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Why might medical student empathy change throughout medical school? Protocol for a systematic review and thematic synthesis of qualitative studies

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Keywords:	EDUCATION & TRAINING (see Medical Education & Training), EPIDEMIOLOGY, QUALITATIVE RESEARCH

Title

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Update

This is not an updated protocol

Registration

Following the guidelines, our systematic review protocol was submitted for registration with the International Prospective Register of Systematic Reviews (PROSPERO) on 28 July 2022 (registration number CRD42022347856).

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Word Count

1425 words

Data Statement

All data for this review will be available as a supplementary appendix to the final published manuscript.

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Should the protocol require amendments, the date of each amendment will be accompanied by a description of the change and the rationale.

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Introduction

Several studies suggest that medical student empathy declines throughout medical school. However, no studies have systematically investigated why. The objective of this study is to conduct a systematic review and thematic synthesis of qualitative studies investigating the reasons empathy may change throughout medical school.

Methods and analysis

This systematic review protocol follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. We have searched Medline, Scopus, CINAHL, and APA PsycInfo for relevant studies. We will also search reference lists of included studies and contact experts to identify additional studies. We will include any qualitative study investigating the reasons why empathy changes throughout medical school. We will use the Joanna Briggs Institute tool to evaluate the risk of bias in included studies. We will use thematic analysis to synthesize our results. For all included studies, we will summarize the main characteristics including the number of participants, medical school year, country, and gender. In our discussion, we will summarize the limitations of the evidence (including the risk of bias and inconsistency), and provide a general interpretation of the results and important implications.

Ethics and dissemination

This study will not require ethical approval since no original data will be collected. The results of this review will be published through peer-reviewed publications and conference presentations. Additionally, this review will inform changes to the enhanced empathy curriculum at the Leicester Medical School.

KEYWORDS

Empathy; systematic review; qualitative; communication; medical school; education

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Strengths and Limitations of this study

- This review addresses a gap in the current evidence-base by systematically answering the question of why empathy might decline throughout medical school.
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- No language restriction will be applied to the selection of the studies.
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INTRODUCTION

Rationale

Empathy in healthcare appears to be beneficial to patients (for example by reducing their pain and improving satisfaction with care[1]) and practitioners (by reducing burnout[2 3]). Despite its potential benefits, the extent to which patients report that their practitioners are empathic varies widely.[4] In addition, several studies have suggested that medical student empathy appears to change throughout medical school. A systematic review published in 2011 identified 11 studies of medical student empathy.[5] Ten of the studies found that medical student empathy decreased during medical school, and the other study found that empathy remained stable. A more recent systematic review published in 2020 found equivocal results, with more studies showing a decrease in empathy throughout medical school (n=14) than those showing an increase (n=6) with the remaining studies suggesting no significant change.[6] At least one study has investigated whether empathy declines throughout medical school since the recent systematic review. The cross-sectional with medical students from 41 osteopathy students found that empathy declined by a very small amount throughout their training.[7] One systematic review also suggests that the change in empathy throughout medical school may have a cultural component, with US medical schools showing a decline and studies from the far East showing an increase in empathy throughout medical school.[8]

Qualitative studies investigating the reasons *why* empathy declines throughout medical school are reported to be rare.[9] Those that have been conducted a report that the reasons for empathy decline include prioritizing specialized biomedical knowledge,[10] and lack of time.[9 11] However, this qualitative literature has not been synthesized. A better understanding of why empathy seems to decline among medical students throughout medical school can inform interventions designed to prevent or reverse the decline.

Objective

This study aims to systematically review the qualitative evidence that explains why medical student empathy may change throughout medical school.

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Outcomes and prioritization

Our primary outcome will be any aspect of medical students' reported experience or reflection of empathy in medical school, including how or why empathy might decline throughout medical school. We will collect data from qualitative interviews (including focus groups).

Risk of bias in individual studies

We will use the Joanna Briggs Institute tool for assessing the risk of bias in individual qualitative studies.[15] Where possible, we will do this at the outcome level. However, because qualitative studies rarely report sufficient data (such as number of participants or interviews that supported a particular outcome), we anticipate assessing the risk of bias at the study level as well. One reviewer will assess the risk of bias and the risk of bias will be checked by a second reviewer, with discrepancies being resolved in discussion with a third reviewer.

Data synthesis

Our scoping search on this topic suggested that the data were unlikely to be highly theorized or conceptual. Therefore, we anticipate synthesizing the data using a thematic synthesis approach. Thematic synthesis is recommended by the Cochrane Qualitative and Implementation Group for the type of data we anticipate collecting.[16]

Thematic synthesis involves three phases,[17] which are applied to all included studies.

1. **Line-by-line coding**. Two senior reviewers will begin by independently coding a proportion of the findings to determine meaning and context. The codes will be discussed, reviewed, further developed and agreed by the two senior reviewers. One reviewer will then code all data, and the coding will be checked by a second reviewer.

Discrepancies in coding will be resolved through discussion with a third reviewer if necessary.

2. **Generation of descriptive themes**. For this stage, codes will be grouped into descriptive themes. These themes will capture and describe similarities in the data across different individual studies. The themes will be organized into a table, with one theme per column. Coded data from each study will illustrate the themes in rows of the table. The table will facilitate illustrative data that captures the similarities and differences within the data where possible.[18]
3. **Generation of interpretive/analytical themes**. These interpretive/ analytical themes identifying new insights from the synthesized data were created from the descriptive themes. These themes go beyond findings from each study by synthesizing findings across studies and involves interpretation.

We will use the NVIVO software to assist with the thematic synthesis.

Subgroup analysis and investigation of heterogeneity

If there is sufficient data, subgroup analyses will be used to explore possible sources of heterogeneity, based on the following.

- Medical school programme (graduate entry or undergraduate entry)
- Medical student characteristic (age, sex)
- By continent

These subgroups are based on the hypotheses that the change in empathy throughout medical school may differ by geographic region,[8] that healthcare practitioner empathy varies significantly depending on characteristics (especially sex/gender),[4] and also by age (which is correlated with whether programme is graduate or undergraduate).[19 20]

Sensitivity analysis

Sensitivity analysis will be performed to explore the source of heterogeneity as follows.

- Quality components (by omitting studies that are judged to be at high risk of bias)

Meta-bias(es)

To help determine whether there were meta-biases, we will investigate whether the outcomes in the individual studies were pre-specified in a protocol.

Confidence in cumulative evidence

We will investigate the confidence in cumulative evidence with the Confidence in the Evidence from Reviews of Qualitative research (CERQual) approach.[21] This involves evaluating how likely that the findings represent a real phenomenon, and requires evaluating: (i) methodological limitations of primary studies, (ii) the relevance of the primary contributing studies with regard

to the objectives of the systematic review, (iii) the coherence of the finding, and (iv) the adequacy of data supporting the finding.

To reduce the potentially biasing influence of the inherently subjective nature of these evaluations, two reviewers will collaborate to perform them. We will present a summary table will list for each finding that includes primary contributing studies, evaluations of the above four domains, an overall confidence rating (high, moderate, low, or very low), and a brief explanation of the rating judgement.

PATIENT AND PUBLIC INVOLVEMENT STATEMENT

Patients or the public were not involved in the design, or conduct, or reporting, or dissemination plans of our research.

ETHICS AND DISSEMINATION

This study will not require ethical approval since no original data will be collected. The results of this review will be published through peer-reviewed publication and conference presentations. Additionally, this review will inform changes to the enhanced empathy curriculum at the Leicester Medical School.

FUNDING STATEMENT

Sources: This systematic review is funded by the Stoneygate Trust and University of Leicester

Role of sponsor or funder: The Stoneygate Trust will have no input on the interpretation or publication of the study results.

AUTHOR CONTRIBUTIONS STATEMENT

JH is the guarantor. JH drafted the manuscript, and all authors contributed to revising the manuscript. All authors contributed to the development of the selection criteria, the risk of bias assessment strategy, and data extraction criteria. KN and JH developed the search strategy. All authors read, provided feedback, and approved the final manuscript.

COMPETING INTERESTS STATEMENT

None of the authors have conflicts of interest related to this work.

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APPENDIX 1. Sample search strategy (OVID Medline)

1	Empathy/ or empath*.mp.	34040
2	Compassion.mp.	8379
3	Students, Medical/	41045
4	(medic* adj3 student*).mp.	69694
5	1 or 2	38849
6	3 or 4	69694
7	5 and 6	1829
8	((("semi-structured" or semistructured or unstructured or informal or "in-depth" or indepth or "face-to-face" or structured or guide) adj2 (interview* or discussion* or questionnaire*)) or (focus group* or qualitative or ethnograph* or fieldwork or "field work" or "key informant")).tw,kw. or interviews as topic/ or focus groups/ or narration/ or qualitative research/	475014
9	((mixed or multi*) adj2 method*).ti,ab.	95691
10	multimethod*.ti,ab.	2265
11	8 or 9 or 10	544371
12	7 and 11	426
13	limit 7 to "qualitative (maximizes sensitivity)"	1254
14	12 or 13	1347

Reporting checklist for protocol of a systematic review and meta analysis.

Based on the PRISMA-P guidelines.

Instructions to authors

Complete this checklist by entering the page numbers from your manuscript where readers will find each of the items listed below.

Your article may not currently address all the items on the checklist. Please modify your text to include the missing information. If you are certain that an item does not apply, please write "n/a" and provide a short explanation.

Upload your completed checklist as an extra file when you submit to a journal.

In your methods section, say that you used the PRISMA-Preporting guidelines, and cite them as:

Moher D, Shamseer L, Clarke M, Ghersi D, Liberati A, Petticrew M, Shekelle P, Stewart LA. Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols (PRISMA-P) 2015 statement. Syst Rev. 2015;4(1):1.

		Reporting Item	Page Number
Title			
Identification	#1a	Identify the report as a protocol of a systematic review	1
Update	#1b	If the protocol is for an update of a previous systematic review, identify as such	1
Registration			
	#2	If registered, provide the name of the registry (such as PROSPERO) and registration number	1
Authors			
Contact	#3a	Provide name, institutional affiliation, e-mail address of all protocol authors; provide physical mailing address of corresponding author	1
Contribution	#3b	Describe contributions of protocol authors and identify the guarantor of the review	2

Amendments			
	#4	If the protocol represents an amendment of a previously completed or published protocol, identify as such and list changes; otherwise, state plan for documenting important protocol amendments	1
Support			
Sources	#5a	Indicate sources of financial or other support for the review	2
Sponsor	#5b	Provide name for the review funder and / or sponsor	2
Role of sponsor or funder	#5c	Describe roles of funder(s), sponsor(s), and / or institution(s), if any, in developing the protocol	2
Introduction			
Rationale	#6	Describe the rationale for the review in the context of what is already known	3
Objectives	#7	Provide an explicit statement of the question(s) the review will address with reference to participants, interventions, comparators, and outcomes (PICO)	3
Methods			
Eligibility criteria	#8	Specify the study characteristics (such as PICO, study design, setting, time frame) and report characteristics (such as years considered, language, publication status) to be used as criteria for eligibility for the review	3
Information sources	#9	Describe all intended information sources (such as electronic databases, contact with study authors, trial registers or other grey literature sources) with planned dates of coverage	4
Search strategy	#10	Present draft of search strategy to be used for at least one electronic database, including planned limits, such that it could be repeated	4
Study records - data management	#11a	Describe the mechanism(s) that will be used to manage records and data throughout the review	4
Study records - selection process	#11b	State the process that will be used for selecting studies (such as two independent reviewers) through each phase of the review (that is, screening, eligibility and inclusion in meta-analysis)	4
Study records - data	#11c	Describe planned method of extracting data from reports (such as	5

collection process		piloting forms, done independently, in duplicate), any processes for obtaining and confirming data from investigators	
Data items	#12	List and define all variables for which data will be sought (such as PICO items, funding sources), any pre-planned data assumptions and simplifications	5
Outcomes and prioritization	#13	List and define all outcomes for which data will be sought, including prioritization of main and additional outcomes, with rationale	5
Risk of bias in individual studies	#14	Describe anticipated methods for assessing risk of bias of individual studies, including whether this will be done at the outcome or study level, or both; state how this information will be used in data synthesis	5
Data synthesis	#15a	Describe criteria under which study data will be quantitatively synthesised	5
Data synthesis	#15b	If data are appropriate for quantitative synthesis, describe planned summary measures, methods of handling data and methods of combining data from studies, including any planned exploration of consistency (such as I2, Kendall's τ)	6
Data synthesis	#15c	Describe any proposed additional analyses (such as sensitivity or subgroup analyses, meta-regression)	6
Data synthesis	#15d	If quantitative synthesis is not appropriate, describe the type of summary planned	6
Meta-bias(es)	#16	Specify any planned assessment of meta-bias(es) (such as publication bias across studies, selective reporting within studies)	6
Confidence in cumulative evidence	#17	Describe how the strength of the body of evidence will be assessed (such as GRADE)	7

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Our primary outcome will be any aspect of medical students' reported experience or reflection of empathy in medical school, including how or why empathy might decline throughout medical school. We will collect data from qualitative interviews (including focus groups).

Risk of bias in individual studies

We will use the Joanna Briggs Institute tool for assessing the risk of bias in individual qualitative studies.[15] This tool is considered suitable for assessing the quality of qualitative research.[16] Where possible, we will do this at the outcome level. However, because qualitative studies rarely report sufficient data (such as number of participants or interviews that supported a particular outcome), we anticipate assessing the risk of bias at the study level as well. One reviewer will assess the risk of bias and the risk of bias will be checked by a second reviewer, with discrepancies being resolved in discussion with a third reviewer.

Data synthesis

Our scoping search on this topic suggested that the data were unlikely to be highly theorized or conceptual. Therefore, we anticipate synthesizing the data using a thematic synthesis approach. Thematic synthesis is recommended by the Cochrane Qualitative and Implementation Group for the type of data we anticipate collecting.[17]

Thematic synthesis involves three phases,[18] which are applied to all included studies.

1. **Line-by-line coding**. Two senior reviewers will begin by independently coding a proportion of the findings to determine meaning and context. The codes will be discussed, reviewed, further developed and agreed by the two senior reviewers. One reviewer will then code all data, and the coding will be checked by a second reviewer. Discrepancies in coding will be resolved through discussion with a third reviewer if necessary.
2. **Generation of descriptive themes**. For this stage, codes will be grouped into descriptive themes. These themes will capture and describe similarities in the data across different individual studies. The themes will be organized into a table, with one theme per column. Coded data from each study will illustrate the themes in rows of the table. The table will facilitate illustrative data that captures the similarities and differences within the data where possible.[19]
3. **Generation of interpretive/analytical themes**. These interpretive/ analytical themes identifying new insights from the synthesized data were created from the descriptive themes. These themes go beyond findings from each study by synthesizing findings across studies and involves interpretation.

We will use the NVIVO software to assist with the thematic synthesis.

Subgroup analysis and investigation of heterogeneity

If there is sufficient data, subgroup analyses will be used to explore possible sources of heterogeneity, based on the following.

- Medical school programme (graduate entry or undergraduate entry)
- Medical student characteristic (age, sex)
- By continent

These subgroups are based on the hypotheses that the change in empathy throughout medical school may differ by geographic region,[8] that healthcare practitioner empathy varies significantly depending on characteristics (especially sex/gender),[4] and also by age (which is correlated with whether programme is graduate or undergraduate).[20 21]

Sensitivity analysis

If there is sufficient data, sensitivity analysis will be performed to explore the source of heterogeneity as follows.

- Quality components (by omitting studies that are judged to be at high risk of bias)

Meta-bias(es)

To help determine whether there were meta-biases, we will investigate whether the outcomes in the individual studies were pre-specified in a protocol.

Confidence in cumulative evidence

We will investigate the confidence in cumulative evidence with the Confidence in the Evidence from Reviews of Qualitative research (CERQual) approach.[22] This involves evaluating how likely that the findings represent a real phenomenon, and requires evaluating: (i) methodological limitations of primary studies, (ii) the relevance of the primary contributing studies with regard to the objectives of the systematic review, (iii) the coherence of the finding, and (iv) the adequacy of data supporting the finding.

To reduce the potentially biasing influence of the inherently subjective nature of these evaluations, two reviewers will collaborate to perform them. We will present a summary table will list for each finding that includes primary contributing studies, evaluations of the above four domains, an overall confidence rating (high, moderate, low, or very low), and a brief explanation of the rating judgement.

PATIENT AND PUBLIC INVOLVEMENT STATEMENT

Patients or the public were not involved in the design, or conduct, or reporting, or dissemination plans of our research.

ETHICS AND DISSEMINATION

This study will not require ethical approval since no original data will be collected. The results of this review will be published through peer-reviewed publication and conference presentations. Additionally, this review will inform changes to the enhanced empathy curriculum at the Leicester Medical School.

FUNDING STATEMENT

Sources: This systematic review is funded by the Stoneygate Trust and University of Leicester

Role of sponsor or funder: The Stoneygate Trust will have no input on the interpretation or publication of the study results.

AUTHOR CONTRIBUTIONS STATEMENT

JH is the guarantor. JH drafted the manuscript, and AA, MD, SNF, KN, NA, RW, and RH contributed to: revising the manuscript. All authors contributed to developing the selection criteria, the risk of bias assessment strategy, and data extraction criteria. KN and JH developed the search strategy. JH, AA, MD, SNF, KN, NA, RW, and RH read, provided feedback, and approved the final manuscript.

COMPETING INTERESTS STATEMENT

None of the authors have conflicts of interest related to this work.

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APPENDIX 1. Sample search strategy (OVID Medline)

1	Empathy/ or empath*.mp.	34040
2	Compassion.mp.	8379
3	Students, Medical/	41045
4	(medic* adj3 student*).mp.	69694
5	1 or 2	38849
6	3 or 4	69694
7	5 and 6	1829
8	((("semi-structured" or semistructured or unstructured or informal or "in-depth" or indepth or "face-to-face" or structured or guide) adj2 (interview* or discussion* or questionnaire*)) or (focus group* or qualitative or ethnograph* or fieldwork or "field work" or "key informant")).tw,kw. or interviews as topic/ or focus groups/ or narration/ or qualitative research/	475014
9	((mixed or multi*) adj2 method*).ti,ab.	95691
10	multimethod*.ti,ab.	2265
11	8 or 9 or 10	544371
12	7 and 11	426
13	limit 7 to "qualitative (maximizes sensitivity)"	1254
14	12 or 13	1347

Reporting checklist for protocol of a systematic review and meta analysis.

Based on the PRISMA-P guidelines.

Instructions to authors

Complete this checklist by entering the page numbers from your manuscript where readers will find each of the items listed below.

Your article may not currently address all the items on the checklist. Please modify your text to include the missing information. If you are certain that an item does not apply, please write "n/a" and provide a short explanation.

Upload your completed checklist as an extra file when you submit to a journal.

In your methods section, say that you used the PRISMA-Preporting guidelines, and cite them as:

Moher D, Shamseer L, Clarke M, Ghersi D, Liberati A, Petticrew M, Shekelle P, Stewart LA. Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols (PRISMA-P) 2015 statement. Syst Rev. 2015;4(1):1.

		Reporting Item	Page Number
Title			
Identification	#1a	Identify the report as a protocol of a systematic review	1
Update	#1b	If the protocol is for an update of a previous systematic review, identify as such	1
Registration			
	#2	If registered, provide the name of the registry (such as PROSPERO) and registration number	1
Authors			
Contact	#3a	Provide name, institutional affiliation, e-mail address of all protocol authors; provide physical mailing address of corresponding author	1
Contribution	#3b	Describe contributions of protocol authors and identify the guarantor of the review	2

Amendments			
	#4	If the protocol represents an amendment of a previously completed or published protocol, identify as such and list changes; otherwise, state plan for documenting important protocol amendments	1
Support			
Sources	#5a	Indicate sources of financial or other support for the review	2
Sponsor	#5b	Provide name for the review funder and / or sponsor	2
Role of sponsor or funder	#5c	Describe roles of funder(s), sponsor(s), and / or institution(s), if any, in developing the protocol	2
Introduction			
Rationale	#6	Describe the rationale for the review in the context of what is already known	3
Objectives	#7	Provide an explicit statement of the question(s) the review will address with reference to participants, interventions, comparators, and outcomes (PICO)	3
Methods			
Eligibility criteria	#8	Specify the study characteristics (such as PICO, study design, setting, time frame) and report characteristics (such as years considered, language, publication status) to be used as criteria for eligibility for the review	3
Information sources	#9	Describe all intended information sources (such as electronic databases, contact with study authors, trial registers or other grey literature sources) with planned dates of coverage	4
Search strategy	#10	Present draft of search strategy to be used for at least one electronic database, including planned limits, such that it could be repeated	4
Study records - data management	#11a	Describe the mechanism(s) that will be used to manage records and data throughout the review	4
Study records - selection process	#11b	State the process that will be used for selecting studies (such as two independent reviewers) through each phase of the review (that is, screening, eligibility and inclusion in meta-analysis)	4
Study records - data	#11c	Describe planned method of extracting data from reports (such as	5

collection process		piloting forms, done independently, in duplicate), any processes for obtaining and confirming data from investigators	
Data items	#12	List and define all variables for which data will be sought (such as PICO items, funding sources), any pre-planned data assumptions and simplifications	5
Outcomes and prioritization	#13	List and define all outcomes for which data will be sought, including prioritization of main and additional outcomes, with rationale	5
Risk of bias in individual studies	#14	Describe anticipated methods for assessing risk of bias of individual studies, including whether this will be done at the outcome or study level, or both; state how this information will be used in data synthesis	5
Data synthesis	#15a	Describe criteria under which study data will be quantitatively synthesised	5
Data synthesis	#15b	If data are appropriate for quantitative synthesis, describe planned summary measures, methods of handling data and methods of combining data from studies, including any planned exploration of consistency (such as I2, Kendall's τ)	6
Data synthesis	#15c	Describe any proposed additional analyses (such as sensitivity or subgroup analyses, meta-regression)	6
Data synthesis	#15d	If quantitative synthesis is not appropriate, describe the type of summary planned	6
Meta-bias(es)	#16	Specify any planned assessment of meta-bias(es) (such as publication bias across studies, selective reporting within studies)	6
Confidence in cumulative evidence	#17	Describe how the strength of the body of evidence will be assessed (such as GRADE)	7