

Integrating leadership into the undergraduate medical curriculum in the UK: a systematic review

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ABSTRACT

Background Leadership is a critical skill required of a doctor and is necessary for clinical and organisational development. Literature suggests that newly qualified doctors are not prepared for the leadership roles and responsibilities that they need to undertake in clinical practice. The opportunities to develop the necessary skillset should be available in undergraduate medical training and throughout a doctor's professional advancement. Various frameworks and guidance for a core leadership curriculum have been designed, but data on their integration in undergraduate medical education in the UK are minimal.

Methods This systematic review collates and qualitatively analyses studies that have implemented and evaluated a leadership teaching intervention in undergraduate medical training in the UK.

Results There are various approaches to teaching leadership in medical school, differing in mode of delivery and evaluation. Feedback on the interventions revealed that students gained insight into leadership and honed their skills.

Conclusions The long-term effectiveness of the described leadership interventions in preparing newly qualified doctors cannot be conclusively determined. The implications for future research and practice are also provided in this review.

INTRODUCTION

Leadership can be defined as 'the art of motivating a group of people to achieve a common goal'.¹ Medical leadership is more complex to define as there are a plethora of perspectives on the attributes of a clinical leader across different health and country settings. In the UK, the NHS Leadership Academy's Healthcare Leadership Model describes nine domains of leadership behaviour: 'inspiring shared purpose, leading with care, evaluating information, connecting our service, sharing the vision, engaging the team, holding to account, developing capability and influencing for results'.² The Medical Leadership Competency Framework (MLCF) outlines five domains based on collaborative leadership, depicted in figure 1.³ Good medical leadership is key to healthcare development both clinically and systematically,⁴ and leads to a higher quality of service delivery with safer patient care.⁵ However, literature suggests that newly qualified doctors are caught off guard by the leadership roles they need to undertake in the workplace.^{5,6} This is due to a lack of formal training and medical students' scepticism about the need to hone their leadership skills,⁵ which might result from their lack of insight into their future work, rather than

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ There is an identified gap in leadership teaching in the undergraduate medical curriculum in the UK.

WHAT THIS STUDY ADDS

⇒ This review analyses interventions reported by UK medical schools and collates their findings.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ As the first systematic review on this topic in the UK, it highlights the need for standardised leadership teaching with longitudinal evaluation to measure effectiveness.

a rejection of leadership as part of it.⁷ The aim is to embed leadership competency into doctors' professional development, so it extends beyond clinical training and encompasses critical skills for 'a practitioner, a partner and a leader'.⁸ Undergraduate medical training is a key phase for developing a professional identity and understanding leadership responsibilities in patient care.⁹ Jefferies *et al* assessed the integration of medical leadership and management (MLM) in UK medical schools in line with the MLCF domains. Out of 25 schools surveyed, 23 reported the presence of MLM in their curricula, but none covered all domains. The MLCF and Healthcare Leadership Model were not well known among medical schools.¹⁰ A lot of work has been done in the UK to create frameworks and indicative curricula for medical leadership teaching. The Faculty of Medical Leadership and Management (FMLM) outlines an undergraduate curriculum based on the MLCF, with elements that map to the FMLM Standards, the Healthcare Leadership Model and the General Medical Council's Outcomes for Graduates.¹¹ Lamont and Chapman present a conceptual 'medical leadership spiral curriculum' that spans over a 5-year undergraduate course.¹² Sheriff *et al* propose student-run leadership teaching as an adjunct to the core curriculum.¹³ It is interesting to explore the implementation of conceptual frameworks. O'Connell and Pascoe reviewed reports of medical leadership teaching in eight medical schools in the USA. They identified that leadership was not the focus in most curricula, instead the dynamics of teamwork were implicitly taught through the exercises.¹⁴ A systematic review was conducted by Lyons *et al*, based in the USA, Sweden, Switzerland and Canada, which found a positive relationship between leadership training and medical students' leadership development.⁴



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Figure 1 The Medical Leadership Competency Framework.³

Another review was conducted by Webb *et al*, which explored leadership training in 24 curricula based in the USA, the UK, Canada, Sweden, Switzerland and Israel.¹⁵ Both reviews recognised a need for explicit leadership training, assessment and evaluation in medical school.^{4 15} Considering the guidance and global findings that highlight the importance of medical leadership teaching, it is pertinent to explore its integration into undergraduate medical curricula. This systematic review collates studies that have trialled a leadership teaching intervention for undergraduate medical students in the UK, and discusses their

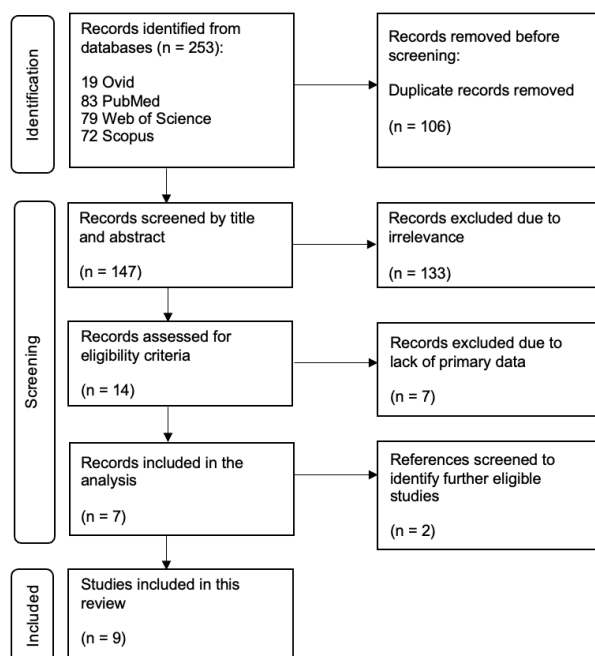


Figure 2 Preferred Reporting Items for Systematic Reviews and Meta-Analyses flow chart of study selection.

methodologies and outcome evaluations. As the first systematic review on this topic in the context of the UK, this paper aims to identify how undergraduate medical programmes can be successfully enriched with leadership training and serve as a baseline for further research and development.

METHOD

Study identification and selection

This review was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.¹⁶ The research question was defined by the population, interest and context (PICo). The population for this review is undergraduate medical students, the interest is a leadership education intervention and the context is the UK. The inclusion and exclusion criteria were then set and a scoping search was conducted. The key terms were combined using Boolean operators and the following search entry was created: “Leadership AND (undergraduate OR MBBS OR BMBS OR MBCHB) AND medic* AND student AND (UK OR “United Kingdom” OR England OR Scotland OR Wales OR “Northern Ireland”)”. The following databases were searched by ZH between 27 April and 10 May 2022: Ovid (Ovid MEDLINE, HMIC), PubMed, Web of Science and Scopus. No limitations were set on the date of publication or type of study. Two hundred fifty-three search results were imported into the Mendeley Reference Manager software. The duplicated references were manually deleted, leading to 147 references. The titles and abstracts were then screened for relevance and the remaining papers were checked for eligibility. This led to a total of seven papers to be included in this review. The references of these papers were screened to identify further studies, which led to the inclusion of two more papers. The selection process is outlined in the PRISMA flow chart in figure 2. Additionally, active researchers in the field were contacted for potential studies and insights.

Eligibility criteria

The inclusion criteria were based on the PICo; studies on a leadership intervention in undergraduate medical programmes in the UK were eligible. The exclusion criteria included literature reviews, systematic reviews, meta-analyses and papers that were: not specific to undergraduate medical students, lacking an implemented leadership intervention, not measuring leadership outcomes as a main outcome, not in the English language and/or not in the UK. Several papers were identified that studied perspectives on leadership in medical education,^{17–19} or reported developing leadership skills as a byproduct of their interventions,^{20–25} or provided guidance on incorporating leadership in the undergraduate medical curriculum.^{12 26–28} These papers were excluded from this review but they are valuable resources for further research. Two systematic reviews were also identified.^{4 15}

Quality assessment

The quality of the included studies was assessed based on the ‘Grading of Strength of Findings of the Paper’ in the Best Evidence in Medical Education Guide No. 10 outlined in table 1.²⁹ The nine studies outlined their aims and methods clearly and followed good research practice. Seven studies were graded a score of 4, and two were graded a score of 3 due to not reporting their evaluation methodology.^{27 30} None were graded 5 as there is no standard approach to evaluating the outcomes of leadership teaching in undergraduate medical curricula.

Table 1 Grading of Strength of Findings of the Paper²⁹

Grade 1	No clear conclusions can be drawn. Not significant.
Grade 2	Results ambiguous, but there appears to be a trend.
Grade 3	Conclusions can probably be based on the results.
Grade 4	Results are clear and very likely to be true.
Grade 5	Results are unequivocal.

RESULTS

A summary of the characteristics, aims and results of the studies is provided in tables 2 and 3, respectively. Six of the nine studies used student-selected components (SSCs), student societies and didactic methods for leadership teaching. Dobson *et al* designed a 3-day leadership SSC for fourth year medical students. The course included workshops on the foundations and qualities of leadership, self-improvement and the National Health Service (NHS). They suggested leadership can and should be taught and reported that students felt more confident about being a leader after the

SSC.³¹ Byrne *et al* created a 2-year SSC for fourth and fifth year medical students, where they learnt about the foundations of leadership and management and had experiential learning. Fourth year students were assessed by presenting a research project. There was no evaluation of the training but general feedback from students was positive. Additionally, a Leadership and Management in Medicine society was founded to encourage students to join the SSC.³⁰ Matthews *et al* created the Birmingham Medical Leadership Society and hosted 16 talks on leadership, with opportunities to have discussions with leaders. Students were asked to evaluate the talks using a 5-point Likert scale and self-assess their knowledge before and after the events. The committee used the positive feedback to propose an intercalated degree in MLM, which was accepted. A student-led society that teaches leadership theory, provides opportunities to practice skills and offers courses for deeper learning is an effective way to enhance MLM teaching.³² O'Brien *et al* first held a discussion with faculty about the MLCF domains and conducted a workshop on teaching leadership. This led to the delivery of an

Table 2 Characteristics and aims of the selected studies

Study	Study design	Aim	Setting	Participants	Leadership intervention	Implementation year
Dobson <i>et al</i> ³¹ Leadership training in the undergraduate medical curriculum	Not stated	To address the need for leadership in the curriculum via a student-selected component	Hull York Medical School	Fourth year medical students	3-day programme as a student-selected component	Not stated
Clark <i>et al</i> ³⁵ Teaching medical students to recognise their strengths and limitations in leadership, teamwork and communication by military led tutorials	Not stated	To use military-based teaching for leadership development and identification of strengths and weaknesses	Cardiff University	Third year medical students	1-hour teaching session by Wales Universities' Officer Training Corps	Not stated
Byrne <i>et al</i> ³⁰ Enhancing medical students' leadership skills through student-selected components	Case study	To supply leadership knowledge and skills practice for interested students	Queen Mary University of London	Fourth and fifth year medical students	A 2-year student selected programme and the registration of a Leadership and Management in Medicine student society	2013–2015
Earis <i>et al</i> ³⁶ Experiential learning, leadership, medical students and the army	Not stated	To challenge students and teach leadership through experiential army-based learning	University of Liverpool	Not stated	Military exercises at an army site	2014–2015
Matthews <i>et al</i> ³² Teaching leadership: the medical student society model	Not stated	To teach medical leadership and management through educational and experiential opportunities	University of Birmingham	Not stated	16 extracurricular leadership talks by the Birmingham Medical Leadership Society over 2 years	2013
O'Brien <i>et al</i> ²⁷ Teaching clinical leadership to medical students	Not stated	To design explicit leadership teaching for medical students	St George's University of London	Preclinical medical students	2 lectures on leadership, initiation of the 'George's Award' and a clinical attachment	Not stated
Ellington and Farrukh ³⁷ Are battlefield and prehospital trauma scenarios an effective educational tool to teach leadership and crisis resource management skills to undergraduate medical students?	Prospective observational	To test students' clinical and non-technical skills through high fidelity simulations	Cambridge University	Clinical medical students	1-day battlefield and prehospital trauma course by the Cambridge University Emergency Medicine Society and 254 Medical Regiment	Not stated
Selway <i>et al</i> ³³ Embedding leadership in undergraduate medical students: an active approach	Not stated	To show students that leadership behaviour is impactful regardless of positional authority	University of Buckingham	Third year medical students	A student-selected course of clinical leadership	Not stated
Chapman <i>et al</i> ³⁴ Leadership development in undergraduate medical education: evaluation of students' perceptions of a student-selected leadership module	Thematic analysis	To evaluate students' perspectives on a completed leadership student-selected component for programme development	University of Glasgow	Third and fourth year medical students	5-week student selected component	2015

Table 3 Evaluation methodology and results of the selected studies

Study	Number of participants	Evaluation method (response rate)	Qualitative results	Quantitative analysis
Dobson <i>et al</i> ²¹	20 students	Anonymous questionnaires with Likert scores before and after the SSC (100%) Open questions within the questionnaire after the SSC	Students liked the interactive nature of the course, felt more self-aware and knowledgeable and gained transferrable skills Students disliked the heaviness of the course in terms of time and content; they prefer more practical learning opportunities	Comparison of Likert scores in the precourse and postcourse questionnaires using a Mann-Whitney U test Significant differences reported ($p < 0.05$) in five of the six components being scored
Clark <i>et al</i> ²⁵	211 students	Feedback questionnaire ranking 'completely ineffective, not very effective, fairly effective, effective or very effective' and two open questions (77%)	Effectively achieved outcomes related to leadership attributes, communication, teamwork and resource management, but not outcomes related to responsibility and mentoring Feedback in open questions revealed teaching was fun and challenging, with a preference for the experiential part Students suggested more time, bigger groups and higher medical relevance to improve the course	N/A
Byrne <i>et al</i> ²⁰	7 students in the SSC ≤ 75 attendees at society events	Not reported; no formal assessment yet	Positive feedback on LMM society events Development of new LMM and SSC opportunities	N/A
Earis <i>et al</i> ²⁶	Not stated	Reflective reports by students on their reaction, learning and behaviours after the course	Students reported gaining insight into their own and others' leadership qualities, teamwork dynamics and feeling empowered Negative feedback was not reported for the content of the course; students had some suggestions for the timing and logistics of the event	N/A
Matthews <i>et al</i> ²²	393 (334 medical students, 50 doctors and 9 others who completed evaluation forms after society events) Total number of attendances is 917	Anonymous rating of events on a 5-point Likert scale, and self-reported MLM knowledge assessment before and after events (42.8%)	Participants felt the events were informative, engaging and relevant Feedback from these supported the initiation of an MLM intercalated degree at Birmingham	N/A
O'Brien <i>et al</i> ²⁷	Not stated	Not reported; long-term evaluation is planned via mixed methodology	Positive student feedback	N/A
Ellington and Farrukh ³⁷	46 students	The Ottawa Crisis Resource Management Global Ranking Scale (OCRMGRS) questionnaire, filled by students and faculty before and after the course Follow-up was done by repeating the OCRMGRS 1 year after the course (39%)	Besides OCRMGRS scores, there was no mention of the students' thoughts or reflections on the course	Two-tailed t-test of the OCRMGRS scores before and after the course Statistically significant ($p < 0.05$) improvement in all postcourse scores by students and faculty and at 1-year follow-up
Selway <i>et al</i> ³³	30 students	Dundee Ready Education Environment Measure survey	92.3% of students felt empowered and had gained insight through the SSC	N/A
Chapman <i>et al</i> ²⁴	11 students	Reflective reports by students after completion of the SSC (100%) Respondent validation by five students Anonymised feedback from four students	Enriched theoretical knowledge, improved leadership and reflective skills and a raised sense of empowerment and collaboration	N/A

LMM, Leadership and Management in Medicine; MLM, medical leadership and management; N/A, not available; SSC, student-selected component.

introductory talk for preclinical students, with signposting to the activities available to develop leadership skills. In their next talk, postgraduate career opportunities were discussed. Furthermore, a 'George's Award' was created for students to showcase the transferable skills they have gained, and a longitudinal clinical leadership placement was piloted. They reported positive student feedback and plan to assess the long-term effects of the interventions.²⁷ Selway *et al* described an SSC for third year medical students, where they learnt about the foundations of leadership and organisations through talks and team activities. Students self-organised into research groups to explore the culture and values of the Milton Keynes University Hospital (MKUH) by shadowing, interviewing

and having discussions with staff in focus groups. They analysed the collected data and proposed action plans about MKUH values to staff and board members. The students' experience was evaluated based on the Dundee Ready Education Environment Measure survey, which revealed that 92.3% gained insight from the course. This approach was deemed effective in teaching leadership values to medical students and demonstrated that leadership behaviour and impact do not require a position of authority.³³ Chapman *et al* also described an SSC where students spent time with leaders and completed a quality improvement project. The course made them feel empowered, provided opportunities to hone non-technical skills and deepened their insight into healthcare provision.³⁴ The

other studies approached leadership training via army-inspired teaching. Clark *et al* reported a 1-hour leadership teaching for third year medical students, including a talk and small-group work on a humanitarian aid conflict scenario. Students found the experience intellectually stimulating and enjoyable, and suggested longer, more medical sessions.³⁵ Earis *et al* grouped students who did not know each other into teams to complete military-inspired tasks using physical, inferential and interpersonal skills. Students gained insight into teamwork and explored their individual leadership identities through the course.³⁶ Ellington and Farrukh described a 1-day national battlefield and prehospital trauma course to hone leadership and crisis resource management (CRM) skills. Forty-six medical students were placed into small groups and completed five clinical scenarios. Both students and faculty used the Ottawa Crisis Resource Management Global Ranking Scale to score their performance and skills before and after the course, and again after 1 year to measure long-term effects. There was a significant improvement in the scores after the course and at follow-up, and the course was deemed effective.³⁷

DISCUSSION

Findings, strengths and limitations of the studies

The studies had clear objectives and varied in course design, participant selection and evaluation. This variety truly represents undergraduate medical leadership teaching as the survey by Jefferies *et al* also demonstrated.¹⁰ Despite strategic differences, all studies reported positive outcomes. The range of successful approaches reflects the space for innovation in implementing leadership teaching. The studies also creatively used self-assessment methods to evaluate the outcomes of their interventions. Two of the studies were further strengthened by quantitatively analysing their results to reveal significant changes.^{31,37} Ellington and Farrukh also conducted a follow-up survey after 1 year to track the long-term impact of their intervention.³⁷ Student feedback revealed important positive outcomes. Students believed that leadership teaching is essential and should be accessible to all medical students.^{31,34} This is valuable as previous surveys reported medical students' lack of interest in learning non-technical skills that seem irrelevant to clinical practice.^{6,10} Some of the studies also reported how students felt after the interventions. Many were significantly more confident about being a leader,³¹ and surprised and empowered to have a leadership impact at their stage.³³

While the nine studies shed light on various designs and reported positive outcomes, they had limitations that make it challenging to determine the factors for success. First, the variety in the courses suggests the lack of a standardised approach to addressing the leadership gap in undergraduate medical curricula. This lack is not in the availability of frameworks, such as the MLCF and the Healthcare Leadership Model, but in the awareness and application of them.¹⁰ It is also possible that medical leadership is in fact taught in medical curricula, but not well demarcated or clearly mapped to intended learning outcomes.¹⁵ For example, clinical placements expose medical students to the hidden leadership curriculum through opportunities such as multidisciplinary meetings and observing service leaders.³⁸ The FMLM suggests apt labelling of various embedded leadership teachings under MLM.¹¹ Another element to explore is the nature of medical leadership teaching. Byrne *et al* state that a student selected component allows mixed teaching methods and creates an opportunity for personal development as the student engages in one-to-one learning.³⁰ Moreover, it is identified as a good approach to the barrier of crowded medical curricula.¹⁰ From the students' perspective, teaching that is practical and

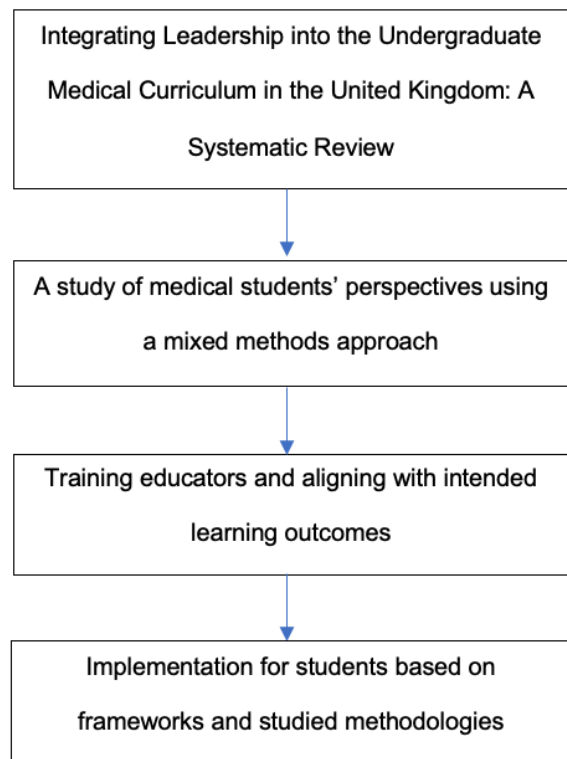


Figure 3 Proposed pathway to implementing a core leadership curriculum in undergraduate medical education in the UK.

experiential is more desirable.³⁵ Experiential learning in medical education allows gaining tangible experience from real-life opportunities that are relevant to the learner's professional development.³⁹ In the study by Dobson *et al*, students did not enjoy the heavy, inactive parts of learning.³¹ An approach that allows experiential learning and is complemented with theoretical knowledge is well-liked,³⁴ and helps students value and understand leadership teaching.¹⁰ However, experiential opportunities are harder to map to guidelines such as the MLCF.²⁷ Another element to consider is the stage at which leadership teaching is introduced. Similar to the findings by Lyons *et al*,⁴ the success of the interventions was not linked to preclinical or clinical stages of learning, suggesting that either could be effective. In addition to the timing, the required frequency and intensity of leadership teaching is unclear. This would depend on the space available within the curriculum, as one of the main challenges is students' overcrowded schedules.^{5,10} Students' readiness, level of leadership competency and the medical schools' learning outcomes for their graduates also need to be considered. Matthews *et al* suggest leadership teaching in three levels: '(1) core knowledge and skills as part of the curriculum; (2) additional learning experiences and skill practice can be provided by a student society and (3) the choice of an optional module, or an intercalated degree, for those who wish to develop specialist knowledge in this area'.³² Following the design and implementation of a leadership intervention, the evaluation methods need to be considered. Two of the studies did not report an evaluation strategy in their interventions.^{27,30} For future implementation, these studies suggested assessing satisfaction and knowledge levels throughout the academic year,³⁰ and evaluating long-term impact with mixed

methods.²⁷ The other studies used self-assessment methods for outcome evaluation. This approach is prone to bias, considering there is no standardised self-assessment tool for evaluating leadership teaching. Swanwick and McKimm recommend a longitudinal approach to assessment, which can be embedded into students' practical exams, portfolios and feedback from clinical placements.⁴⁰ The FMLM's indicative curriculum mentioned earlier could guide this process.¹¹ The risk of bias is further compounded by small and unknown sample sizes across the studies. Additionally, in most of the interventions, students who took part had an underlying interest in leadership, so the results may not reflect on the effectiveness for other students. The opportunities to develop core leadership skills should be appealing and adaptable to all medical students.²⁸ In order to minimise bias and validate their methodology, Chapman *et al* used participant validation and anonymised feedback.³⁴ In the study by Ellington and Farrukh, the course staff also completed the assessment survey to compare to students' self-assessments. Additionally, only this study included long-term follow-up of participants, where they were asked to self-assess again after 1 year of the leadership intervention, although the response rate was 39%.³⁷ The lack of long-term assessment among the included studies is in line with the established scarcity of longitudinal data on the impact of undergraduate medical leadership training on patient and organisational outcomes.⁹ The authors of this systematic review attempted to evaluate the studies using a modified Kirkpatrick model, but the low number and lack of details described above posed a great challenge.

Strengths and limitations of this systematic review

The significance and objectives of this review are clearly outlined, and the research question is specific to the developments in this field in the UK. An extensive database search was conducted and valuable studies were collated. The quality of the included studies was assessed using the best evidenced approach. Overall, the systematic review provides a pertinent, critical qualitative analysis of the studies and makes suggestions to propel future research. One of the main limitations of this review is the single-handed conduction of the systematic search and analysis. This increases the risk of selection bias and data misinterpretation. In addition to a qualitative review, a quantitative synthesis of the included studies would strengthen this review. The review is also limited by the limited data in the studies. Respective authors could be contacted to collect supplementary information on their methodologies and results.

Implications for future research and practice

This review highlights the need and potential for further research. The authors suggest prospective, longitudinal study designs to evaluate how leadership teaching, specifically at the undergraduate level, prepares newly qualified doctors for their leadership roles. Future research could explore its impact within non-UK curricula and healthcare systems. Further work to standardise the evaluation of medical leadership teaching would be valuable. When designing interventions, it is important to ensure they are accessible to a wide body of preclinical and clinical students, regardless of their innate interest in medical leadership. Medical schools can use accredited frameworks such as the FMLM indicative curriculum and the Medical or Clinical Leadership Competency Frameworks (MLCF, CLCF) to design interventions in line with their curriculum goals. They can also refer to the NHS Leadership Academy for courses such as the Edward Jenner Programme. The authors encourage UK medical

schools to document and publish their trialled interventions to propel further data and innovation in this field. The authors of this review have proposed a pathway for adding leadership to the UK undergraduate medical curriculum, outlined in [figure 3](#).

CONCLUSION

Good medical leadership is crucial to improving patient and organisational outcomes. It is a skill required by the GMC for newly qualifying doctors and will soon be tested within the Medical Licensing Assessment. This systematic review explored the implementation of leadership teaching in undergraduate medical curricula in the UK. The qualitatively analysed studies provided insight into various leadership teaching and assessment methodologies and reported overall positive outcomes. Leadership interventions at the undergraduate level provide medical students with a better understanding of leadership and the value of non-technical skills for future practice. With the current data, conclusions cannot be drawn on the long-term success of the described interventions in preparing newly qualified doctors. This systematic review provides a unique overview of leadership in the undergraduate medical curriculum in the UK and aims to guide future research.

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