essential to understand its impact. A study by Goldie et al. has elaborated on the importance of curriculum evaluation for an ethics curriculum [42]. The current review revealed immediate student feedback as the dominant strategy adopted for curriculum evaluation [4,17,29–31]. Liu et al. in their study, interviewed the graduates retrospectively on their experience of learning ethics and their current views [33]. Such an approach seems to have a better outcome for long-term evaluation of ethics curricula.

5. Limitations

This review highlighted the teaching and assessment strategies in undergraduate medical education. The authors found the studies conducted worldwide, but there were still countries from which such literature is still lacking. The included studies were heterogeneous in their design, and the majority were of cross-sectional in design. The risk of bias would be one of the confounding factors while assessing the long-term impact of ethics education. We also agree that our search was not so rigorous, as we had excluded the grey literature.

6. Conclusion

A defined curriculum in ethics exists in medical schools that follow a longitudinal pattern in teaching ethics to the medical undergraduates. Heterogeneity still exists in the planning of the curricula, teaching, and assessment methods. These curricula suit the cultural and religious set up of that particular country. Although case-based discussion is a well-known teaching strategy, there exist numerous innovative and cost-effective active teaching strategies. Knowledge of these strategies would help educators to choose their preferred approach based on their teaching environment. The assessment of ethics education is still a challenge, and there is a gap in the literature on their strategies. The studies, which assessed the students, used more of a qualitative approach such as reflections, simulated patient interactions, and development of portfolios. Most of the studies evaluated the ethics curricula mainly by the student feedback using unstructured, open-ended questionnaires, and reflective writing. Only one study used a retrospective approach by interviewing the graduates on their learning experience and practise. Such an approach would be better in evaluating the long-term impact of ethics education. To address this, we need to have studies that are more rigorous to assess the long-term effect of the ethics curricula.

Ethical approval

The Institutional Ethics Committee has exempted the study from the ethics review.

Sources of funding

This study did not receive any funding from external agencies.

Author contribution

Anne D Souza & Vina Vaswani together conceptualized the study. Anne D Souza performed the initial search through PubMed. Both the authors separately then scrutinized the articles for inclusion in the review. Anne D Souza prepared the draft manuscript and Vina Vaswani critically reviewed it. Anne D Souza as a requirement for the completion of Postgraduate Diploma in Bioethics & Medical Ethics during December 2019 with the
guidance of Vina Vaswani presented the initial work.

**Trial registry number**

As the current work is a scoping review, as per guidelines it has not been registered.

1. Name of the registry: 
2. Unique Identifying number or registration ID: 
3. Hyperlink to your specific registration (must be publicly accessible and will be checked):

**Guarantor**

1. Dr. Anne D Souza.

**Declaration of competing interest**

The authors state that there is no conflict of interest to declare.

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**APPENDIX A. SUPPLEMENTARY DATA**

Supplementary data to this article can be found online at https://doi.org/10.1016/j.amsu.2020.06.028.

**ANNEXURE 1. PROTOCOL**

**Background**

Medical education has evolved over the past decade, and there has been an emphasis on competency-based approach. This approach demands students to have a knowledge of ethics, humanities, and attitudinal values at the early phase of their medical school. Now, there are diverse methods for teaching medical ethics, and there is no single accepted approach towards its learning and assessment. Therefore, this review aims to explore the various strategies practiced by medical schools to teach their students the fundamentals of medical ethics and their evaluation.

**Objectives**

The current review aims to:

- Identify the different approaches of teaching ethics for medical undergraduates
- Identify the various strategies of assessment for ethics for medical undergraduates
- Analyze the effectiveness of different attitudes towards training and assessing ethics for medical undergraduates

**Methods**

This review would include the articles published from January 2014 to September 2019. PUBMED will be the database to search for the relevant items. The grey literature, including conference proceedings and unpublished material, will also be accessed. The search strategy includes the Mesh key terms. We will categorize our search in three stages that involve searching for the keywords in titles, in abstracts, and from the reference list of the obtained literature.

**Inclusion and exclusion criteria**

We will include the studies addressing the ethics education to the medical undergraduates from first to final year, interns. We will consider the articles published in the English language only. We will also include the research reports, viewpoints, letters to the editor. However, we wish to exclude the studies conducted only on research ethics. The search will not be limited to certain countries but across the globe. We will eliminate the articles dealing with ethics in postgraduate medical education and practicing doctors.

The author would follow the guidelines for conducting a scoping review [16] to carry out this research work.

**Search strategy**

(((ethics [Title] OR medical ethics [Title]) AND (“students, medical” [MeSH Terms] OR (“students” [All Fields] AND “medical” [All Fields]) OR “medical students” [All Fields] OR (“medical” [All Fields] AND “students” [All Fields]))) OR (medical [All Fields] AND undergraduates [All Fields]))) AND (((“education” [Subheading] OR “education” [All Fields] OR “teaching” [All Fields] OR “teaching” [MeSH Terms]) OR (“teaching” [MeSH Terms] OR “teaching” [All Fields] OR (“educational” [All Fields] AND “techniques” [All Fields]) OR “educational techniques” [All Fields])) OR (“teaching” [MeSH Terms] OR “teaching” [All Fields] OR (“teaching” [All Fields] AND “methods” [All Fields]) OR “teaching methods” [All Fields]) OR (“teaching” [MeSH Terms] OR “teaching” [All Fields] OR (“training” [All Fields] AND “activities” [All Fields]) OR “training activities” [All Fields]))) AND (“2014/01/01” [PubDate]: “2019/09/31” [PubDate])

**Proforma for collecting information**

| Title of the article |
|----------------------|
| Authors              |
| Journal              |
| Year of publication  |
| Place of research    |
Extraction of data
The authors will extract the data using the data extraction sheet constructed based on the guidelines given by Peters et al. [16]. We will include the demographic details (authors, place and year of work, country) and the details on the study design, teaching and assessment methods, highlights, outcome, etc. We will save the data in excel format for constructing the results.

Summarizing and reporting the results
The authors will describe the demographic details of the studies based on the format of a table. Further, we will describe the different teaching and assessment methods used in each study. At the later stage, we will highlight the studies carried out to develop a learning module for ethics in medical education. We will then describe how they had measured their outcomes.

ANNEXURE 2. Demographic details of the studies reviewed

| S. No. | Authors               | Year of publication | Country     | Study design                  |
|--------|-----------------------|---------------------|-------------|-------------------------------|
| 1      | Smith [17]            | 2014                | Clemson, USA| Perspective                   |
| 2      | Bebeaus [40]          | 2014                | Minneapolis, USA | Perspective                   |
| 3      | Herried [37]          | 2014                | New York, USA | Perspective                   |
| 4      | Marshall [18]         | 2014                | Phoenix, USA | Perspective                   |
| 5      | Papankitas et al. [24]| 2014                | United Kingdom | Conference report             |
| 6      | Trirakarn et al. [27] | 2014                | USA         | Perspective                   |
| 7      | Miranda & Sanchez [44]| 2014                | USA         | Research report               |
| 8      | Aleksandrova-Yankulovska [21]| 2014 | Bulgaria | Survey                        |
| 9      | Giugliani et al. [14] | 2015                | Brazil      | Research report               |
| 10     | Schochow & Steger [21]| 2015                | Germany     | Questionnaire-based cross-sectional study |
| 11     | Wistrup [46]          | 2015                | UK          | Debate                        |
| 12     | Bosch-Barrera et al. [12]| 2015 | Spain   | Research report               |
| 13     | Mahajan et al. [2]    | 2016                | India       | Perspective (curriculum development) |
| 14     | Beigy et al. [22]     | 2016                | Iran        | Cross-sectional (curriculum development) |
| 15     | Ferreira-Padilla et al. [5]| 2016 | Spain   | Observational, descriptive-comparative, and transverse study |
| 16     | Elmekki [38]          | 2016                | Turkey      | Narrative review               |
| 17     | Greenberg et al. [22] | 2016                | Canada      | Prospective Cohort            |
| 18     | Schildmann et al. [26]| 2017                | Germany     | Survey                        |
| 19     | Cheung [29]           | 2017                | Canada, USA | Perspective                   |
| 20     | Mahajan et al. [31]   | 2017                | India       | Pilot study on curriculum innovation |
| 21     | Makowska [25]         | 2017                | Poland      | Questionnaire-based cross-sectional study |
| 22     | AlMahmoud et al. [6]  | 2017                | UAE         | Questionnaire-based cross-sectional study |
| 23     | Dasgupta [19]         | 2017                | USA         | Research report (curriculum development) |
| 24     | Robeson & King [28]   | 2017                | USA         | Concept paper                 |
| 25     | Goldberg et al. [20]  | 2018                | Northwell, UK | Cross-sectional (Curriculum planning & evaluation) |
| 26     | Bilgin et al. [39]    | 2018                | Turkey      | Cross-sectional (Qualitative study) |
| 27     | Liu et al. [33]       | 2019                | USA         | Retrospective, qualitative study |
| 28     | Aguilera et al. [30]  | 2019                | Central America | Case study                  |
| 29     | Vergano et al. [4]    | 2019                | Italy       | Editorial (curriculum development) |

References

[1] M. Munyaradzi, Critical reflections on the principle of beneficence in biomedicine, Pan Afr Med J 11 (2012) 29.
[2] R. Mahajan, B.W. Aruldas, M. Sharma, D.K. Badyal, T. Singh, Professionalism and ethics: a proposed curriculum for undergraduates, Int J Appl Basic Med Res 6 (3) (2016) 157–163.
[3] A.E. Emery, Hippocrates and the oath, J. Med. Biogr. 21 (4) (2013 Nov 1) 198–257.
[4] J. Coverdale, Teaching medical ethics in graduate and undergraduate medical education: where are we? Where should we be going? A review, Acad Med J Assoc Am Med Coll 80 (12) (2005 Dec) 1143–1152.
[5] S. de la Garza, V. Phuoc, S. Throneberry, J. Blumenthal-Barby, L. McCullough, J. Brunet, J. Bosch-Barrera, Ethics competences in the undergraduate medical education curriculum: the Spanish experience, Croat. Med. J. 57 (5) (2016) 493–503.
[6] J. Goldie, Review of ethics curricula in undergraduate medical education, Med. Educ. 34 (2) (2000 Feb) 108–119.
[7] A. Heidari, S.H. Adeli, S.A. Taziki, et al., Teaching medical ethics: problem-based learning or small group discussion? Journal of Medical Ethics and History of Medicine 6 (2013) 1.
[8] A. Quintanas, et al., Teaching bioethics to students of medicine with problem-based learning (PBL), Cuad Bioet Rev Of Asoc Espanola Bioet Etica Medica 26 (87) (2015 Aug) 303–309.
[9] J. Mitra, I. Saha, Attitude and communication module in medical curriculum: rationality and challenges, Indian J. Publ. Health 60 (2) (2016 Apr) 1–5.
[10] J.W. Tysinger, L.K. Klonis, J.Z. Sadler, J.M. Wagner, Teaching ethics using small-group problem-based learning, J. Med. Ethics 23 (5) (1997 Oct) 315–318.
[11] J. Bosch-Barrera, H.C. Briceno Garcia, D. Capella, C. De Castro Vila, R. Farrés, A. Quintanas, et al., Teaching bioethics to students of medicine with problem-based learning (PBL), Cuad Bioet Rev Of Asoc Espanola Bioet Etica Medica 26 (87) (2015 Aug) 303–309.
[12] J. Bosch-Barrera, H.C. Briceno Garcia, D. Capella, C. De Castro Vila, R. Farrés, A. Quintanas, et al., Teaching bioethics to students of medicine with problem-based learning (PBL), Cuad Bioet Rev Of Asoc Espanola Bioet Etica Medica 26 (87) (2015 Aug) 303–309.

