Mentoring for Admission and Retention of Black Socio-Ethnic Minorities in Medicine: A Scoping Review

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ABSTRACT

PURPOSE: Despite numerous mentoring strategies to promote academic success and eligibility in medicine, Black students remain disproportionately underrepresented in medicine. Therefore, we conducted a scoping review to identify the mentoring practices available to Black pre-medical students, medical students and medical residents, specifically the mentoring strategies used, their application, and their evaluation.

METHOD: Between May 2023 and October 2023, the authors conducted a literature review. Studies that described a mentoring strategy applied among Black learners were eligible for inclusion, and all years of publication were included. Two reviewers screened each article using the Covidence tool, and conflicts were resolved by a third author. All reviewers extracted the data to summarize the various mentoring practices.

RESULTS: After screening 6292 articles, 42 articles met the criteria for full review. Of these, 14 studies were included in the study. Mentoring practices for Black students included peer mentoring, dyad mentoring, and group mentoring. Mentoring was typically offered through discussion groups, educational internships, and didactic activities. Evaluation of mentoring programs took into account (1) pass rates on medical exams (eg, MCAT, Casper), (2) receipt of an invitation to a medical school admissions interview, (3) successful match to a competitive residency program, and (4) a mentee's report of the overall experience and effectiveness of the program.

CONCLUSION: This review is the first, to our knowledge, to focus on mentoring strategies implemented among Black learners in medicine. The results will inform mentoring strategies adapted for Black learners and will therefore address the underrepresentation of Black students in medicine.

KEYWORDS: Medical education, Black students, medicine, mentoring, mentorship, minorities

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Introduction

The pursuit of medical studies and medical school admission is highly correlated with the student's ability to navigate the educational system.[1] Critical to this success is effective and stable mentorship, which is essential to the student's personal and professional development.[1,2] Despite numerous mentoring strategies available to students looking to pursue a career in medicine, Black students remain disproportionally underrepresented in the medical field.[3] A recent study conducted across English medical schools in Canada estimated the proportion of Black medical students to be 1.7%, compared to 6.4% for the general Canadian population.[4] Similarly, according to the American Association of Medical Colleges (AAMC), Black students made up 6.2% of total medical school graduates in 2019[5] in the United States, compared to 13.6% in the general population.[6] This disparity comes at a societal cost, as research has consistently shown that diversity in medicine improves access to health care for underserved patients, as well as their experience, satisfaction, and health outcomes.[7,8] Thus, there is a clear need to further investigate and remedy the underrepresentation of Black students in medicine.

Research outlines that mentorship is key to success for admission and matriculation in medical school, as well as for personal growth and development.[9] There are many mentoring strategies in medical education that help students achieve their goals.[10] An optimal match between mentor and mentee must consider several factors.[10] For instance, research suggests that Black medical students feel more comfortable during

interactions, identify better with their mentor, and better navigate the medical education system when their mentor is also Black.[11] A variety of mentoring strategies have been used in the context of Black medical students, to facilitate their integration in the medical system. For example, dyadic mentoring was successful in providing support with the application to academic and research grants,[12] career advancement[13,14] and specialty matching[15]; mosaic mentoring was successful in preparing students for an academic career[16]; peer mentoring improved their preparation for the Computer-based Assessment for Sampling Personal Characteristics (CASPer) test[17]; and group mentoring, in addition to facilitating research funding, was adapted for writing scientific articles and posters.[18] However, these mentoring practices were implemented within the general student population rather than being exclusively designed for Black students. Further, none of these studies comment of the success of matriculation of Black students following the implementation of these mentoring practices, and to our knowledge, no studies have established a link between specific mentoring strategies and increased rates of enrollment of Black students into medical school or residency. As a result, these mentoring practices were not specifically tailored for Black students.

Research has shown that Black students encounter distinct obstacles compared to their peers. Among these barriers to matriculating to medical school are a lack of exposure to other Black medical professionals and insufficient emotional and financial resources.[19] Thus, adapted mentoring to address the specific needs of Black students would be a strategy to consider in addressing the underrepresentation of Black medical students in Canada.[19] A few studies propose mentorship strategies specifically tailored to the Black student population,[11] however this has not been implemented in a medical context, and there has been no synthesis of these studies to inform medical school mentoring programs. Therefore, this scoping review was conducted to explore the literature on mentoring practices offered to Black students in medical education. Specifically, the research questions are (1) What is the state of knowledge on mentoring strategies used with Black students in a pre-medical and medical education context? (2) How is this mentoring implemented and (3) How are these strategies evaluated for impact?

Methods

Study design

This scoping review was conducted in concordance with the framework introduced by Arksey and O'Malley[20] and enhanced by Levac and colleagues.[21] This framework is described in 5 steps: (1) identifying the research question, (2) identifying relevant studies, (3) study selection, (4) data charting, and (5) collating and reporting results. Steps 1 to 5 are presented below. This study was reported in concordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for scoping reviews (PRISMA-ScR),[22] which can be found in Supplementary Digital Appendix 1. This scoping review was registered with the Open Science Framework software (doi: 10.17605/OSF.IO/9278 W)

Step 1: identifying the research question

The purpose of this study was to explore the academic literature on mentoring practices offered to Black students in a medical education context. Specifically, the research questions are:

1. What is the state of knowledge on mentoring strategies used with Black students (pre-medical, medical and residents) in a pre-medical and medical education context?
2. How is this mentoring implemented and
3. How are these strategies evaluated for impact?

Step 2: identifying relevant studies

The search strategy was developed by an academic librarian (M-C. D) in consultation with the larger research team. In accordance with the *Peer Review of Electronic Search Strategies (PRESS)* guide, the search strategy was subsequently reviewed by a second librarian. This search strategy is presented in Supplemental Digital Appendix 2 and focuses on keywords used to describe current mentoring practices in academic medicine for Black students. The search included published peer-reviewed articles from various electronic databases. The search was limited to English and French articles, with no limitations of a specific date range. The search yielded a total of 6292 articles: 2454 from Embase, 1778 from Medline, 750 from Eric, 699 from Web of Science and 611 from Education Source.

Step 3: study selection

Search results were uploaded to the Covidence (v2.0) systematic review management software (Veritas Health Innovation, Melbourne, Australia), where we conducted the screening and extraction phases. Study selection was done in 2 steps. First, 5 reviewers (JK, MR, ML, SJ, NM) independently screened titles and abstracts to determine study eligibility based on established for inclusion and exclusion criteria. Second, studies were screened for full-text eligibility by the same reviewers, using the same criteria. Each assessment and screening step was performed by two reviewers and arising discrepancies were resolved by a third reviewer (JK). The final list of articles was reviewed by the larger research team to determine whether additional articles should be included or excluded, and no further modifications were made. Overall, studies were included if they featured a mentoring strategy implemented (not only described) among Black participants. Specifically, the inclusion criteria narrowed down articles that were: (1) conducted among Black pre-med students, Black medical students,

Table 1. Inclusion and exclusion criteria

Inclusion Criteria	Exclusion Criteria
Studies in English or French	Studies in a language other than English or French
Studies conducted with Black pre-medical students	Studies lacking stratification in the study population (ie racial minorities vs Blacks, etc).
Studies conducted with Black medical students	Non peer-reviewed articles
Studies conducted with Black medical residents	Conference abstracts
Study design: RCTs, RCTs, matched comparison group studies, pre-post and post studies, qualitative studies	Letters to the editor
Implementation of a mentoring strategy for participants	Editorials, commentaries

or Black residents, (2) peer reviewed articles, (3) included a mentoring strategy implemented with participants, and (3) were in English or French. Articles were excluded if they were (1) not peer-reviewed, (2) not conducted on Black students or residents, and (3) lacked stratification of Black students in the study population. The full inclusion and exclusion criteria are listed in Table 1. Following title and abstracts screening, 42 articles met the inclusion criteria. After full-text review, 14 articles were extracted and included in the analysis.

Step 4: charting the data

SJ developed the extraction data sheet through an iterative process of revision with the principal investigator (SF), followed by all the coauthors. The extraction sheet featured publication features (name of lead author, year of publication, data collection location, funding source), study characteristics (study design, participants, inclusion/exclusion criteria), socio-demographic characteristics of participants, mentoring context (academic environment, care setting) mentoring strategy and mentoring implementation description. Disagreements were addressed in the larger team setting to ensure consistency across forms. A pilot data extraction with one article was conducted with all reviewers to ensure a consistent comprehension of the variables the data extraction sheet. No further modifications were subsequently made to the list of variables. The final full data extraction sheet is outlined in the Supplement Digital Appendix 3. Five reviewers (JK, MR, ML, SJ, NM) extracted data from each included article using the data extraction sheet. The reviewers were then randomly assigned a list of articles for independent extraction.

Step 5: collating, summarizing and reporting the results

Following data extraction, results were analyzed and synthesized by the lead author (JK), reviewed by the principal investigator (SF), and further by all coauthors. One reviewer (JK) subsequently analyzed thematic trends using the extracted information from all articles. A narrative synthesis of the qualitative data was conducted. One reviewer (JK) compiled a descriptive summary of the extracted data, using key characteristics and themes. Findings were articulated around the various available mentoring interventions for Black students in medicine, their targeted competencies, as well as their results and evaluation.

Results

The initial search generated a total of 6292 articles. After duplicates were removed, 4630 articles were screened for eligibility and 42 were selected for full-text review (Figure 1). Among those, 28 articles were excluded and thus 14 were selected for extraction as they met the inclusion criteria. Several excluded articles were not peer reviewed (n = 10), some described a mentoring strategy not implemented with students (n = 5), others did not refer to Black students (n = 3), did not describe a mentoring strategy (n = 2), did not correspond to the study design sought (n = 7), or did not report results following implementation (n = 1). All articles were in English. The majority of articles were based on studies carried out in the United States (n = 13) while one referred to the Canadian context (n = 1). These studies were conducted with pre-medical students (n = 10), medical students (n = 4) and residents (n = 1). A description and summary of all studies included are presented in Supplemental Digital Appendix 4, notably the types of strategies used, types of outcomes measured, as well as targeted skills and knowledge.

Mentoring strategies and activities

Several of the articles selected proposed virtual mentoring[23–27] as an intervention with students. This virtual mentoring usually took the form of workshops on scientific writing,[28] video call sessions to enhance research skills,[24] webinars on extracurricular prerequisites and requirements for medical school admission,[25] review sessions for cover letters and curriculum vitae,[25] workshops on scientific research to increase the chances of matching into a MD/PhD program,[26] webinars on interdisciplinary care[29] or video sessions to offer advice on preparing an application file.[27] Three articles instead proposed group mentoring sessions.[17,28,30–33] These sessions consisted of didactic courses on the structure and content of the CASPER test,[17] workshops on scientific writing and grant research,[12] workshops on the research process,[30,31] didactic courses on learning strategies and tips for passing the MCAT,[32] or didactic courses in preparation for the SATs exam.[33] Peer mentoring was also used to prepare students for the CASPer test, notably by pairing them up to give each other feedback on practical questions.[17] Lastly, one-on-one mentoring was used in the context of clinical observerships to generate interest in medicine among students before they apply for admission[33,34] and to facilitate discussions between

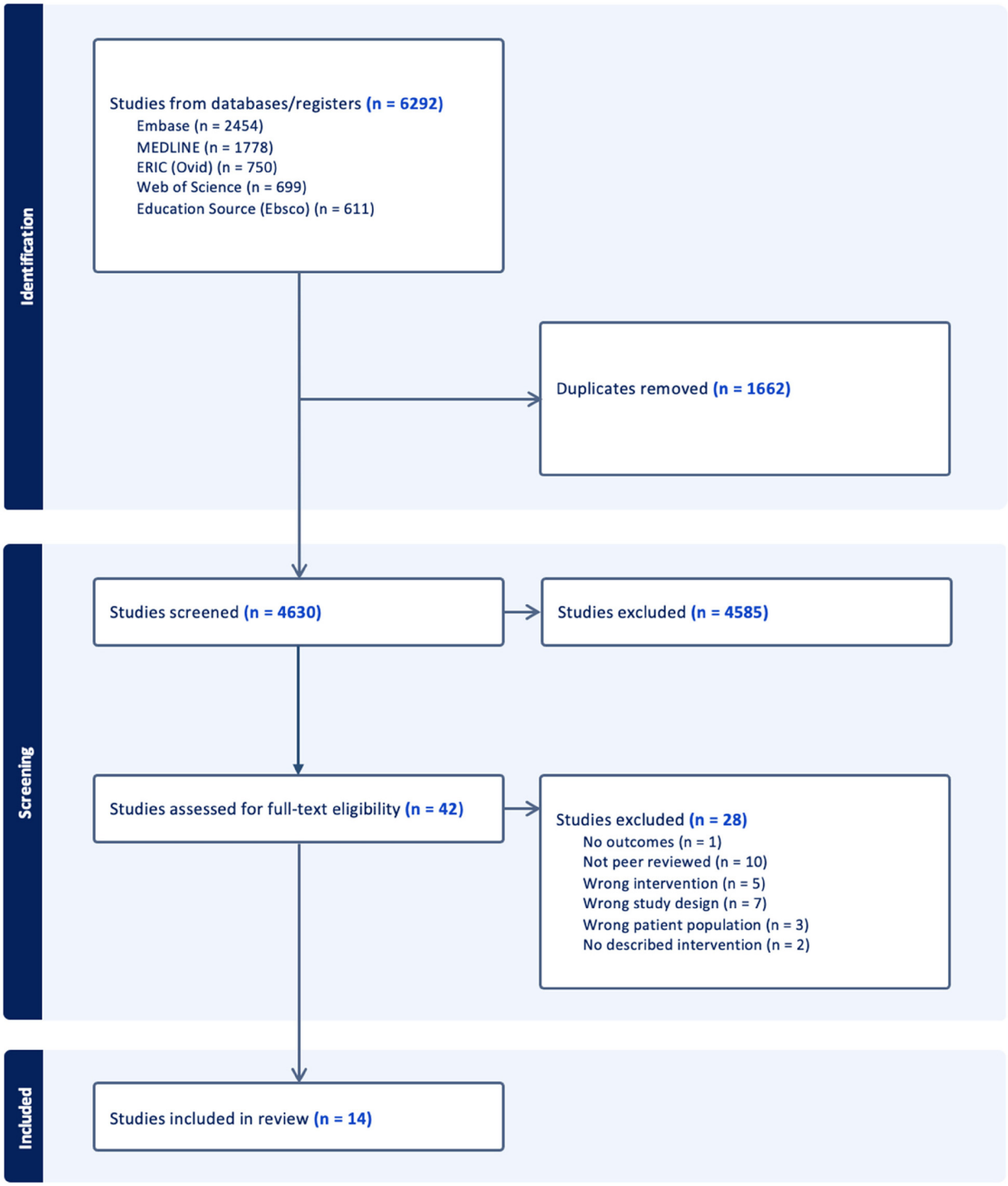

Figure 1. Preferred Reporting Items for Systematic Reviews and Meta-Analysis Extension for Scoping Reviews (PRISMA-ScR) 11 Flow Diagram.

mentors and mentees to help the latter prepare a medical application.[27,35]

Targeted knowledge and skills

The mentoring offered was designed to enable students to develop research skills in four articles,[12,26,28,30] particularly for scientific writing and grant applications,[12,28] literature review,[26] and critical appraisal of scientific articles.[30] Also, this mentoring was aimed at students' professional development,[24,25,31,34] in particular to enable them to develop interpersonal skills,[24,25] team spirit, communication and empathy,[34] as well as critical thinking skills enabling them to choose among alternative career options.[31] Improving students' knowledge of the

application process for various medical programs was also targeted,[24,26,32] both to give them the information needed to apply for undergraduate medical studies[24,32] as well as residency.[26] More specifically, for residency programs, improving students' knowledge of specialties and the matching process[25,27,29,35] was the focus of several mentoring programs, in particular for specialties such as urology,[25,27] radiation oncology[29] and emergency medicine.[35] In addition, numerous studies focused on improving students' academic average by helping them perform better in their courses, to enable them to have a competitive record for admission to medical school.[24,26,30,32,33] Few studies offered mentoring to develop students' cross-curricular competencies, particularly with regard to improving performance on the CASPer[17] test required as part of the medical school application process in some faculties, as well as on the SATs exam.[33] Similarly, general competencies such as self-confidence in order to gain admission to medical school[34] and eventually become a doctor[26] were covered in few articles.

Mentoring evaluation strategies

All of the studies reported the results and impact of mentoring interventions offered to students. The effectiveness of the mentoring offered was evaluated in various ways, including surveys.[24–30,32–34] These surveys were administered before and after the mentoring program offered, in order to capture the effectiveness of the proposed intervention. Some surveys used Likert scales,[28,29,34] in particular for students' self-assessment of their perceived degree of academic competence before and after mentoring,[28] as well as their interest in oncology residency for example,[29] before and after the intervention. Other articles evaluated the mentoring offered through students' matching rate into a residency program.[25,27,35] Also, the number of students admitted to medical school[34] was used as a parameter for evaluating mentoring. Other evaluation methods related to the degree of improvement in academic knowledge,[17,33,34] including by the increase in SAT scores[33] and the scores obtained by students following simulated CASPER[29] tests.

Impact of mentoring

The mentoring received enabled students to improve their self-confidence,[28,33] increase their motivation and perseverance during the medical school admission process,[24] and inspire interest in pursuing a career in medicine.[12,33] Students were also able to further develop their social network[24,30,33] as a result of the mentoring they received, through their participation in dissemination activities, such as conferences.[30] In addition, this mentoring enabled students to increase their confidence and competence for the prerequisite medical school admission tests, notably the CASPer test[17] and SATs exam.[33] Several students were also successfully admitted to a medical school as a result of their participation in a mentoring program.[17,32,34] With regard to medical residents, the mentoring received facilitated increased matching into various specialties.[16,35] Similarly, the mentoring offered to medical residents also helped to generate greater interest in family medicine.[29]

Discussion

This scoping review describes the different mentoring practices offered to Black students in a medical education context. While other scoping reviews on mentoring in medical education exist,[36–40] to our knowledge this scoping review is the only one that deals exclusively with mentoring among the Black student population. The 14 articles selected describe various mentoring practices offered to Black students, including virtual mentoring, group mentoring, peer mentoring, and one-on-one mentoring. Overall, these forms of mentoring enabled students to develop a variety of skills, in particular, research and interprofessional skills, academic and general skills, as well as a better understanding of the application process at various medical schools. The effectiveness of the mentoring offered was measured using surveys to evaluate pre- and post-mentoring competencies, the match rate of Black students into a residency program, the number of students admitted to medical school, and the degree of improvement in academic knowledge. The mentoring received enabled students to increase their self-confidence, complete the prerequisites for admission to medical school, develop their social network, gain admission to medical school, or be matched into a residency program.

Firstly, the results on the mentoring strategies employed with Black students in a medical education context are comparable to the existing literature on mentoring offered to all students. This study reports the use of virtual mentoring and concurs with the writings of Jadi and colleagues who, in a recent study (2023), report the use of this type of mentoring with students interested in a career in surgery, following which these students were able to develop their curriculum vitae and networking skills, and thus acquire the skills necessary for career advancement.[41] Furthermore, according to these authors, the majority of virtual mentoring activities take place through peer mentoring, which is partly in line with the findings of this study articles dealing with virtual mentoring proposed activities such as webinars, didactic courses and tutoring sessions offered not only by peers but also in small and large groups. If we take a closer look at peer mentoring in medical schools, a recent scoping review by Farid and Huang (2020)[37] reported that most peer mentoring activities were offered in small groups of 3 to 12 students. This is in contrast to this study given that the only article that used peer mentoring, it was offered to a large group of 50 students.[17] It might be appropriate to further explore the use of peer mentoring more specifically with Black students in a medical education context. Regarding the group mentoring strategy, this study reports that it is effective for enabling students to develop

certain skills. These results are in keeping with those of Duke and colleagues in 2015, who used the same strategy to enable third-year medical students to further develop empathy and professionalism,[42] which are skills targeted by some of articles in this study. Thus, in comparison with the literature, there seem to be similarities and contrasts in the mentoring strategies used. The specific features of each mentoring strategy for Black medical students should be taken into account to ensure their success. In addition, it should be noted that other mentoring strategies reported in the literature did not appear in the articles analyzed as part of this study, including dyadic mentoring, cascading mentoring and mosaic mentoring.[43]

Secondly, the impacts of the various forms of mentoring offered to Black students in this study are in line with the general literature on mentoring offered in a medical education context to all students. This study reports that mentoring enabled students to improve their medical application file[17,33] and to be matched into their desired specialty.[25,34,35] These results align with those obtained in 2016 by Nellis and colleagues,[44] who stated in their study that mentoring had enabled students to increase their number of scientific publications and residents' matching rate into certain specialties. This study also reports that mentoring enabled students to develop their general competencies,[12,24,28,33] enabling them to feel better prepared to navigate the medical application process. These results are in line with the writings of Afghani and colleagues (2013) who, in their studies, found that self-confidence, motivation to pursue a career in medicine, and students' leadership skills improved as a result of mentoring.[45] The fact that certain studies[44,45] that did not include Black students generated similar impacts to some of the articles in this study raises the question of whether mentoring adapted to the Black population will truly be more effective than what they are currently receiving; the same mentoring strategies are generally used successfully with all students.

Lastly, the methods for evaluating the impact of mentoring used in this study have also appeared in the general literature on mentoring offered to all students in a medical education context. In particular, the studies by Nellis et al (2016), Afghani et al (2013) and Harris et al (2012) used surveys,[44,45] the number of residents matched into residency,[44] the number of students admitted to medical school,[45] and the degree of improvement in academic weighted averages[18] to measure the impact of mentoring on students. These writings are in line with the present study, as similar evaluation methods were used.[24–30,32–34]

An interesting observation can be made from the present findings. In analyzing the articles selected for this study, the majority describe mentoring approaches generally implemented with Black students, rather than mentoring approaches uniquely adapted to this group. Indeed, the fact that these same mentoring practices are also offered to non-Black students in the literature[37,41,44–48] further supports that these practices are not exclusively adapted to the Black student population. However, given the unique experiences of Black students in medical education, it would be appropriate to highlight the importance of offering mentoring adapted to Black students with an approach that takes into account the intersectionality that these students may experience, rather than a one-size-fits-all approach.

Furthermore, while it is concluded in this study that various mentoring practices successfully help students get into medical school or match into residency, there is no mention of whether these successful students are Black. Despite the availability of these general mentoring practices, the persistent underrepresentation of Black students in medicine suggests that those who benefit from these practices by matriculating into medicine are not Black. This raises the question of why general mentoring practices are not increasing the number of Black students in medicine, even though they are effective for other groups and still have some benefits among Black students. This is where adapted mentoring could be beneficial, as it would specifically address the underrepresentation of Black students. When mentoring is offered to the general student population without stratification, the goal typically is not to increase the number of Black students specifically. However, offering mentorship tailored to Black students could help address their underrepresentation in medicine as it would fill the gaps between their specific needs and those of their peers. For instance, research has shown that Black students often face greater financial difficulties than their peers and struggle to find mentors of the same race in medicine.[19] This study also outlined that Black students reported that having a supportive faculty was an important factor in helping them complete medical school once matriculated. Therefore, an example of adapted mentorship in the medical context could be to encourage faculties to diversify their workforce to increase the number of Black staff, thereby allowing Black students to have more mentors who share their racial background and have more emotional support. Additionally, providing mentorship to Black students with finding financial opportunities through bursaries and scholarships to support them for the MCAT may be another way of providing adapted mentoring, as this exam is historically expensive and heavily considered in medical school admissions. In order to close the disparity gap, Black students do not necessarily need a greater volume of mentorship, but rather adapted mentorship that takes into account their specific needs that may be overlooked by more general mentorship programs.

Previous research has supported adapted mentoring to be more effective than traditional mentoring. One study published in the Journal of Applied Psychology found that Black students who had race-concordant mentors reported higher levels of academic achievement and personal development compared to those without such mentors. The mentors provided not only academic support but also social and emotional guidance,

which helped the students navigate the challenges unique to their experiences as racial minorities.[49] Another study indicated that race-concordant mentoring positively influenced the retention and graduation rates of minority students in higher education. Mentors who shared similar racial backgrounds with their mentees were better able to address specific cultural and social barriers, thereby promoting a more inclusive and supportive educational environment.[50] Other researchers have intentionally used group mentoring rather than one-on-one mentoring with Black students, as the literature seems to suggest that group mentoring is more in keeping with African-American culture.[51] Although some articles in the present study also used group mentoring, it remains unclear whether this initiative was intentionally implemented for Black students to take into account their culture, or whether it was incidentally adopted and proved to be effective. Consequently, although the various mentoring programs discussed in this study had a positive impact on Black students, it cannot be concluded with certainty that this mentoring was specifically adapted to the Black population, as none of the articles explicitly state having taken into account the values, principles and experiences of the Black population when implementing mentoring.

Adapted mentorship focuses on equity rather than equality. It recognizes that Black students may need specific resources and support to navigate challenges that their non- peers might not face. Nevertheless, though an adapted mentoring could be beneficial, it is important to note that a race-specific approach to addressing disparities and fostering inclusivity can be fraught with potential pitfalls. One concern is the risk of inadvertently reinforcing divisions rather than promoting unity. Additionally, focusing solely on race-specific strategies can sometimes overlook the multifaceted nature of discrimination that intersects with other identities, such as gender, socioeconomic status, and disability. This narrow focus may also foster resentment or misunderstanding among those who feel excluded from these initiatives, potentially undermining broader efforts to create an inclusive environment. However, research indicates that Black individuals frequently experience the highest levels of intersectionality in discrimination compared to other racial groups.[52] This makes it less likely for the complex and multifaceted nature of discrimination to be overlooked in their case.

This study has considerable limitations. Firstly, most of the articles in this study are taken from studies conducted in the United States, which limits the generalizability of the results, as the terms and conditions of the medical school admission process and medical education vary considerably from one country to another. As a result, the type of mentoring required can also vary widely by country. A geographically diverse range of articles would have permitted to explore a wide variety of strategies and activities offered to students. Secondly, the number of articles in this review was relatively small, which could also limit the generalizability of the findings. Thirdly, another limitation of this study is the fact that only articles that explicitly mentioned Black learners in the population studied were considered, such that other articles carried out among Black learners but instead generalized their population by using terms such as "racial minorities" or "underrepresented minorities" may not have been captured.

Conclusion

In conclusion, this scoping review identified 14 articles that proposed various types of mentoring carried out among a Black population, either pre-medical students, medical students, or residents. Several themes emerged from this review, including the fact that the same mentoring practices seem to be used among non-Black students, and also generate the same positive outcomes. The methods for evaluating these mentoring programs in this article are for the most part also similar to the literature on mentoring carried out with all students. This review reports no studies in which a mentoring program was designed specifically for Black students and, therefore, future research that focuses on the design and implementation of such programs would be useful. In addition, further research could also look at the implementation and impact of other types of mentoring that were not explored in this review, including cascading and mosaic mentoring with Black students. Overall, these results will serve to inform best practices in mentoring adapted within the Black student population in a medical education context, in order to address the underrepresentation of Black medical students.

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Supplemental material

Supplemental material for this article is available online.

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