

1. Cover Sheet

Title of review

How does medical education affect empathy and compassion in medical students? A meta-ethnography

Name of lead reviewer

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Abstract

Background

Empathy and compassion are crucial for healthcare professionals to provide high quality patient care and the literature suggests that empathy, a relational quality arising through interaction between people is modifiable through appropriate training. However, to the best of our knowledge, no review has been undertaken to explore empathy and compassion outcomes in studies evaluating medical curricular components or how this is experienced by medical students, educators and patients. Hence, we propose to review findings from qualitative intervention and evaluative studies to understand how medical students, educators and patients experience empathy and show compassion.

Methods/design

A range of databases will be used to conduct a systematic search for qualitative studies describing how medical education affects empathy and compassion in medical students, from the perspectives of medical students, patients and educators. Educators include medical teachers, faculty, and patients involved in teaching medical students. Meta-ethnography is a commonly used method in investigations of health services and technologies and is suitable for synthesizing qualitative research. A data extraction form based on the BEME coding sheet will be adapted and piloted to suit our review needs. The Critical Appraisal Skills Program (CASP) quality assessment tool for qualitative studies (CASP 2014) will be used to assess the quality of the studies such as the suitability of the aims of the study, methodology, design, methods of data analysis and usefulness of the results. Using the seven steps developed by Noblit and Hare (1988), our review team will identify key themes and concepts, identify any contradictions across studies, and build a new interpretive account from the primary empirical qualitative studies.

Discussion

The review will help address gaps in knowledge, attitude and skills from intervention studies as well as studies evaluating curricular components with empathy and compassion outcomes. This review will enable us to examine how medical students experience empathy and show compassion, and how medical students, patients and educators perceive them. We expect the review will provide useful information and important consideration points for medical educators and faculty developers in developing medical curricula including clinical

placements, as empathy and compassion are viewed as essential components for the provision of high quality patient care.

Systematic review registration

Registration will be done with BEME.

Sources of support

NHG-HOMER Grant (NHG-HOMER FY16/B03).

2. Background to the topic

Medical education including the use of medical education curricula and activities aims to develop and sustain empathy and compassion in students as it is believed that these are important qualities for a doctor to possess in order to provide high quality patient care (Eikeland et al. 2014). As described in the literature, empathy is a complex concept which lacks a common definition (Pedersen 2009). Despite empathy being extensively studied, conceptual flaws remain in its operationalization (Batt-Rawden et al. 2013; Sulzer et al. 2016). In a review by Sulzer et al. (2016), for instance, it was found that cognitive, emotional and behavioural components of empathy are the most commonly defined. Mercer and Reynolds (2002), however, consider empathy as a process, involving the ability to understand the patient's situation, perspective, and feelings and to communicate back that understanding. They consider empathy to be a learnable skill rather than an unalterable personality trait, and theirs is one of the most used definitions of physician empathy (Neumann et al. 2012).

Various systematic reviews have been conducted to investigate the development of empathy among medical students and residents. In a review by Pedersen (2009), it was highlighted that most of the quantitative studies on empathy were based on self-report questionnaires by physicians or medical students while the studies on patients' perspectives did not address the aspects of empathy that contribute to better patient care. Several measurement tools have been developed including the Jefferson Scale of Physician Empathy (Hojat et al. 2002). However questions have been raised regarding the usefulness of validated, self-report questionnaires in predicting perceived empathy in practice, and the failure to consider interactional effects between patient, doctor, clinical and institutional contexts (Batt-Rawden et al. 2013; Fernando et al. 2016; Sulzer et al. 2016). Additionally, Sulzer et al. (2016) suggest that a better understanding of the relational aspects of empathy is required, in terms of it being an engagement between a subject and an object rather than a personal quality that may be modifiable wholesale through appropriate training.

Other concepts frequently linked with empathy include dutifulness (Wolf 1980), prosocial behaviour (Lockwood et al. 2014), moral reasoning (Olsen 1997), sympathy (Svenaeus 2015), and altruism (Persson and Kajonius 2016). A concept frequently associated with empathy is compassion, and this is important because of the increasing emphasis on the need for compassion in healthcare delivery (Schantz 2007). In the healthcare practice setting, compassion is often expressed as a professional value of compassionate care, a skill to be

performed and a competence associated with knowledge of suffering, empathy and willingness to act (Davin and Thistlethwaite. 2014). Empathy and compassion are described by Haidt (2003) as moral emotions that motivate moral behaviour. Compassion is defined as “the feeling that arises in witnessing another’s suffering and that motivates a subsequent desire to help” (Goetz et al. 2010, p.351). Similarly, Singer and Klimecki (2014) also mention that compassion is conceived as a feeling of concern for another person’s suffering which is accompanied by the motivation to help.

Various educational interventions such as patient narrative and creative arts, writing, drama workshops, communication skills trainings and experiential learning have been introduced into the formal medical curriculum to help foster empathy and other virtues such as compassion and respect for patients in medical students (Batt-Rawden, Chisolm, Anton and Flickinger 2013; Wear and Zarconi 2008). The literature also reports disparate evidence about the effect of medical training on empathy in medical students (Colliver, Conlee, Verhulst and Dorsey 2010; Neumann, Edelhauser, Tauschel, Fischer, Wirtz, Woopen, Haramati and Scheffer 2011): for example reports of role modelling in which negative behaviours of educators can contradict the professionalism taught in the formal curriculum and have strong internal conflict within the students (White et al 2009). To our best knowledge, no review has been done to explore how medical education affects empathy and compassion in medical students, and how this is shown and perceived by medical students, patients and educators.

Given the complexity of the concept of empathy, we propose to review findings from qualitative studies to explore how medical education affects empathy and compassion in medical students, and explore the perspectives of medical students, patients and educators, to build a knowledge base and facilitate theoretical development. Qualitative studies offer rich information to enhance our understanding of educational dilemmas and help formulate educational decisions (Bearman & Dawson 2013). Some qualitative studies have been conducted to evaluate the use of narrative and reflective writing in developing empathy (DasGupta & Charon 2004; Ganesh & Ganesh 2010). Other authors have also examined how medical students perceive empathy and experience compassion during clinical training using qualitative approaches (Aomatsu et al. 2013; Eikeland et al. 2014; Kasman et al. 2003; Ratanawongsa et al. 2005).

The review aims to address gaps in knowledge, attitudes and skills on how education affects empathy and compassion in medical students. The use of a meta-ethnography method of synthesis would allow induction and interpretation, and encourage comparison between different studies, the transfer of ideas, concepts and metaphors across different studies for the building of a knowledge base or theoretical development (Britten et al 2002). Using the seven steps developed by Noblit and Hare (1988), our review team will identify key themes and concepts, identify any contradictions across studies, and build a new interpretive account from the primary empirical qualitative studies (Ring et al. 2011). This will allow us to examine how medical education affects empathy and compassion, and how this is shown and perceived by medical students, patients and educators such as through compassionate feelings, thoughts and experiences from students for example. The findings will help deepen understanding of emotion as described by McNaughton (2013), in terms of physiological discourses such as bodily experiences, skills and abilities to manage emotions, and social exchanges arising from the experience of empathy and compassion. The findings should also provide useful information and important points for consideration by medical educators and faculty developers when developing medical curricula including clinical placements.

Definitions

For the purpose of this review, these definitions will be used:

- Empathy is considered as a process, involving the ability to understand the patient's situation, perspective, and feelings and to communicate back that understanding (Mercer and Reynolds 2002).
- Compassion is defined as “the feeling that arises in witnessing another's suffering and that motivates a subsequent desire to help” (Goetz et al. 2010, p.351).
- Medical student: Persons involved in medical, undergraduate studies and engaged in initial medical training regardless of their qualifications on entry.
- Medical education: includes medical education curricula and activities medical students engage in, in a variety of learning environments that could include classroom, bedside teaching, homework, interactions with patients etc. This includes formal, informal and hidden curricula.
- Educators: include medical teachers, faculty and persons involved in teaching medical students, e.g. patients.

3. Review aims and objectives

The aim of the review is to synthesise the qualitative evidence on how medical education curricula affects empathy and compassion in medical students, and how this is perceived by medical students, educators and patients.

The objectives are to:

- Examine medical students', educators' and patients' perceptions and experiences of what affects empathy and compassion in medical students.
- Build a new interpretive account from the primary empirical qualitative studies to understand how education affects empathy and compassion in medical students.
- Provide useful information and important consideration points for medical educators and faculty developers in developing medical curricula including clinical placements, as empathy and compassion are viewed as essential components for the provision of high quality patient care.

Keywords: Medical education, medical student, compassion, empathy, educator, faculty

4. Study selection criteria

Intervention studies and studies that evaluate curricula with qualitative outcomes, using qualitative designs with outcomes of empathy and compassion that are in English, and were published from 2007 to 2017 will be included to capture articles on recent curricula and teaching methods. Study designs include phenomenology, ethnography, grounded theory, narrative research, and case studies. Qualitative articles are suitable for understanding social situations and interactions, and for providing insight to the informants' perspectives about their world (Creswell 2009). These studies will enable us to gain insight on how education affects empathy and compassion in medical students, to answer our research questions.

Inclusion criteria are:

- Empirical study in English.
- Paper published since and including year 2007.
- Involvement of students enrolled in medical, undergraduate studies and engaged in initial medical training regardless of their qualifications on entry.
- Study describes some form of education or teaching intervention or learning experience for the medical students

- Study uses qualitative study design.

Exclusion criteria are:

- Students or faculty were from non-medical professions, therapy or healthcare therapy.
- Study does not provide information on education or teaching intervention for medical students with empathy or compassion outcome.

5. Search sources and strategies

In February 2017, a pilot scoping was conducted to get a sense of the resources available and to help refine the review question. An initial search was conducted on two databases: PubMed and CINAHL without limiters on year, using these search terms: (empathy OR compassion) AND (medical undergraduate OR medical student OR medical educator OR medical faculty OR medical teacher) AND (qualitative OR phenomenology OR ethnography OR grounded theory OR interview OR narrative OR focus group).

Scoping search terms

P	I	C	O
Medical undergraduate		Qualitative	Empathy
Medical student		Phenomenology	Compassion
Medical educator		Ethnography	
Medical faculty		Grounded theory	
Medical teacher		Interview	
		Narrative	
		Focus Group	
		Meta-ethnography	

The scoping search strategy used on CINAHL and PubMed are as follows:

CINAHL	[AB medical undergraduate OR AB medical student OR AB medical educator OR AB medical faculty OR AB medical teacher] AND [AB empathy OR AB compassion] AND [AB qualitative OR AB phenomenology OR AB ethnography OR AB grounded theory OR AB interview OR AB narrative OR AB focus group OR AB meta-ethnography]
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	Results: 36
PubMed	<p>((((((((((qualitative) OR phenomenology) OR ethnography) OR grounded theory) OR interview) OR narrative) OR focus group) OR meta-ethnography)) AND (((empathy[MeSH Terms]) OR compassion[MeSH Terms])) OR ((empathy) OR compassion))) AND (((((((((((medical teacher[MeSH Terms]) OR medical faculty[MeSH Terms]) OR medical educator[MeSH Terms]) OR medical student[MeSH Terms]) OR medical undergraduate[MeSH Terms])) OR ((medical) AND teacher)) OR ((medical) AND faculty)) OR ((medical) AND educator)) OR ((medical) AND student)) OR ((medical) AND undergraduate))</p> <p>Results: 436</p>

The results for the scoping literature searches were exported to Zotero, and separate libraries for each search were kept. From this scoping search, a total of 472 results were obtained. After duplicates were removed, 439 results were left. A preliminary screening of titles and abstracts by two of the authors was performed using the inclusion and exclusion criteria described in Section 4. From this preliminary screening of results from the scoping search, 72 articles met our initial relevance criteria, addressing empathy, compassion, and teaching in medical education. The citations of the 72 articles are provided in Appendix 1.

From these 72 results, 10 articles were randomly selected to test the data extraction form (Appendix 2). The 10 articles were randomly selected using a random number generator in Microsoft Excel. This data extraction form was adapted from the coding sheets in supplementary materials in the BEME review by Rees et al. 2016, and data extraction method used by Park et al. 2015, with the inclusion of fields relevant to our review aims. Of these 10, three articles were excluded on reading of the full text as they did not satisfy the preliminary inclusion/exclusion criteria. Some details of the data extracted from the remaining 7 articles are shown in Table 1. The data extraction form to be used will include collection of information pertaining to publication details, study design, objective of study, location and setting, type of teaching activity, description of experiences, attitudes or perceptions of empathy and compassion.

Table 1. Preliminary summary of data extraction from scoping exercise

First author (year)	Study design/ Data collection methods	Study aims/ objectives (relevant to the review topic)	Location/context	Type of teaching/ learning activity	Outcomes/ Description of experiences, attitudes or perceptions of empathy	Outcomes/ Description of experiences, attitudes or perceptions of compassion
Atasoy et al. 2012	Action research, Questionnaires and long interviews	To understand the needs and expectations of caregivers of cancer patients, develop potential solutions, and evaluate the physician-patient communication performed in challenging situations in a preclinical medical education program	University outpatient clinic room, Turkey	Interviews performed by medical students with patients' caregivers, reflections on learning experience	The learning experience was important for students to understand approaches with patients, the communications required and difficulties in developing skills. "Unusual experience, the requirement for the elimination of the ambiguity, the need for the ability of empathy... being a physician is not consisted of just reading the books and studying..." "As physician candidates, in our first hospital experience, we observed that a good empathy and an appropriate communication not only with the patients, but also with his/her relatives, had a favorable effect on the patient and on his/her caregiver."	"I understood that being a physician is not consisted of just studying or having an ordinary profession and that it requires the formation of the wish to help the others and of empathy skills." "I wish that there was a therapeutic program applied to the patients treated in the department of oncology and to their caregivers by the people qualified in this subject, because the patients' relatives are in a very difficult situation during this time period; when they are with their patients, they try to appear to be happy, to smile and to betray no emotion, but a storm has broken in their heart and they can talk

					<p>“Approach of the physicians is specialistic, rather than empathic. But, being a specialist is not sufficient alone, showing empathy is also expected.... The patient had confidence in him, because he was the physician advised by the first physician (the physician herein)... Affection gave raise to confidence...”</p>	<p>about all these things with nobody.” “...During the interviews, we had some caregivers who opened their heart to us, or even cried... May be, we said nothing and just listened. I was happy of this, because they were relaxed, even a little bit. I was sad, because they just needed to be listened to and to talk about their feelings with somebody. And, so few of them could find somebody to talk both in their family and in their entourage.”</p>
Frazier et al. 2015	Grounded theory, Qualitative analysis of 166 student-written reflections	Assess the perceived impact of a required half-day with a hospital chaplain	First year medical students, hospital setting	Students attend 3 hours of chaplain rounds as part of their curriculum in the behavioural and social sciences to understand the types of care settings and professional involved with care.	One described a wish to “empathize without self-identifying.”	<p>“A sizeable number of students (21%) wrote that the visits served to support and re-emphasize their determination to give compassionate care as a physician.” “A smaller group of students reflected more generally rather than personally on the need for doctors to have compassion.’</p>

						<p>“One student quoted a chaplain as saying, “The best doctors she has seen are those who see their patients as humans, not merely diseases to be treated.” ‘Students commented on the need for doctors to take time, listen to, and comfort patients and to have good communication with their patients.</p> <p>Students appeared to reflect on the importance of compassionate care of patients by physicians.”</p>
Granek et al. 2015	Qualitative interviews and a quantitative pre- and postcourse survey	Evaluate the impact, reception and effectiveness of an oncology course	Second year medical students, University, Israel	One-week introduction oncology course	<p>“After taking the course, more students reported being concerned about ethical issues, being emotionally stirred by the course as compared with what they had expected before the course, being comfortable speaking with a cancer patient about death and dying, and being comfortable with the fact that the course dealt with death and loss and with “how to live with cancer.”</p>	<p>“Finally, one student wrote, “In addition to learning about the specialty of cancer, I hope that as a doctor I won’t forget my humanity or the humanity of my patients.”</p>

					<p>“Moreover, more students reported a fear of causing a cancer patient suffering because of a treatment yet were optimistic about being able to treat cancer.”</p> <p>“Students indicated an increase in empathy toward cancer patients and a more holistic view of cancer in general.”</p>	
Klemenc-Ketis et al. 2011	Qualitative data analysis	To test the relevance and usefulness of movies in teaching professionalism to fourth year medical students, and to assess its teaching method on students’ attitudes towards some professionalism topics	11 fourth year medical students	Lectures on doctor/patient communication, ethical issues, role of doctor and nurse in palliative care, in-depth discussions about professional issues in the film, oral presentation on the topic.	<p>Students recognised “communication, empathy, doctors’ personal interests and palliative care” in the movie. The “movie made them think about their own life and death and helped them to understand all phases of a dying patient.”</p> <p>“Students recognised that a doctor-patient relationship should be based on empathy, which is also the key issue for good management of a dying patient.” “The whole point is in listening and empathy.” “They described a doctor-patient relationship, presented in this movie, as cold,</p>	-

					<p>emotionless and too rational.” “The doctor regarded the patient as an object. In her, he saw just another case of illness. He acted totally unprofessional.” On the other hand, the students easily recognised the empathy, provided in this movie by a nurse. “Nurse regarded this patient as a subject. She saw her as a person who is breathing, thinking, hearing, seeing, talking, wanting, suffering and seeking support from other people.”</p> <p>They came to the conclusion that all patients react the same way when faced with their own death. They also expressed that this film helped them to understand all phases of a dying patient. “Future doctors should learn how to identify with the patients, how to show them a proper degree of empathy and how to</p>	
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					practice a holistic approach.”	
Lutz et al. 2013	18 semi-structured interviews, thematic content analysis	Evaluate students' perceptions of the helpfulness of the Clinical Reflection Training (CRT) and its effects on their medical education	Medical students, Clinical education ward of academic hospital	3-5 medical students take over the care of patients for one HO on the ward. Students work through psychosocial or moral personal and interpersonal dilemmas faced in their clinical work.	-	“Several personality factors, such as being overly perfectionistic, being idealistic, being compassionate and not being able to sufficiently care for oneself, were found to produce unrealistic expectations in students regarding clinical practice: ‘‘We had such a big ideal picture in our heads of the kind of physicians we wanted to and were supposed to be, and then, of course, you notice where it doesn’t work out that way.’’ Students’ attitudes toward immersion in patient care influenced their ability to stay motivated. Although students were reportedly eager to provide good care in good patient relationships, warnings from their older peers about exhaustion, frustration and resignation made them reticent to

						expose themselves to the same potential outcomes: “It’s just fun when I can do it and I know it’s good for the patient.” “...during the course of your studies, you always see beginners, those just starting out in their career, who fall apart during the first year.””
McDonald et al. 2015	Thematic analysis, constructivist approach	To see how successfully the students had been able to “stand in someone else’s shoes”	Third year students, Medical School	Creative writing course, students wrote about a character with a life-changing physical disorder.	“Some of the students wrote in their reports that they had felt increased empathy towards their character as the course progressed: I realised when writing that Andrew’s depression was not a new occurrence. It was something he had struggled with for most of his life. (student 5) Putting him through different scenarios and using different writing types helped me create more about his feelings, his character...Through this course I feel like I evolved with my character and get to know more and more about him through	“Creative writing enabled me to access an otherwise alien experience and perspective and as a result feel genuine empathy and compassion towards someone I may otherwise have been quick to judge... I was interested to see how my character’s tone and attitude impacted on both the group’s and my own emotions towards her...(student 4)”

					<p>the writing exercises. (student 6) At first it was very unusual writing about a character I hadn't completely made up myself; as I progressed, I felt that I understood my character more due to the chronicity of her condition. This allowed me to empathise more with the situations she would find herself in on a daily basis. (student 3) I found his story distressing and the more I spent on my creative writing, the more empathy I felt for his experiences in life. (student 1) As the course progressed, the character developed from an abstract concept to a fully-fledged concept. As he gained depth, he became more relatable, gaining a history, ambitions, motivations, regrets that I could also understand. Additionally, as more was revealed about him, there was more</p>	
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					<p>for him to lose if his cancer came out of remission. Understanding this ominous sense of panic while trying to maintain a normal life made it easier to understand some of his decisions which might otherwise not have made sense (student 5)</p> <p>My original perception was that her plot would necessarily be a tragedy, yet by truly engaging with the character, I began to realise her strength and potential, was able to envisage her success... my final piece demonstrates the acceptance, respect, love and hope that has developed for Rebecca, and which, as a partner in the telling of her story, she began to feel for herself. (student 2)”</p>	
Tavakol et al. 2012	Descriptive, phenomenological study, interviews	To investigate undergraduate medical students’ experiences of	10 undergraduate medical students (Year 4 and 5)	Students who had experiences with patients in introductory medicine,	(see paper for details) Main themes - meaning of empathy, willingness to empathise, innate empathic ability, empathy	“Many participants believed that students did not need to have experienced the same feelings and emotions as

		empathy during the course of their medical education and to explore the essence of their empathy		surgery, child health, obstetrics and gynaecology, psychiatry, dermatology, otorhinolaryngology, advanced medicine and surgery, musculoskeletal disabilities and disorders, general practice rotations.	decline or enhancement, and empathy education	patients in order to empathise with them, although they considered that sharing experiences with patients contributes to kindness and compassion, which ultimately improves patient care.”
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Following the scoping search, literature searches will be conducted on the following databases for the meta-ethnography:

- Cumulative Index to Nursing and Allied Health Literature (CINAHL)
- Excerpta Medica Database (Embase)
- Education Resources Information Centre (ERIC)
- PsycINFO
- PubMed

The search terms that will be used are:

P	I	C	O
Medical undergraduate*		Qualitative	Empathy
Medical student*		Phenomenology	Compassion
Medical educat*		Ethnography	
Medical faculty		Grounded theory	
Medical teach*		Interview*	
		Narrative*	
		Focus Group*	
		Meta-ethnography	
		Case study	
		Thematic analysis	
		Framework analysis	

The search strategies on the databases will be:

Cumulative Index to Nursing and Allied Health Literature (CINAHL)	<p>[AB medical undergraduate* OR AB medical student* OR AB medical educat* OR AB medical faculty OR AB medical teach*] AND [AB empathy OR AB compassion] AND [AB qualitative OR AB phenomenology OR AB ethnography OR AB grounded theory OR AB interview* OR AB narrative* OR AB focus group* OR AB meta-ethnography OR AB case study OR AB thematic analysis OR AB framework analysis]</p> <p>Limitier: English</p>
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EMBASE	<ol style="list-style-type: none"> 1. (Medical undergraduate* or Medical student* or Medical educat* or Medical faculty or Medical teach*).af. 2. (Qualitative or Phenomenology or Ethnography or Grounded theory or Interview* or Narrative* or Focus Group* or Meta-ethnography or Case study or Thematic analysis or Framework analysis).af. 3. (Empathy or Compassion).af. 4. 1 and 2 and 3 5. limit 4 to English language
Education Resources Information Centre (ERIC)	<ol style="list-style-type: none"> 1. Medical undergraduate* OR Medical student* OR Medical educat* OR Medical faculty OR Medical teach* 2. Qualitative OR Phenomenology OR Ethnography OR Grounded theory OR Interview* OR Narrative* OR Focus Group* OR Meta-ethnography OR Case study OR Thematic analysis OR Framework synthesis 3. Empathy OR Compassion 4. 1 AND 2 AND 3 <p>Limiters: English</p>
PsycINFO	<ol style="list-style-type: none"> 1. Medical undergraduate* OR Medical student* OR Medical educat* OR Medical faculty OR Medical teach* 2. Qualitative OR Phenomenology OR Ethnography OR Grounded theory OR Interview* OR Narrative* OR Focus Group* OR Meta-ethnography OR Case study OR Thematic analysis OR Framework synthesis 3. Empathy OR Compassion 4. 1 AND 2 AND 3 <p>Limiters: English</p>
PubMed	<p>((((((((((qualitative) OR phenomenology) OR ethnography) OR grounded theory) OR interview*) OR narrative*) OR focus group*) OR meta-ethnography) OR case study) OR thematic</p>

	<p>analysis) OR framework synthesis) AND (((empathy[MeSH Terms]) OR compassion[MeSH Terms])) OR ((empathy) OR compassion))) AND (((((((((((medical teacher[MeSH Terms]) OR medical faculty[MeSH Terms]) OR medical education[MeSH Terms] OR medical educator[MeSH Terms]) OR medical student[MeSH Terms]) OR medical undergraduate*[MeSH Terms])) OR ((medical) AND teacher)) OR ((medical) AND faculty)) OR ((medical) AND educator)) OR ((medical) AND student*)) OR ((medical) AND undergraduate*)))</p> <p>Filter: English</p>
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Only articles in English will be included. There will be no geographical limits applied for the search and inclusion. The search will be conducted and completed in the first three months of the review. Mixed methods studies will be excluded from the actual review because mixed method studies are of a different paradigm from qualitative studies (Johnson et al. 2007). The quality of reporting in qualitative studies is also stronger than in mixed method studies (Atkins et al. 2012).

The timeline of the project is as follows:

Activity	Time needed	Month - Year
Submit protocol to BEME, await review and make revisions	2 months	July-Aug 2017
Data search	3 months	Sep-Nov 2017
Data extraction and appraisal of studies	2 months	Nov-Dec 2017
Synthesize data	4 months	Dec-Mar 2018
Report results	1 month	Apr 2018

6. Extracting data

The results for the literature searches will be exported to Endnote X7.4 for the actual search and separate libraries for each search will be kept. Duplicates will then be removed and each of the remaining titles and abstracts of the search results will be assessed independently by at least two authors using the inclusion and exclusion criteria described. The criteria for

screening and extraction of data have been discussed and agreed on by the authors during the construction of the criteria. Any disagreement during the title and abstract screening will be resolved through discussion with a third reviewer.

Each of the selected papers will be randomly allocated to at least two authors and the data from the papers will be extracted independently by at least two persons. Similar to the extraction details used with the scoping search results, the study design, objective of study, location and setting, type of teaching activity, description of experiences, attitudes or perceptions of empathy and compassion will be extracted. The details of the data extraction form are provided in Appendix 2.

All members of the research team will be involved in evaluating articles to be included in the review, and any disagreement in data extraction will be resolved through discussion with a third reviewer. The results of the evaluation of the articles will be stored in an online database for tracking and analysis by the team. All papers that do not address medical education and empathy or compassion will be excluded.

7. Appraisal of studies

The quality of the articles to be included will be assessed using the CASP criterion which includes criteria pertaining to the aims of the study, suitability of the methodology, design, and methods of data analysis (CASP 2014). Each article will be appraised by at least two reviewers. Any disagreement will be resolved through discussion with a third reviewer.

8. Synthesis of evidence and transfer to research and practice

Meta-ethnography is a commonly used method in investigations of health services and technologies and is suitable for synthesizing qualitative research (Ring et al. 2011). It is a valuable qualitative synthesis technique which allows the interpretive properties of primary data to be considered (Sharma et al. 2015), and allows reviewers to produce new interpretations that go beyond the findings of individual studies (France et al. 2015). It is also useful for understanding relationships across studies and to consider the contextual and social factors surrounding empathy and compassion (Bearman & Dawson 2013), and the usefulness of educational interventions to make recommendations.

The seven steps by Noblit and Hare (1988) will be used for data synthesis of extracted evidence:

- 1) Getting started: involves determining the focus of the data synthesis.
- 2) Deciding what is relevant to the initial interest: involves locating studies and making decisions on inclusion and quality assessment.
- 3) Reading the studies: involves reading the accounts and noting metaphors, concepts, or themes.
- 4) Determining how the studies are related: involves comparing concepts, metaphors and concepts from studies, and to see how they are similar or different.
- 5) Translating studies into one another: involves comparing concepts and metaphors between and within study accounts, to see how they relate to other key concepts or metaphors.
- 6) Synthesising translations: involves making a whole from common types of translations or concepts and reaching new interpretations.
- 7) Expressing the synthesis: involves conveying the findings of the synthesis.

The review findings will deepen understanding of empathy and compassion from the perspectives of medical students, patients and educators. It will also contribute to the knowledge base or theoretical development of how medical education affects empathy and compassion in medical students. The review findings will provide useful information and important consideration points for medical educators and faculty developers in developing medical curricula including clinical placements, as empathy and compassion are viewed as essential components for the provision of high quality patient care.

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Appendix 2: Data extraction form

How does medical education affect empathy and compassion in medical students? A meta-ethnography

1. Administrative

Date: _____

First coder		Second coder	
1. CK	<input type="checkbox"/>	1. CK	<input type="checkbox"/>
2. SY	<input type="checkbox"/>	2. SY	<input type="checkbox"/>
3. ME	<input type="checkbox"/>	3. ME	<input type="checkbox"/>
4. JT	<input type="checkbox"/>	4. JT	<input type="checkbox"/>

Citation type:

1. Journal article

Citation information:

Authors:

Title:

Publication (e.g. Name of Journal):

Year: _____ Volume: _____ Issue: _____ Pages: _____

Search method:

1. Electronic search

2. Research design/ theoretical framework

(Select all that were used)

1. Phenomenology

2. Ethnography

3. Grounded theory

4. Narrative research

5. Case study

6. Thematic analysis

7. Others: _____

3. Data collection/ evaluation method

- 1.Focus group Time frame: _____
- 2.Individual semi-structured or open interviews Time frame: _____
- 3.Observation Time frame: _____
- 4.In-depth document analysis Time frame: _____
- 5.Questionnaire Time frame: _____
- 6.Diary (e.g. reflection) Time frame: _____
- 7.Action research (please specify): _____ Time frame: _____

4. Aims of study

Aim/Objective/ purpose of study/research question

- 1.Stated
- 2.Not stated

State the aim/objective/purpose/research question if available:

5. Context

Study population

Number of participants: _____

Response rate (if applicable): _____

Country/location of study: Stated _____ Not stated

Type of setting (e.g hospital/ university, if stated): _____

Level/ stage of medical training : Stated _____ Not stated

Educator:

- 1. University/academic educator
- 2. Clinical educator
- 3. Patient as educator
- 4. Other: _____

Curriculum (select all that apply)

- 1. Core
- 2. Elective module/voluntary/optional
- 3. Others: _____

Type of learning

- 1. Clinical (details/duration) _____
- 2. Lecture (details/duration) _____
- 3. Workshop or seminar (details/duration) _____
- 4. Short course (details/duration) _____
- 5. Computer-based program (details e.g. online; distance education /duration) _____
- 6. Other (details/duration) _____

Assessment

- 1. Feedback 2. Practical 3. Written 4. No assessment
- 5. Other (details) _____

6. Learning outcomes

Attributes assessed

- 1. Empathy: (as cognitive, behaviour or affective, or as process, involving the ability to understand the patient's situation, perspective, and feelings, and to communicate back that understanding)
- 2. Empathy (implied)
- 3. Compassion (as a form of cognitive and emotional perspective taking and which involves wanting to alleviate suffering)
- 4. Compassion (implied)

Components in curriculum that were developed to promote empathy/compassion

- 1. Patient narratives 2. Creative arts 3. Drama workshop
- 4. Reflective writing 5. Communication skills training
- 6. Community volunteer work 7. Others (please specify) _____

Aspects of curriculum that were reported to affect empathy/compassion

- 1. Professional behavior & attitudes including role modeling
- 2. Evaluation / assessment
- 3. Peer interactions
- 4. Physical environment
- 5. Patient interactions
- 6. Informal discussion with clinical teachers & tutors including social media interactions
- 7. Formal discussion (e.g. small group work)
- 8. Other healthcare professionals and/or students (interdisciplinary contact)
- 9. Others (please specify) _____

By whom were outcomes assessed?

1.Students

2.Faculty

3.Patients

Descriptions

Students' experiences of empathy and compassion resulting from the influence of the curricula (description):

Students' perceptions of empathy and compassion resulting from the influence of curricula (description):

Students' demonstration/expression of empathy and compassion resulting from the influence of curricula (description):

Any other comments:
