

Title page

**Title:** Current efforts in medical education to incorporate national health priorities

## **Authors**

Manisha Nair

National Perinatal Epidemiology Unit, Nuffield Department of Population Health,  
University of Oxford

Richard Doll Building, Old Road Campus, Headington, Oxford OX3 7LF, UK

Email: [manisha.nair@npeu.ox.ac.uk](mailto:manisha.nair@npeu.ox.ac.uk)

Gracia Fellmeth

Nuffield Department of Population Health,  
University of Oxford

Richard Doll Building, Old Road Campus, Headington, Oxford OX3 7LF, UK

Email: [gracia.fellmeth@dph.ox.ac.uk](mailto:gracia.fellmeth@dph.ox.ac.uk)

## **Corresponding author**

Manisha Nair

National Perinatal Epidemiology Unit, Nuffield Department of Population Health,  
University of Oxford

Richard Doll Building, Old Road Campus, Headington, Oxford OX3 7LF, UK

Email: [manisha.nair@npeu.ox.ac.uk](mailto:manisha.nair@npeu.ox.ac.uk); Phone: 01865-617820

## **Abstract**

**Introduction:** The purpose of this paper is to present a conceptual synthesis of current efforts in medical education to incorporate national health priorities as a reflection on how the field has evolved with respect to the recommendation from the Edinburgh Declaration. Considering that health needs vary from country to country, our paper focuses on three broad and cross-cutting themes informed by the Declaration and Commission on Education of Health Professionals for the 21st Century: health equity, health systems strengthening, and changing patterns of disease.

**Method:** Considering the complexity of our study, it was not feasible to conduct a comprehensive literature review; instead we conducted a targeted search to broadly sample and critically review the literature in two phases. Phase-1: Within each theme, we assessed the current challenges in the field of medical education to meet the health priority. Phase-2: A search for various 'medical education models' in both undergraduate and post-graduate education (including curriculum development and refining, teaching method, assessment and feedback) that have been developed and tested, worldwide as an effort to address the identified challenges. We conducted a qualitative synthesis of the identified literature initially in two separate groups conforming to the two phases followed by mapping of the identified challenges within each of the three themes with targeted efforts.

## **Findings:**

Health equity: Challenge-1: mismatch between need for generalist models of healthcare and current medical education curricula's' specialist training approach. Efforts: integrated clinical clerkship model and community based education. Challenge-2: attitudes of healthcare providers can contribute to disparities in healthcare. Efforts: strategies to increase awareness of unconscious bias and Community-Based Participatory Research.

Health systems strengthening: Challenge-3: the lack of a universal approach in preparing medical students for 21<sup>st</sup> century health systems. Efforts: additional curricular domains for health systems training and Integrative Learning Activities System-based. Challenge-4: inability of medical education to keep up with the abundance of new healthcare technologies. Efforts: incorporating health technology into the curriculum.

Changing patterns of disease: Challenge-5: mismatch between requirement for integrated care and training specialists for poorly-integrated and specialised healthcare systems. Efforts: training medical students in general areas of competency including interpersonal skills and communication. Challenge-6: development of a globally interdependent education system to meet global health challenges. Efforts: incorporating global health subjects and promoting international medical rotation for all students, and the Global Minimum Essential Requirements model.

**Discussion:** We identified six important challenges in relation to the role of medical education in meeting national health priorities (two for each of the three themes) and found examples of efforts being made in curricula and teaching methods to address these challenges. Although medical education models exist, the effectiveness of these models depends on them being locally adaptable and applicable. Curricular reform must go hand-in-hand with political will, research and evaluation to develop comprehensive, efficient and

futuristic models of teaching and learning that will adequately prepare health professionals to address the challenges of health inequity, health systems complexities, and changing disease burdens.

## Introduction

Three decades ago the Edinburgh Declaration laid down the aims and principles underlying medical education. One of these goals was to ensure that curriculum content reflects national health priorities.<sup>1</sup> The social accountability of medical education – the responsibility of medical schools to be responsive to the health priorities of the communities they serve – has been a central tenet to medical education. The need to create physicians capable of improving the health of individuals and communities has been stressed repeatedly.<sup>2</sup> However, the report from the Commission on Education of Health Professionals for the 21st Century, published to coincide with the 100<sup>th</sup> anniversary of the 1910 Flexner Report, points to important gaps between health professionals' skills and population health needs in the present era.<sup>3</sup> It is suggested that these gaps are the result of outdated medical curricula which generate predominantly hospital-oriented specialists who work in silos with a narrow technical focus and limited leadership capabilities.<sup>3</sup> Whilst acknowledging these concerns, it is important to highlight the advances and on-going positive efforts seen in many countries across the world in remodelling medical education to address these issues.

Over the past century medical education has undergone commendable transformation resulting in the increased expertise and efficiency of health professionals. The alignment of medical curricula with national health needs has informed the outcome-based approach of “basing what we do instructionally on the outcomes we want to achieve”.<sup>4</sup> This approach has been adopted by several countries including the UK, USA, Canada, and many Latin American states.<sup>5</sup> However, while many regard medical education today as being in its “golden era”,<sup>2</sup> important challenges remain. Despite vast spending on training of health professionals,<sup>3</sup> there are widening gaps between physician training and competency on the one hand, and population health needs on

the other.<sup>2,6</sup> Continued efforts are required to ensure that advances in medical education remain focused on producing health professionals who are not only expert and efficient but able to address the health priorities of their local communities and their nation as a whole.

The purpose of this paper is to present a conceptual synthesis of current efforts in medical education to incorporate national health priorities as a reflection on how the field has evolved with respect to the recommendation from the Edinburgh Declaration. However, health needs vary globally and it is beyond the scope of this paper to address the extent to which medical education has met or tried to meet all nationally-defined needs. Therefore, our paper focuses on selected broad and cross-cutting themes that are applicable across all settings and which are of relevance locally, nationally and globally. Informed by the Edinburgh Declaration and the report from the Commission on Education of Health Professionals for the 21st Century, we grouped health priorities into three themes: health equity, health systems strengthening, and changing patterns of disease.<sup>3,7</sup> These are described, in detail, in the 'findings' section.

## **Methodology**

Considering the complexity of our study, it was not feasible to conduct a comprehensive literature review, instead we conducted a targeted search to broadly sample and critically review the published literature in two phases. Phase-1: within each of the three selected themes, we assessed current challenges in the field of medical education to meet the health priority. Phase-2: a search for various 'medical education models' in both undergraduate and post-graduate education that have been developed and tested, worldwide as an effort to address the identified challenges. The collective terminology 'medical education models' was used to encompass the various components of medical education, including curriculum development and refining, teaching method, assessment and feedback in both undergraduate and post-graduate

education. Instead of a conventional method, we adopted a pragmatic approach to meet the objective of our paper.

To increase the sensitivity of our search, we used broad key words related to each theme (for example 'health equity', 'health system', 'disease burden', 'disease epidemiology', 'epidemiological transition', 'challenge', 'medical education'). In relation to each challenge identified, we used broad (for example 'curriculum', 'teaching methods', 'assessment', 'feedback', 'model') and targeted words (example 'medical technology', 'global health') for the components of medical education. We conducted our searches on MEDLINE, Scopus, and Google Scholar. Google scholar was mainly used as a back-up to identify any additional published literature that might have been missed. . We included studies from all countries globally, but restricted our search to literature in English published since 2000 (up to 31<sup>st</sup> December 2016). Language restriction helped to manage the volume of our work. Only those studies that described and tested a specific component of medical education aimed at improving health providers' knowledge and skills to deliver equitable healthcare, and effectively address the challenges related to health systems and changing patterns of diseases or epidemiological transitions were included. We excluded studies that did not specifically focus on medical education.

We conducted a qualitative synthesis of the identified literature initially in two separate groups conforming to the two phases described above. Identified challenges within each of the three health priority themes were then mapped with targeted efforts in undergraduate and postgraduate medical education to analyse whether these were effective in addressing the challenges.

## **Findings**

In this section, we present the results of the qualitative synthesis of the challenges within each of the three health priority themes and efforts made in the field of medical education to address them. Each sub-section begins with a description of the theme

and its relevance to local and national health priorities. We adapted the conventional template for reporting literature review to better suit the requirements of this paper.

### ***Health equity***

Health is determined by multiple external factors ranging from the social and economic environment people live and work in to the availability, accessibility and quality of health services.<sup>8</sup> These wider determinants of health give rise to systematic inequalities in health across regions and populations, both within and between countries.<sup>9</sup> Although addressing the array of factors driving health inequities is necessarily complex, medical education can play an important role in bridging the gap.

Challenge-1: We identified a mismatch between need for generalist models of healthcare and current medical education curricula's specialist training approach. Many countries have seen a move away from specialist care towards more integrated and generalist models of care in an attempt to address health inequity and demographic changes.<sup>10,11</sup> However, this healthcare remodelling has not been accompanied by corresponding changes in medical education curricula to build a cadre of appropriately trained healthcare providers.<sup>10</sup> The equitable distribution of healthcare services across communities and geographical areas and the provision of unbiased, high quality services by health professionals is key to ensuring that health needs are adequately addressed.

Efforts to address the challenge: We found studies which showed that shifting the centres of medical learning away from more highly specialised, urban centres to rural areas can have a positive impact on learning outcomes and has been shown to encourage students to pursue careers in primary care<sup>12,13</sup> and practice in rural areas.<sup>14</sup> The integrated clinical clerkship model, for example, uses extended community placements with an emphasis on continuity of care and patient-centred learning.<sup>15</sup> Under this approach, clerkships last from several months to a year, in contrast to the

short and often disjointed clerkships typical of more traditional medical curricula.<sup>15</sup> Students work with a designated group of faculty members, learning initially how to manage simple medical problems and gradually becoming exposed to increasingly complex conditions.<sup>15</sup> When this model was evaluated across 17 medical schools in the USA, Australia, Canada and South Africa, no significant difference in exam scores was found but participants of the programme were more likely to choose a career in primary care and general medicine.<sup>15</sup>

British medical schools include community-based education as a component of medical education with a variety of teaching methods employed to promote better understanding of health concerns at the community level.<sup>16</sup> Early exposure of students to general practice and other community settings provides students with increased insight into patient-centred medicine, improves continuity of care and enhances communication skills.<sup>16</sup> This approach has been shown to increase students' interest in general practice as a career choice – an important outcome given the UK's changing demographics and an accompanying shift in emphasis from management to prevention.<sup>16</sup> Further studies from Thailand,<sup>17</sup> Jordan,<sup>18</sup> Australia,<sup>12,13</sup> Canada,<sup>13</sup> and the USA<sup>13</sup> have shown that community-oriented training in undergraduate medical education through specific programmes or standalone rural schools provides students with better understanding of community needs, hands-on experience and exposure to health issues that are locally relevant, and can generate a sense among students of being valued by the community.

Challenge-2: Attitudes of healthcare providers can contribute to disparities in healthcare. Adherent or inadvertent biases of healthcare professionals towards patients on the basis of age, gender or ethnicity, for example, can affect patients' perceptions of care and willingness to seek medical attention when required.<sup>19</sup>



Efforts to address the challenge: Teal *et al.* used a review of educational strategies for addressing unconscious bias to develop a training model for undergraduate and postgraduate medical education.<sup>20</sup> The authors recommend a model whereby students are exposed to multiple and diverse educational experiences which enable them to identify unconscious biases and accept these which in turn allows them to manage them during encounters with patients (See Box 1).<sup>20</sup>

**Box 1.** Strategies to increase awareness of unconscious bias (Teal *et al.*<sup>20</sup>)

- Make students aware of unconscious bias and its relevance to clinical practice through active facilitation and feedback from educators
- Provide students with more opportunities to interact with diverse patient groups and expose them to positive, counter-stereotypical experiences with groups about which one may be biased
- Teach and encourage students to interact with patients as individuals and to refrain from any judgement based on their socio-demographic characteristics
- Use senior faculty members as role models for students and help them reflect upon their behaviour
- Evaluate, refine and improve the teaching model on an on-going basis

At the post-graduate level, the Community-Based Participatory Research (CBPR) model has been effective in bridging the gap between physician competence and health equity. This involves community members and other stakeholders as well as researchers collaborating to select an issue of importance locally. The aim is to combine the knowledge and expertise of multiple parties to create action for social change, improve community health and eliminate health disparities.<sup>21</sup> An evaluation of the CBPR programme curricula of the Robert Wood Johnson Clinical Scholars Program, a post-doctoral research training fellowship for physicians was implemented in four institutions in the USA (University of California at Los Angeles; University of Pennsylvania; University of Michigan; and Yale University).<sup>22</sup> The study showed that CBPR could be an effective method for developing physicians' awareness about community needs, thus helping them to tailor their clinical practice to meet these needs while also involving community partners in locally relevant health research.<sup>22</sup> It was

observed that teaching CBPR principles developed health professionals' skills in relationship-building, communication, collaboration and negotiation and that these skills could in turn be applied to improve health services, in general, and reduce disparities in healthcare provision.<sup>22</sup> However, the authors noted that in order to effectively integrate a CBPR model into traditional research training curricula, it is important to establish and maintain community relationships, balance the potentially conflicting relationship between academic mentors, fellows and community partners and their desired goals ,, and develop mechanisms for a sustainable partnership beyond the training period of the fellow.<sup>22</sup>

### ***Health systems strengthening***

Across the world health systems are becoming increasingly complex as they strive to achieve excellence in coverage, quality, provider competence, patient satisfaction, advancing technologies and affordable care – all against the backdrop of limited resources. These factors are inextricably linked with health equity and quality of care. Health professionals increasingly find themselves needing to engage in the non-clinical arenas of managing health systems challenges such as co-ordination of care across large and complex health structures, change management and leadership, and inter-professional and multidisciplinary working and communication.<sup>2,23</sup>

Challenge-3: The lack of a universal approach in preparing medical students for 21<sup>st</sup> century health systems. There are inconsistencies in the extent to which the expansion of skills sets – including experience of and training in inter-professional communication, teamwork, systems-based care, quality improvement, population health, informatics and meta-cognitive skills are being addressed.<sup>2</sup> This is despite evidence of an increase in student demand for training in health systems science <sup>24</sup> and medical students being open to leadership and management training<sup>25</sup>

Efforts to address the challenge: We identified the following studies to illustrate efforts that are being made in different countries to reform medical education curricula to address this challenge. A review of health systems-related curricula across eleven medical schools in the USA found that curricular content within these schools could be categorised into three domain groups which could be used as a broader framework to be built upon in other settings.<sup>23</sup> The three groups of curricular domains identified were:<sup>23</sup>

- i. The core domains: These included health care structures and processes; health care policy, economics, and management; clinical informatics and health information technology; population and public health; value-based care; and health system improvement.
- ii. The cross-cutting domains: These included leadership and change agency; teamwork and inter-professional education; evidence based medicine and practice; professionalism and ethics; and scholarship.
- iii. The linking domain: This consisted of systems thinking, including for example an awareness of the complexity of interdependencies and the ability to recognize multi-directional cause and effect relationships.

In Colombia, the Rosario University School of Medicine and Health Sciences in Bogotá implemented curricular reform in order to better prepare medical students for the most pressing healthcare and social needs of the Colombian population and the country's current health system challenges.<sup>26</sup> This involved development of a variation on the problem-based learning approach named 'Integrative Learning Activities System-based'. Its aim was to improve the competency of medical graduates to work in challenging health systems scenarios. Integrated learning activities included opportunities for students to build skills in leadership, teamwork, communication and professionalism as well as to think creatively and solve problems collaboratively.<sup>26</sup>

Challenge-4: Inability of medical education to keep up with the abundance of new healthcare technologies which are transforming abilities to predict, diagnose and treat disease. As health systems globally adopt these advanced technologies, health technology assessment is becoming an increasingly important skill.<sup>27</sup> Rapid technological changes can leave health professionals unprepared or uncomfortable, and at worst lead to inappropriate practice causing medical errors and harm. Health professionals also need the skills to evaluate the economic, organisational and societal impact of a particular technology before incorporating it in their clinical practice.<sup>28</sup>

Efforts to address the challenge: Although we found literature that defined the components of a health technology curriculum (cost-effectiveness, safety, legal and ethical issues relating to its use, local relevance and affordability),<sup>29</sup> <sup>27</sup> we were unable to find studies that evaluated the effectiveness of incorporating health technology into the curriculum.

### ***Changing patterns of disease***

The prevalence of non-communicable diseases is increasing globally, and individuals are increasingly living with long-term and co-existing conditions.<sup>30</sup> In Scotland a study found that almost a quarter of adult patients suffered from multiple morbidities, with prevalence increasing with age.<sup>30</sup> Long-term conditions are consuming ever greater proportions of health service budgets.<sup>31</sup>

Challenge-5: Mismatch between requirement for integrated care and training specialists for poorly-integrated and specialised healthcare systems. In order to manage multiple morbidity, health professionals can no longer afford to work in siloed specialties,<sup>2</sup> rather, continuity of care across multiple medical disciplines and co-ordination across community and hospital settings is required. Integrated care – a “multi-level, multi-modal, demand driven and patient-centred strategy” – has been proposed as a model for effectively managing multiple morbidities.<sup>32</sup> The concept of

integrated care is complex with integration required across different domains: between various levels of healthcare (vertical and horizontal), between patients and providers, and between patient experiences and clinical outcomes.<sup>32</sup>

Efforts to address the challenge: We found a number of studies emphasising the need to train general and primary care physicians instead of specialists,<sup>12-14</sup> an important one being the recommendation from the US Accreditation Council for Graduate Medical Education (ACGME) in 1994 to train undergraduate medical students in six general areas of competency: patient care; medical knowledge; practice-based learning and improvement; professionalism; interpersonal skills and communication; and systems-based practice.<sup>35</sup> However, challenges were anticipated in implementing the curriculum with regard to the availability of resources, ability to achieve the expected outcomes and tools to measure them. More recently, the Commission on Education of Health Professionals for the 21st Century in their report called for 'interprofessional' and 'transprofessional' education to break the professional silos and to enhance collaborative and effective teamwork.<sup>3</sup>

Challenge-6: To develop a globally interdependent education system which will equip health professionals to harness global resources in order to meet new local challenges efficiently and effectively.<sup>3</sup> Global interdependence, the free movement of people and the blurring of national borders have led to shared disease burdens between countries. An epidemic does not remain confined to national boundaries but rapidly becomes a global problem, as evidenced by the Ebola and Zika virus outbreaks in recent years. Similarly, food and lifestyle changes brought about by social and economic interdependence have led to increasing obesity and associated chronic diseases across all parts of the world.

Efforts to address the challenge: The following synthesis of published and unpublished literature shows the efforts made in the field of global health education. A review of

initiatives and reforms undertaken in the USA to encourage global health education found that there is a growing demand for global health education among students which has not been met effectively by medical schools.<sup>36</sup> The authors recommended various reforms in medical education curriculum including incorporating subjects such as tropical medicine, cross-cultural training, public health, medical anthropology, global health economics, and promoting international medical rotation for all students.<sup>36</sup> Partnerships between medical schools from developing and developed countries to promote such placements can encourage mutual learning, develop competency in recognizing and managing diverse conditions and enhance cultural sensitivity.<sup>37</sup>

In the UK, a series of high-level reports by the Government and Department of Health have highlighted the importance of the global health exchanges by medical students and healthcare professionals, and the benefits to be obtained by both the UK and destination communities.<sup>38,39</sup> Experience of global health working among medical students could promote their ability to deliver effective care to increasingly multi-cultural societies with diverse health needs.<sup>40</sup> A consultation hosted by the Association of Royal Medical Colleges culminated in the development of a series of global health competencies for UK health professionals which could be incorporated into medical schools' curricula.<sup>40</sup> The five inter-related competencies identified covered the areas of health systems and health professionals; diversity, human right and ethics; environmental, social and economic determinants of health; global epidemiology of disease; and global health governance.<sup>40</sup>

Similarly, the concept of 'Global Minimum Essential Requirements' (GMER) was developed by the Institute for International Medical Education Core Committee, which set out to define the global essential competencies required by health professionals.<sup>41</sup> The committee developed a set of 60 learning objectives grouped under seven educational domains (summarised in Box 3) to meet global learning outcomes.

**Box 3: Educational domains of Global Minimum Essential Requirements (IIMC Core Committee)<sup>41</sup>**

- 1. Professional values, attitudes, behaviour and ethics:** Health professionals should develop these values as part of their professionalism and have the autonomy to set and enforce these values.
- 2. Scientific foundation of medicine:** Health professionals should have a strong scientific foundation of medicine in order to apply their knowledge to solve a range of medical problems and adapt to changes in relation to the changing health needs.
- 3. Communication skills:** Health professionals should develop skills to communicate effectively with patients and other health professionals in order to improve patient satisfaction and appropriate medical decision making.
- 4. Clinical skills:** Health professionals should have appropriate skills to manage and treat patients effectively and efficiently.
- 5. Population health and health systems:** Health professionals should be equipped with basic skills to protect and promote health at a population level. They should understand the basics of health systems including policies, management and financing to be able to take leadership positions in health institutions when required.
- 6. Management of information:** Health professionals should be able to use information management technologies to solve medical problems, collect and analyse information to enhance education and knowledge.
- 7. Critical thinking and research:** Health professionals should have the expertise to critically assess existing knowledge, develop new hypotheses and conduct research to test them in order to continually acquire as well as contribute to new scientific evidence.

## **Discussion**

We identified six important challenges in relation to the role of medical education in meeting national health priorities (two for each of the three themes) and found examples of efforts being made in curricular and teaching methods to address these challenges. These are summarised in Table-1.

We identified three different efforts made to reform undergraduate medical education curricula to incorporate the focused health priorities: (i) an integrated framework to train students to recognise and manage unconscious bias in clinical practice to abolish age, race and ethnic disparities in healthcare provision; (ii) an additional component that is

able to provide students with a global health experiences built on a strong foundation of core clinical competencies, team-working and inter-personal skills, and ethical values in order to produce professionals capable of managing emerging health challenges locally and globally; and (iii) comprehensive training in health systems science with an embedded health technology assessment module to help health professionals thrive in the challenging and rapidly evolving health systems of today and to prepare them to lead successful healthcare institutions. However, more evidence is required on the effectiveness of specific health technology curriculum.

With regard to teaching methods, most relevant to health priorities was found to be community-based post-graduate training including longitudinal integrated clerkships and community-based participatory research programmes. These have been shown to be effective in facilitating alignment with community needs and thereby encouraging new graduates to choose careers in general medicine or primary care. This can also help to resolve inequitable distribution of care provision in a society.

Although exemplar models exist there are challenges to implementing them. The concept of 'needs-based curricula' has been recognised for a long time,<sup>7</sup> but developing a needs-based curriculum is often not easy, requiring substantial human and financial commitments to undertake a dynamic process of curricula revision, implementation, and impact evaluation as health priorities change.<sup>6</sup> A lack of willingness to change a traditional curriculum and the limited time devoted by clinicians to teaching are other known challenges.<sup>6</sup> Further, although medical education models exist, the effectiveness of these models depends on them being locally adaptable and applicable. Rigorous evaluation is paramount in new settings in which curricula have been reformed. In this way, an empirical evidence base can be created upon which other institutions can build similar reforms.<sup>42</sup>

## ***Limitations***



We acknowledge that the three chosen health priority themes may not be generalisable to all countries as health needs vary both within and across countries. However, it was not possible to conduct a comprehensive literature review to cover individual health priorities. Our objective was to present a conceptual synopsis of current efforts in medical education to incorporate national health priorities to reflect on the recommendation in the Edinburgh Declaration. Considering the complexity of this topic we were unable to conduct a structured and comprehensive literature review. Instead, we used a pragmatic approach to broadly sample and critically review published literature. A limitation of this approach was that it did not allow us to examine all interventions in the field of medical education curricula and teaching methods to analyse their effectiveness in incorporating national health needs. However, our study showed that efforts are being made using different models in different countries, but further research is required to examine the effectiveness of these models and their usefulness in varying settings.

It recommended that all countries should establish a joint educational and health planning mechanism in order to rapidly and effectively bridge the gaps between health professionals' education and national health needs on an on-going basis.<sup>3</sup> Medical education curriculum should be rigid enough to maintain excellence in scientific training and teaching quality, but flexible enough to incorporate new training methods and modules to keep pace with the changing health needs locally, nationally and globally.

Despite a number of challenges, over the last century medical education has undergone major reforms, shifting from informative learning that produced expertise, to formative learning that produced professionals, and finally to transformative learning to produce leaders and agents of change.<sup>3</sup> However, transformative learning will have to be aligned with the national health priorities of individual countries in order to effectively bridge the gap between professional competency and population health needs. Curricula reforms must go hand-in-hand with political will, research and evaluation to

develop comprehensive, efficient and futuristic models of teaching and learning that will adequately prepare health professionals to address the challenges of health inequity, health systems complexities, and changing disease burdens.

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**Author contributions:** MN developed the concept, conducted the searches and a critical review of the literature, and wrote the first draft of the manuscript. GF contributed to developing the concept, conducted the searches and a critical review of the literature, and wrote sections of the manuscript. Both authors edited the manuscript and approved the final version of the submitted manuscript.

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